

Welcome

Welcome to the July/August issue of MechNEWS™, a service provided by MechSigma Consulting, Inc. As you know, *profile* is a very powerful control. Because it has so many options, profile can be confusing. This article shows how profile tolerancing relies on basic dimensions and datums to achieve various levels of control.

We hope you enjoy this issue of MechNEWS™ and continue to [tell your colleagues about it](#).

Achieving Various Levels of Control with Profile Tolerancing

According to paragraph 6.5.1 of ASME Y14.5M-1994, profile tolerancing "is used to control form or combinations of size, form, orientation, and location." This indicates that we can use profile to control many *levels* of control. In general, profile tolerances control

- Size and form.
- Size, form and orientation. Or
- Size, form, orientation, and location.

It is not always intuitive as to the level of control that the drawing dictates. The following examples show how combinations of basic dimensions and datum referencing are manipulated to achieve varying levels of control.

In Figure 1 we dimensioned a revolved surface with basic dimensions and applied a profile feature control frame. Notice that the feature control frame does not have any datums. Since we didn't reference any datums, the tolerance zone is free to float relative to the base. As dimensioned, the size and form of the revolute are controlled by the profile tolerance but orientation and location to the base are *not* controlled.

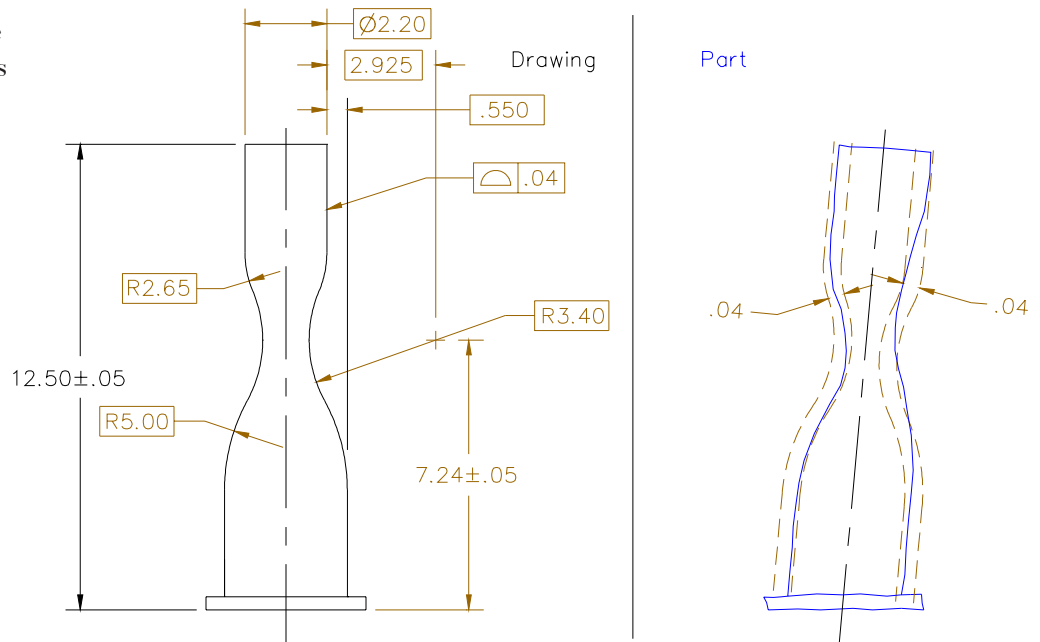
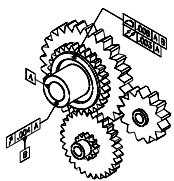


Figure 1

(Continued)

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Having problems with your designs?



MechSigma offers consulting and on-site training in mechanical tolerancing and GD&T.

Contact us at: info@mechsigma.com

Events:

The next GD&T committee meeting is scheduled for the week of October 3 at the Holiday Inn Denver Downtown Hotel Resort. These meetings are open to the public.

Please contact ASME for more information.

In Figure 2 we added a datum to the profile feature control frame. Notice we did not use a basic dimension to locate the profiled surface to datum A. Since we used a "plus/minus" dimension ($7.24 \pm .05$) to locate the profiled surface to datum A, the profile tolerance does *not* control location. It does, however, control the *orientation* to datum A.

