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Known as the "Doctor of Dimensioning," Alex Krulikowski is a noted educator, author, and expert on Geometric Dimensioning and Tolerancing (GD&T). A design manager with one of the world's largest manufacturing corporations, he has more than 30 years of industrial experience putting GD&T to practical use on the shop floor.

## Web Highlights



### Controlling Tolerances

Gillian Babicz writes about the need for a good tolerancing scheme and why companies should strive to control tolerances in the manufacturing stage in the April 2001, *Quality Online* E-zine

To read more about it, [Click here](#)



### GD&T Professional Certification Available

ASME has established a certification program for GD&T Professionals. The GDTP Certification

ETIMail is a regular online publication devoted to Geometric Dimensioning & Tolerancing. Each edition features a host of GD&T resources and links, as well as dimensioning tips by noted GD&T author and ETI founder, Alex Krulikowski. We also invite you to visit our website, [etinews.com](http://etinews.com). To view past issues of ETIMail, see the [archives](#).

ETIMail is now available in [PDF format](#). To read the PDF file, you will need [Adobe Acrobat Reader](#).

## Nine Myths of Geometric Dimensioning and Tolerancing

Alex Krulikowski

Geometric Dimensioning and Tolerancing (GD&T) is confusing and ambiguous. ASME Y14.5 makes drawings harder to create and use. These statements are examples of myths that have made some companies apply GD&T incorrectly, and kept others from using it altogether. GD&T is, in fact, the means by which designers can create quality drawings and, by extension, quality products. But to benefit from GD&T, companies must understand and eliminate common myths about it.

### Myth One: We don't need GD&T.

This myth is perpetuated by a preference for coordinate dimension, which most designers have used since high school and cling to because they understand it better than GD&T. But the 150-year-old coordinate dimensioning system lacks clear rules, and quality-oriented design philosophy. GD&T is used by about one-half of the world's manufacturers. It allows communication among all levels and functions within a company, as well as with their customers and suppliers. Its philosophy is pro-profits and pro-growth.

### Myth Two: GD&T raises product costs.

This myth stems from the idea that GD&T prescribes tight tolerances. The tight-tolerance myth is essentially a misunderstanding of GD&T's use of basic dimensions, which have no tolerances, and lack of knowledge of feature-control frames, which do provide tolerance. In fact, the GD&T philosophy calls for the maximum possible tolerance within the bounds of part function. GD&T's round tolerance zones allow 57% more tolerance than coordinate dimensioning's square zones. And GD&T provides additional tolerance through use of the maximum-material condition modifier. Drawing errors also drop with GD&T, which further reduces product cost.

### Myth Three: GD&T and Y14.5 are confusing.

While there may be a grain of truth to this myth, it is true only for those with inadequate training. Just because GD&T takes time and effort to master does not mean it is flawed, inadequate, and not worth learning.

### Myth Four: GD&T drawings take too long to make.

Proponents of this myth want speed at all costs. Ironically, while they do not have time to make drawings correctly the first time, they do have time (and money) to make revisions later. The clarity and precision of GD&T may require more time initially, but they save time later.

### Myth Five: It's easier to use coordinate dimensioning.

This myth, again, stems from fondness for coordinate dimensioning and from assuming that it is better because it has been around longer. The problem with using coordinate dimensioning is that it is not able to meet the level of precision demanded by technologies such as CAD/CAM and electronic gaging. GD&T meets today's demands, performing even better when designers use it to thoroughly think through part function.

Program provides the means to recognize proficiency in the understanding and application of GD&T principles. [Click here](#)



#### ASME Standards Info

Keep up to date with issues pertaining to the ASME standards, with Mechanical Engineering Online.

[Click here](#)

#### ETI Products



#### GD&T Trainer Makes Learning Fun

ETI's GD&T Trainer is the perfect solution to your training needs. It's an entire interactive GD&T fundamentals course on one handy CD-ROM. It's convenient, portable, and fun.

