

AISC's new mobile bolt app can help you
find the right bolt assembly for the job, wherever you are.

Bolts on the Fly

BY ERIN CRISTE

FOR WHAT ARE RELATIVELY SMALL components of an overall structural steel framing system, bolts sure can raise a large number of questions.

What does a certain bolt marking mean? What type of nut or washer goes with a certain bolt type? What is the best bolt for my specific application?

With these and similar questions in mind, AISC has set out to develop a mobile app (available for iPhones, Droid phones, etc.) to help identify some basic aspects of high-strength structural steel bolts. The new Build-A-Bolt app, now available at www.aisc.org/boltapp, is intended for use as a bolt selector for anyone looking to identify the appropriate bolt, nut and washer combination for their application or for those in the field trying to determine which combinations are present at the job site. It provides a simple guide for selecting the proper bolt and nut/washer combination and provides a list of producer markings for reference. The dimensions for each bolt, nut and washer are also provided based on the data in Table 7-14 of the 14th Edition AISC *Steel Construction Manual*.

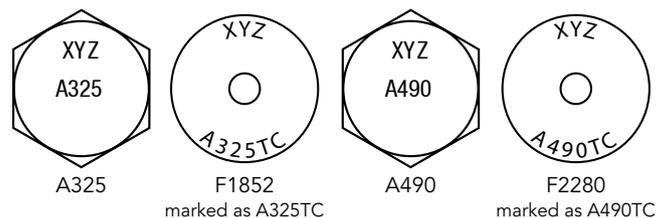


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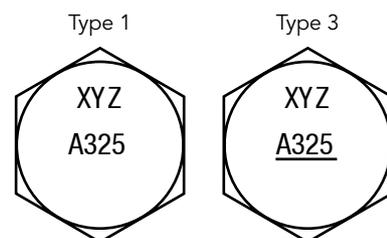
Approaching the App

Let's take a quick tour of the app. After agreeing to the terms outlined in the disclaimer, the app opens up to display a series of options: bolt grade, bolt type, bolt finish and bolt manufacturer. Here, you can select the bolt grade from a list (A325, F1852, A490 and F2280). Please note that only the most common bolt grades are currently provided.

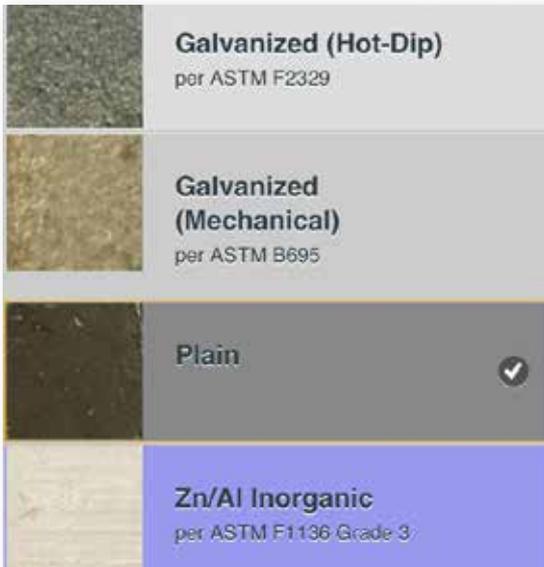
Once the grade is selected, the user selects a bolt type: Type 1 (plain carbon) or Type 3 (weathering); the types are depicted



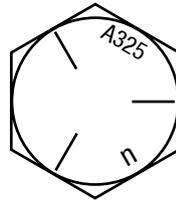
in Figure C-2.1 of the RCSC *Bolt Specification* (and explained in the commentary to Section 2.3) and the designation is denoted by the absence of a line under the grade mark or the presence of a line under the bolt grade as shown below for A325 bolts.



The next step is to select the finish for your bolt. You can choose from the available finishes for Type 1 bolts including: plain, mechanical or hot-dip galvanized or zinc coated. (Note that bolt Type 3 is weathering steel and the finish will be plain.) When an inappropriate combination is selected—e.g., A325, Type 3 and Galvanized—an error message appears and the inappropriate combinations display as strike-through text to indicate that they should not be selected. The acceptable finishes are also outlined in Table 2.1 of the RCSC *Bolt Specification*.



▼ A sample error message.