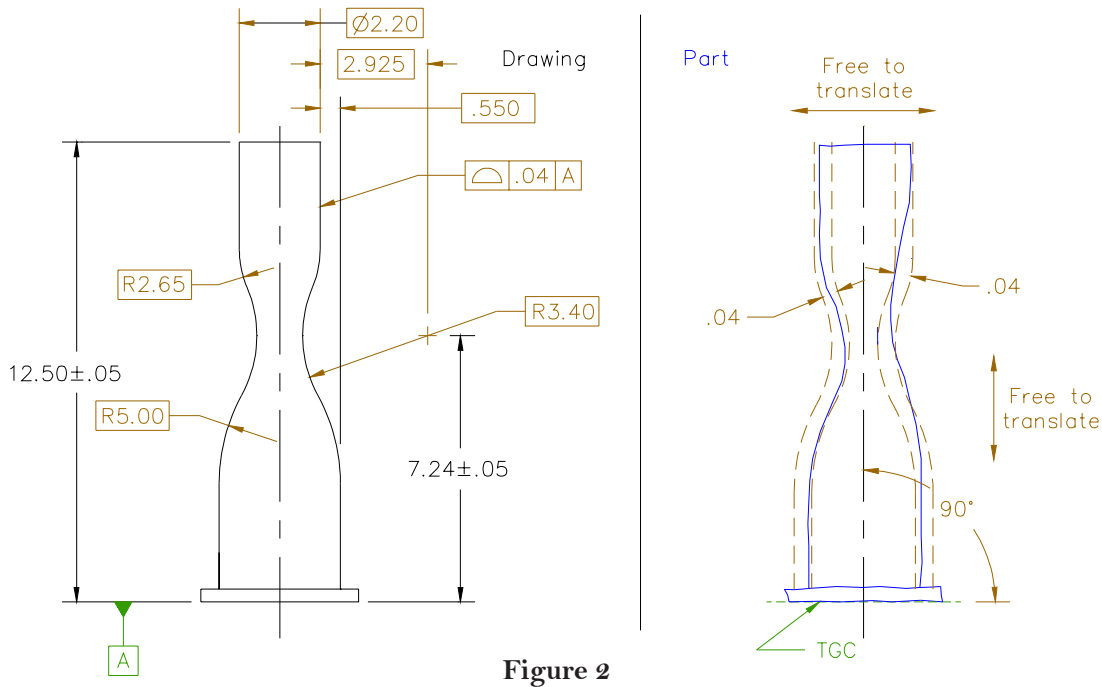


Figure 2

In Figure 3, we changed $7.24 \pm .05$ to a basic dimension. Now, the profile tolerance zone is constrained to datum A. The tolerance zone is located 7.24 from datum A. The zone is still free to translate left and right with respect to the diameter of the base.

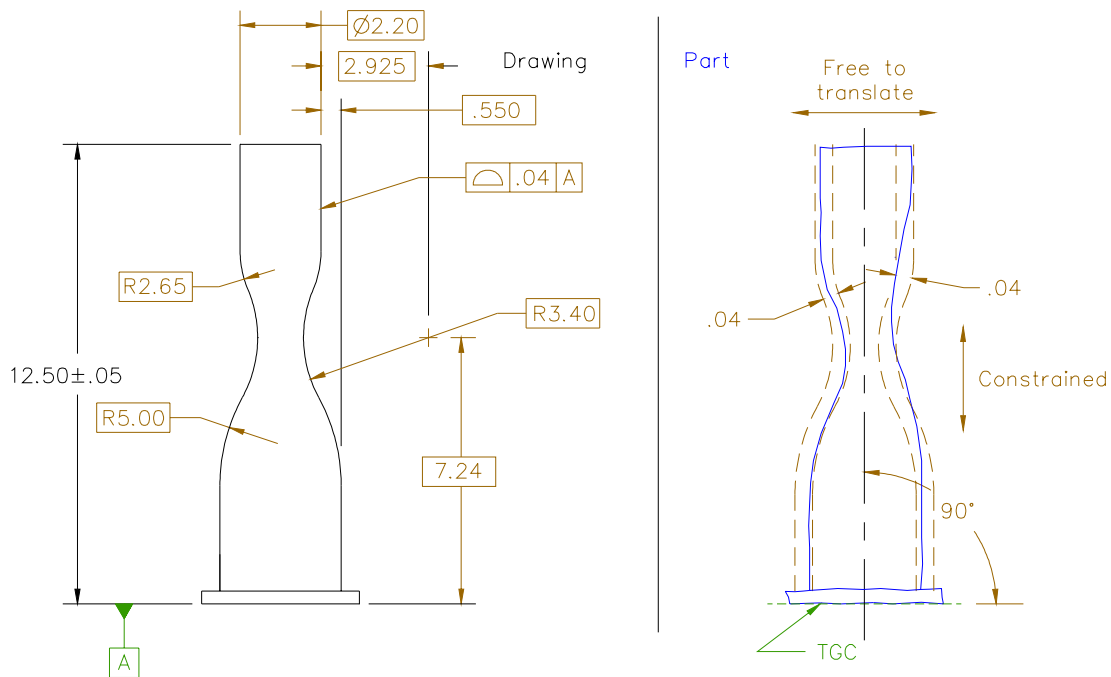


Figure 3

(Continued)

ASME Continuing Education

MechSigma is offering a two-day, **Mechanical Tolerancing for Six Sigma** course through ASME's Continuing Education Institute. Please contact ASME to register.