To read more about it, [Click here](#)

To download a demo, [Click here](#)

#### ETI Services



#### ETI Offers On-Site Training

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#### Tech Calendar

#### Myth Six: GD&T should be used only on critical part features.

This myth asserts that some part features are non critical. The problem becomes, then, who decides which features are critical and which are not. Limited use of GD&T may bring some benefit, but when GD&T's philosophy and rules are applied to all part features, and to the entire process of creating drawings, the benefit of GD&T increases exponentially.

#### Myth Seven: Dimensioning and geometric tolerancing are separate steps.

The myth of doing the drawing now and adding the symbols later has developed from the need for speed, as well as from lack of knowledge about geometric tolerancing. A drawing with missing dimensions and insufficiently defined tolerances may produce artificially low cost estimates of cause manufacturing to produce nonfunctional parts. GD&T allows a product to be tested on paper rather than in prototype form. Companies that train their designers to test on paper, and give them the time to do it, often eliminate the need for several prototyping iterations.

#### Myth Eight: I know GD&T.

This myth is caused by overconfidence in inadequate training programs. Poor training also produces people who know their GD&T skills are inadequate and, therefore, do not criticize the skills of others, often ignoring training and competency altogether.

#### Myth Nine: You can learn GD&T in two days.

Most people get only 16 hours of training, so they assume that is enough. Two days may be enough time to teach a person to read GD&T drawings, but it is not enough to teach someone how to make drawings, and certainly not enough to become fluent in GD&T. Fluency requires a minimum of 120 hours of interactive classroom sessions, testing, and on-the-job training.

To eliminate the myths of GD&T, a company must develop a thorough understanding of GD&T's scope, and make the time available for drawing-maker and user education. Management must also change priorities to not reward speed over quality, and tight tolerances over the largest possible functional tolerances. When GD&T is thoroughly learned, fully understood, and correctly used, myths and their consequences will be eliminated.



In the next ETIMail: ***Minding Mechanical Specs Pays Off in Production***

#### Standards in the News

ETIMail's *Standards in the News* takes a look at real-life issues where standards have failed or need improvement. This month: the poorly-written virus.



**InfoWorld** LEAD WITH KNOWLEDGE

Excerpts from the [InfoWorld Website](#)

#### POOR DESIGN HAMPERS THE WORM

Computer users are often plagued by viruses designed to irritate victims, or even destroy important files. The worm is a virus that takes the form of a file attached to an email. The email itself is designed to mislead the recipient into opening the attachment to the mail, often claiming to contain family pictures or jokes. One such virus, the Anthrax Worm, hit the computer-ways in October of last year, attached to an email that supposedly carried information about the disease anthrax.

"The worm has been found in both English- and Spanish-language versions and arrives in inboxes with a subject line that reads 'Anthrax' or 'Antrax,' according to both Moscow-based Kaspersky Labs and Cupertino, Calif.'s Symantec.



Stay up to date on the latest industry news with the ETI Tech Calendar.

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[www.etinews.com](http://www.etinews.com)

"Included is an attachment called Antraxinfo.vbs or Antraxjpg.vbs that the message says is a picture of 'the results' of Anthrax, but is actually a .VBS (Visual Basic script) file used to execute the worm," the companies said. "When the file is double-clicked, the worm attempts to overwrite all system files ending in .VBS and .VBE, as well as send itself to all addresses listed in the system's Outlook address book. "It may also attempt to overwrite a Script.INI file used by chat clients," Symantec added.

"The body text of the worm reads: 'If you don't know what antrax [sic] is or what the results of it are, please see the attached picture so that you can see the results that it has. Note: the picture might be too strong.' " [Full story](#)

### THE REST OF THE STORY. . .

Although viruses can be harmful, this particular virus didn't meet "virus standards" so the worm isn't doing its devious job. According to the anti-virus companies, the worm "has appeared on the Internet but. . . because of a flaw in the way the worm is written, the worm fails to spread as designed."

