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Profile Services

The annual listing of 10 companies in Canada that are at the forefront of providing Industrial Engineering services and impacting the marketplace


James Sykes,
Owner

Profile Services

GD&T: The Cornerstone of Effective Design and Manufacturing

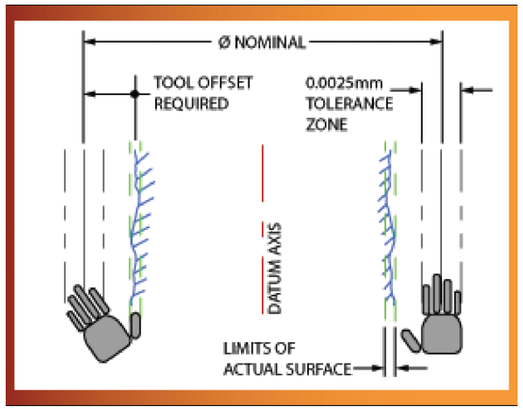
The size, geometric form, orientation, and position of a feature are critical for the successful functioning of a component. Engineers typically create 2D drawings using conventional dimensioning to specify the allowable variation in a physical dimension. While traditional dimensioning and tolerancing might yield accurate individual components, a notable drawback is its inability to ensure effective interaction when assembled. Even if a part's dimensions fall within the specified tolerance range, it may still fail to fit or function properly due to other factors.

Ensuring that critical dimensions and features align with specifications is crucial, without unnecessarily increasing the effort, cost, and time associated with manufacturing and inspecting a part. This realization led to the development of GD&T (Geometric Dimensioning and Tolerancing), a system that defines and communicates design intent and engineering tolerances. This system enables optimal control of variations in manufacturing processes, allowing designers to impart functional limits of imperfection to manufacturers.

However, gaining proficiency in GD&T is challenging, and a deficiency in these skills can hinder cross-functional communication and cause delays in downstream processes. Hence, achieving a uniform proficiency level in GD&T training is essential for product development, manufacturing, and metrology teams. This brings a better understanding of design requirements, improves interaction with customers and suppliers, and enhances designs by leveraging bonus tolerance and other GD&T benefits.

With nearly three decades of mechanical engineering design expertise, Profile Services offers comprehensive training in GD&T fundamentals, applications, and tolerance analysis. The company is pivotal in educating design and manufacturing teams to create clear engineering drawings for accurate interpretation in manufacturing and design processes, avoiding misinterpretations.

"The ASME Y14.5 GD&T methodology provides a robust method to communicate the geometries, dimensions, and tolerances associated with a component, with materials, finish, and other details completing the workpiece specification," says James Sykes, owner of Profile Services. The company, known for its value-added support services in the application and training of design documentation through GD&T, aids the quality, efficiency, and competitiveness of the industry.



Its training programs cover a spectrum of topics, with the GD&T fundamentals course serving as a core and in-depth introductory program. Despite its introductory level, this course requires four to five days for effective teaching due to the extensive information it covers.

Profile Services is developing training material for a new application course, taking a systematic approach to GD&T. This material spans diverse examples, such as sheet metal, cast parts, and machined parts, providing learners with a broad experience in understanding part interfaces and decision-making on datum selection in the GD&T application process.

The GD&T tolerance stack-up course focuses on tolerance analysis through graphical representation, helping understand the fit of parts in manufacturing, design, and quality control. This course identifies sources of variance in assemblies, guiding problem-solving efforts in manufacturing and assembly processes.

Profile Services also offered an Advanced Graphical Communication (AGC) course, a semester-long GD&T-focused program at the University of Manitoba, from 2016 through 2021. Beyond GD&T application, it incorporates drafting, drawing checks, and additional design skills.

The company organized a mechanical design skills workshop (MDSW), covering topics such as material selection, drawing creation, and understanding various manufacturing processes. These sessions aimed to equip participants with a diverse set of general mechanical design skills and knowledge typically acquired later in one's design career.

Recognizing the lack of local support for GD&T, Profile Services wants to establish a GD&T user group in Canada. It aspires to build a knowledge base within the industrial community, fostering collaboration among participants.

Profile Services demonstrated its competence with a specific instance involving a client specializing in medical 3-D printing. They faced challenges understanding drawings due to the use of GD&T and lacked sufficient information for efficient parts manufacturing. After engaging in discussions and receiving training from Profile Services, the client experienced significant quality improvement.

Apart from GD&T, Profile Services specializes in intellectual property, providing services such as writing patents, creating illustrations, and challenging or defending patents. The company guides clients in defeating patents with strategies for invalidating questionable ones and assists in safeguarding intellectual properties against claims.

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As companies rely on effective design and communication to enhance their quality, efficiency, and global competitiveness, Profile Services emerges as an unrivaled partner, seamlessly bridging the gap from design to manufacturing and quality. MO