ASME membership Exclusives

CHECKLIST:

Is Your GD&T Data Ready for the Digital Transformation?

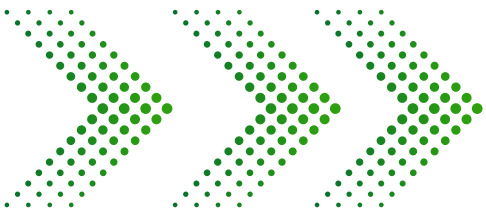


ARE YOU READY?

FIVE QUESTIONS TO ENSURE EVERYTHING IS IN ORDER.

As manufacturers and mechanical engineers pursue the digital upgrades that will take their organizations into the future, **geometric dimensioning and tolerancing data plays a crucial role.** "For companies to fully leverage the benefits of digital transformation, they must be able to consume and integrate the standards and specification into their modern engineering workflow," note researchers in the *Journal of Research and Innovation*.[1]

How can you ensure GD&T data is primed to transition seamlessly into this new way of working? **Start by considering these questions.**



1 Andrew Bank, Rupert Hopkins, Bob Solomon; The Next Generation of Industry Standards: A Proposed Solution for Digital Transformation. Standardization - Journal of Research and Innovation 1 December 2022; 1 (5): 13-22. doi: https://doi.org/10.5555/2831-7920-1.5.13

5 QUESTION CHECKLIST

1. Are you using consistent standards across the organization? ☐
2. Is your GD&T data incorporated into digital models ☐
3. Is GD&T data positioned consistently within digital models? ☐
4. Have you given thought to how to maximize the benefit of your GD&T data? ☐
5. Have you developed a system to address problems in your GD&T data? ☐

WHY IT MATTERS...

1

Are you using consistent standards across the organization?

Consistency enables greater collaboration, because it means everyone is using a shared language with a clear, understood meaning behind each and every symbol. If engineering teams are still using a mash-up of formal standards and ad hoc annotations, now is the time to get everyone on the same (digital) page.

You may not realize that there are two GD&T standards currently in use: The ASME Y 14.5-2018 standard, published by the American Society of Mechanical Engineers, measures and verifies the schematics of a product, and is used by roughly 86% of U.S. manufacturing companies, according to a survey by GD&T Basics. The ISO Geometrical Product Specifications (GPS) standard, published by the International Organization for Standardization, is designed to both specify and verify a part's geometry, as well as to calibrate geometry-verifying instruments. The GD&T related ISO standards are formed by a series while the Y14.5 is one compendium standard.

Many engineers rely on a combination of 2D and 3D renderings, but this hybrid approach means any manual change is an opportunity for error, misunderstandings, and delays. By incorporating GD&T data into your model-based definition, or digital twin, that information becomes part of one consistent, easy-to-access artifact. Even as the design winds its way through various departments and to the production floor, the data is included in the model and any adjustments are included in the model.

As Marc Soucy, president of the Polyworks software platform company, recently explained in an interview with Metrology News, "Most manufacturing organizations manage their 3D measurement data files and folders manually...It is unbelievable to see such a goldmine of dimensional information - complete scans of manufactured pieces - being reduced to a flat static report." In other words, if your organization is only adopting digitization halfway, with one foot in the new ways of manufacture and one foot still in the old, you're not only hindering your own efficiency but hampering any further digitization efforts.

2

Are you using consistent standards across the organization?

WHY IT MATTERS...

3

Is GD&T data positioned consistently within digital models?

Digital twins and virtual 3D models may not yet dominate engineering, but now is the time to develop robust routines and clear consistency so engineering teams aren't breaking bad habits later. The majority of engineers who incorporate GD&T data into 3D models do so by adding it directly to the syntax (23% of respondents), according to a recent survey by Engineering.com. Fewer (15%) add it to the semantic model. What matters more than which method you prioritize is that you pick one to prioritize—and stick with it.

4

Have you given thought to how to maximize the benefit of your GD&T data?