Excerpted from the article, "Anthrax Worm Fails to Spread on the Net," by Sam Costello in the October 17, 2001 InfoWorld. Sam Costello is a

Boston-based correspondent for the IDG News Service, an InfoWorld affiliate.

[More Info](#)



## The ETI Mailbag

*Does the "M" in the ASME standard Y14.5M 1994 also cover inch unit or should the "M" be removed on inch drawings?*

**The "M" means the standard is metric compatible. The standard is written using metric units but applies to drawings made to both metric and US customary units (inches). In paragraph 1.1.3 it states that "References to this standard shall state ASME Y14.5M-1994."**

**Since the standard covers both metric and inch units, the standard should be referenced on both types of drawings.**

**By the way, paragraph 1.1.2 states, "Customary units (inch) could equally well have been used with prejudice to the principles established. Paragraph 1.6.2 shows how inch dimensions should be stated on drawings.**

*Regarding the GD&T Certification Process: Can I apply for the tests by myself or do I have to do that via a company like ETI for example? How should I proceed in order to be a certified GD&T professional? Are there several levels of certification or just one?*

**You can apply for the ASME GDTP Certification Test yourself. There is a section on GD&T certification on our [website](#). The URL is:**

[http://etinews.com/gdt\\_cert.html](http://etinews.com/gdt_cert.html)

**This page describes the ASME GDTP Certification, including the different levels of certification that are available. Also, one of the past "Tips of the Month" goes into detail on how to study for the ASME GDTP Certification exam. The URL is:**

[http://etinews.com/tip\\_mnth\\_asmecertexam.htm](http://etinews.com/tip_mnth_asmecertexam.htm)



Send your GD&T questions to [etimailbag@etinews.com](mailto:etimailbag@etinews.com).

## Alex's Tech Tip

From teaching ideas to new products that will assist you on the job, the *ETImail Tech Tip* will keep you informed about new technology and ideas. This month's *Tech Tip* is about the [ETI Discussion Board](#).

### Effective Training Inc Message Board

ETI Discussion Forum

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### ETI'S DISCUSSION BOARD HAS THE ANSWERS YOU SEEK

ETI's website has an interactive forum that's easy to access and may give you a broader knowledge of GD&T-related topics. Drop by the Interact section of our website and take a look at the [Discussion Board](#). Click on any subject title and you can browse through GD&T topics, where you may find ideas to spark your own questions.

To ask questions of others or answer those already posted, simply fill out the [registration form](#), log in, and join the discussion. Alex has answered many of the questions, but we'd like students and teachers to add their opinions to help give a variety of answers and continue the flow of ideas.

Our [Prior GD&T Questions](#) section includes:

- Datum feature as a diameter
- "Total" in a feature control frame
- Rigid / non-rigid parts
- Cosmetic parts
- Angular tolerance zone specifications
- Datums and cylindricity
- Positioning with respect to FOS datums
- Tolerancing a semi-cylinder
- Discussion of feature of size (FOS)

[Tolerance Analysis](#) and [ASME Y14.5](#) have their own sections for discussion.

Our [Employment Opportunities](#) section allows employers to post openings with specific job requirements, and lets employment-seekers browse job openings or post their resumes.

We also have a section for frequently asked [Questions About our Products](#), including software installation help, fixes, and planned updates.

Whatever your interests may be, the Discussion Board can provide a place for you to find answers to questions, an exchange of ideas, and a continued discussion of the ever-changing world of GD&T.



If you know about a new tech tool or an innovative idea that would aid our readers, please write us at <mailto:etimailbag@etinews.com>.



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We would appreciate it if you'd keep us in mind when you need GD&T training, consulting, or GD&T products. Feel free to contact us by [email](#) or by phone at 734-728-0909 or 800-886-0909.

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