Oct. 27-28, 2005 Houston

April 6-7, 2006 Las Vegas

In Figure 4 we added secondary datum B. By doing so, we have constrained the profile tolerance zone to be centered on secondary datum B. The profile feature control frame now controls size, form, orientation, and location in two directions.

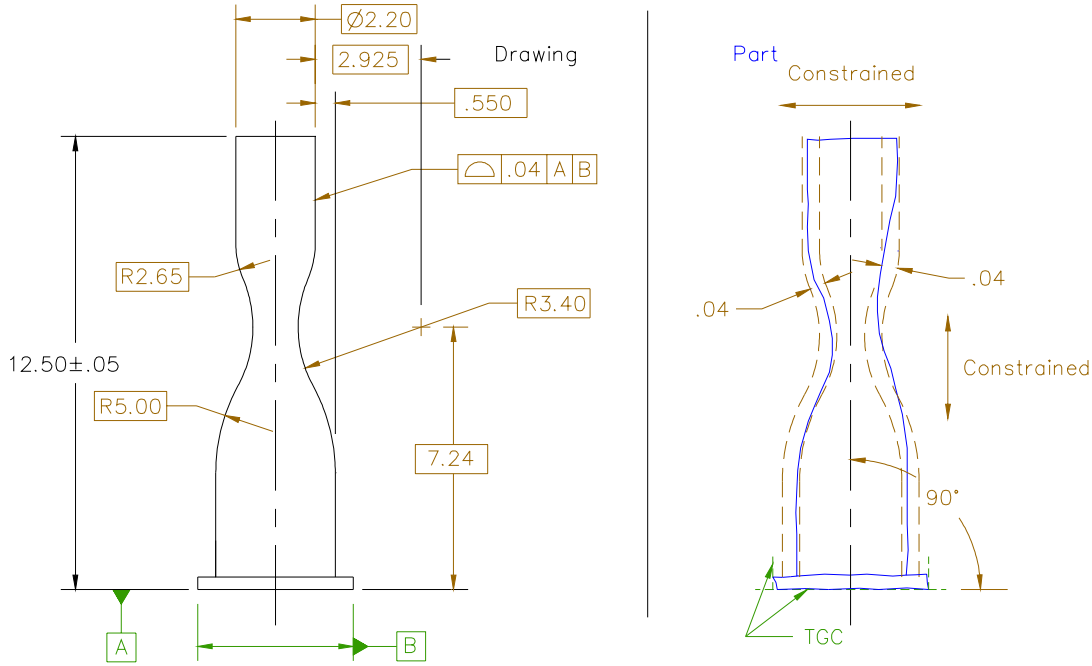


Figure 4

Summary

At first glance, Figures 1 through 4 seem similar. After further study, we see that they are quite different. For us to fully understand the level of control, we need to look at the datum reference frame (or lack thereof) and how the profiled surface is dimensioned to the datum reference frame. If there are no datums, then the profiled surface is not oriented or located to any other features on the part. If datums are present, but the profiled surface is not basically located to these datums, then the profile tolerance zone is only oriented to the datum reference frame. If the profile surface is basically located to the datums, then the tolerance zone is both oriented and located to the datum reference frame. A

Joke of the Bi-Month? This is for real...



The concept of how we react to “seeing but not being seen” was put to the test by 38-year-old architectural artist Monica Bonvicini in December 2003, when her work entitled “Don’t Miss A Sec” was installed at a construction site (the future home of the Chelsea College of Art and Design) across the road from London’s Tate Britain museum. (The same work was also displayed at an art exhibition in Basel, Switzerland, in June 2004.) Bonvicini’s creation is a public toilet enclosed within reflective glass walls that allow the user to see out but prevent those outside from seeing in, an exhibit that challenges whether we can adapt to the idea of being able to view others passing in close proximity to us while we engage in an activity which we don’t want them to view — even when we know full well that they can’t possibly see us.



Would you use it?