There are plenty of ways that this data store can be of profit-boosting, efficiency-increasing use to you—presuming it's robust, consistent, and standardized, as explored above. But none of those can come to fruition if you haven't yet considered how to make the most of the data you capture. For example, have you given thought to incorporating Internet of Things (IoT) sensors in your calibration and inspection instruments? By marrying these sensors with the bevy of GD&T data you already have in hand, your organization can inspect products without an iota of data being manually entered.

5

Have you developed a system to address problems in your GD&T data?

One of the chief benefits of GD&T is the ability to quickly spot errors within designs or products—and the faster these can be identified and corrected, the better, considering the waste and inefficiency that can result from design or manufacturing inaccuracies. To that end, does your organization have a system in place to reiterate ideas and designs once errors like these are spotted during the GD&T verification process? Routinizing this correction process helps avoid slowdowns and any costly reworking down the line.

As the digitization train rolls on, barreling ahead into a new future of manufacture, your GD&T methods, measurements, and metrics for further improvement must keep pace. To ensure that you're able to do just that, you'll need to refine your approach to this instrumental aspect of product and part design and development—and be ready to tweak systems, adopt new standards, and iterate new approaches as the need arises

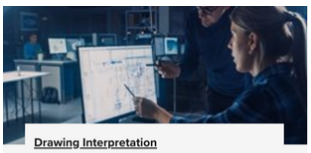
LEARN MORE

Learn the skills needed to interpret engineering designs and avoid mistakes that occur during the manufacturing process with ASME's official GD&T online courses. **View course collection.**



Y14.5-2018 Dimensioning and Tolerancing (GD&T) Overview

Overview of the contents and guidelines outlined in the ASME Y14.5 - 2009 Dimensioning and Tolerancing Standard



Drawing Interpretation

Understand basic mechanical two-dimensional engineering drawings, drawing elements, part and section views, dimensions, tolerances, finish and welding symbols.



ASME GD&T Fundamentals / ASME Y14.5 - 2018 Course (On Demand)

Read and create engineering drawings and interpret design intent per the latest version of ASME Y14.5 - Geometric Dimensioning and Tolerancing (GD&T) in this On Demand course.



Introduction to Geometric Dimensioning & Tolerancing (GD&T) – Y14.5

Introduction to Geometric Dimensioning & Tolerancing (GD&T) Y14.5



Advanced Geometric Dimensioning and Tolerancing (GD&T) Y14.5

Gain advanced knowledge of geometric dimensioning controls for mechanical engineering drawings per the ASME Y14.5 Dimensioning and Tolerancing standard.



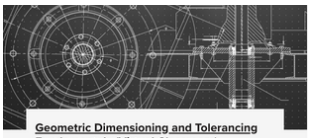
ASME Y14.5 Geometric Dimensioning and Tolerancing (GD&T) Fundamentals Learning Path

This ASME Geometric Dimensioning and Tolerancing (GD&T) Learning Path consisting of 3 On Demand courses where students learn read and create engineering drawings and interpret design intent per ASME Y



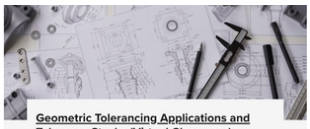
Virtual Classroom: ASME Y14.5 Geometric Dimensioning and Tolerancing (GD&T) Design and Applications Combo Course

Virtual Classroom: Gain a comprehensive understanding of Geometric Dimensioning and Tolerancing (GD&T) and apply it to your designs and stacks per ASME Y14.5.



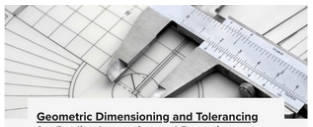
Geometric Dimensioning and Tolerancing Fundamentals (Virtual Classroom)

Read and create engineering drawings and interpret design intent per ASME Y14.5 - Geometric Dimensioning and Tolerancing (GD&T).



Geometric Tolerancing Applications and Tolerance Stacks (Virtual Classroom)

Apply Geometric Dimensioning and Tolerancing (GD&T) to your designs and perform tolerance stacks through authentic case studies.



Geometric Dimensioning and Tolerancing for Quality, Inspection and Reporting (Virtual Classroom)

This course focuses on how to apply Geometric Dimensioning and Tolerancing (GD&T) in inspection and apply content from the ASME Y14.45-2021 Standard for Measurement Data Reporting.



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