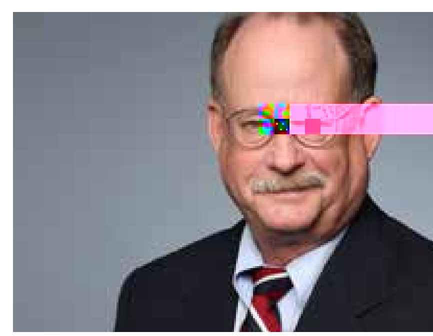
STEELS APPROVED FOR use with the AISC *l l l* (ANSI/AISC 360, www.aisc.org/speci cations) are typically required to be "killed."

When this is not explicitly stated in a given ASTM speci cation, there are likely reasons that the killed steel has been used to manufacture the product. Most materials used in the U.S. are continuously cast, a process that is ef cient but demanding on the producer. The requirements a producer must meet to successfully produce steel provide such bene ts as better through thickness properties and soundness. Ingot cast material is still permitted and can be killed, semi-killed, rimmed or capped. (For de -nitions of these terms, please see the "Steel Terms" sidebar on page 18.) All material listed in Section A3 of the meets these requirements.



Tolerances

The effect of dimensional tolerances that are different from those provided in the approved ASTM speci cations must be carefully considered. Section M2.6 of the AISC requires the dimensional tolerances to be in accordance with Chapter 6 of the AISC *l l* (ANSI/AISC 303, www.aisc.org/speci cations). Section 6.4.2 of the in turn references the "applicable ASTM standards" for straightness tolerances. If there is no applicable ASTM standard (or other source of a straightness tolerance such as the dimensional tolerances of welded steel members provided in AWS D1.1) then the tolerance must be de ned in the contract documents. Tolerances introduced after the contract has been awarded represent a revision to the contract as addressed in Section 9.3 of the .

Tolerances can affect many aspects of a project. The most obvious effect will be on the plumbness, elevation and alignment of the structure. Experience has shown that the erection tolerances in Section 7 of the can be met using typical fabrication and erection practices when the mill tolerances in the appropriate ASTM speci cation and the fabrication tolerances de ned in the various documents referenced from the AISC are satis ed. Similar experience does not exist for the full range of materials that might be available in the marketplace. The speci er is ultimately responsible for ensuring that the accumulation of the mill and fabrication tolerances do not cause the erection tolerances to be exceeded, as indicated in Section 7.12 of the . If the tolerances for the substituted material are larger than those permitted in the ASTM speci cations, then the fabrication tolerances may have to be tightened, the erection tolerances relaxed or both.

In addition to the effect that material tolerances may have on other tolerances, they also may affect the methods used to design the structure. Many of the design methods used in the

tions. The User Note in Section C2.2 states: "Consideration of initial out-of-straightness of individual members (member imperfections) is

Another option might be to impose additional project-speci c tolerances. Establishing project-speci c tolerances can be complex and should ideally involve all affected parties. Very tight tolerances may lead to more ef cient designs relative to member sizes but may be prohibitively expensive relative to mill production, fabrication and/or election.

Testing

The ASTM speci cations approved for use with the obviously contain limits on mechanical property and chemistry. They also contain requirements related to testing. When evaluating unlisted materials it can be just as important to understand how values associated with various properties were obtained as it is to know the values themsed(5 (the)$7.2 (WhFon.)xa shofabri)]TJ as (-)T.27842278 Td[(to test(faorta)37atile)37 (ow)run on.whned s thsa sho1 Tw have intentional boron additions for hardenability, the boron content will not normally exceed 0.0008%."

The intended meaning can be dif cult for steel users to determine. Steel with high hardenability is susceptible to weld cracking, but at the right level boron will help achieve