The last item on the Build-A-Bolt page is the producer markings. An abridged listing of the most common bolt manufacturers or suppliers is listed along with their associated bolt marking or symbol. You will be able to view the marking as well as view the general contact information of the manufacturer or supplier. Only a few producer and supplier markings are listed, but the MSC website provides a more extensive listing of supplier and contact information at www.modernsteel.com/products.php?cat=2.

At the bottom of the app is a menu indicating the three screens that are available: Bolt, Dim and N&W. The first one is the Build-A-Bolt page that we covered above; Dim covers the dimensional properties of the bolt, nut and washer; and N&W is the Nuts and Washers page. Each menu item is labeled and has a corresponding icon to help clarify the content of each page.

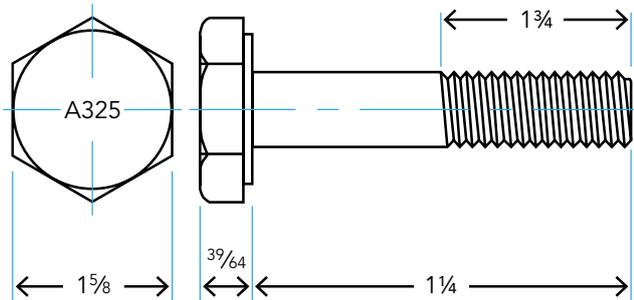
Make Your Own Steel App

Ever think about making your own steel app? Here's your chance! AISC is holding a competition for the creation of useful and functional apps for the design, erection, fabrication or inspection of structural steel buildings and/or bridges. Enter an app and you could win one of three cash prizes!

- ▶ How to enter: Create an open-source app and tweet the URL using #SteelApps in your post. Submit your app between now and September 22, 2013 and include your name, email, phone number, app title and app purpose in your source code.
- ▶ Eligibility: You must be following AISC on Twitter (@AISC) and reside and have a bank account in the U.S.
- ▶ Prizes: Up to three cash prizes will be awarded: Gold, \$5,000, Silver, \$3,000 and Bronze, \$1,000. (Not all prizes may be awarded as shown.) Prizes will be awarded based on the usability of the app, and the chosen apps will receive media coverage in MSC and on AISC social media channels. The winners will be announced on SteelDay, October 4, 2013.
- ▶ Rules and regulations: All entries must be either in the public domain or available under an OSI-approved open-source license. For an entry to be considered valid, we will require access to a functional version of the software and an indication of where the public code repository may be found. AISC reserves the right to modify contest rules and regulations. Entries using web technologies (javascript, etc.) are preferred but "native" software may be used, provided it is accessible and operable using major operating systems (Android, iOS, Windows, Mac OS). Any fees or developer program licenses that may be associated with placing your app in an "app store" or other distribution channel are solely your responsibility. You may base your entry upon existing open-source projects, but you must have been personally responsible for the addition of significant new features (combining functions in a novel fashion counts as a new feature) that are relevant to the structural steel industry.
- ▶ Questions: Contact the AISC Steel Solutions Center at solutions@aisc.org or 866.ASK.AISC.



Selecting the Dim page sends you to a separate screen where bolt, nut and washer dimensions are displayed individually. At the top of the screen are four icons: one for bolts, one for nuts and two for washers, and selecting one will display the dimensional properties of that particular piece. You can change the bolt diameter at the bottom of the page to adjust the properties to the appropriate values for your bolt of choice. These values are the same as those provided in Table 7-14 of the 14th Edition *Manual*. (To learn more about specifying the proper bolt length, see the *Engineering Journal* article “Specifying Bolt Length for High-Strength Bolts,” 2nd Qtr. 1996).



The last page of the Build-A-Bolt app is dedicated to specifying the appropriate nut/washer combination to match your selected bolt. On the initial Build-A-Bolt page you selected

your bolt grade, type and finish. Based on this selection the appropriate nut and washer combination is displayed. (These are also listed in Table 2.1 of the RCSC *Bolt Specification*, and the app includes user notes to help explain where in the specification to find these requirements.) The nut and washer grade and the appropriate finish are displayed here as well, and you can also view a larger image of the nut/washer markings.



Build-A-Bolt was born from an increasing number of questions related to bolts as well as the recognition of the power of mobile apps to make life easier for steel designers and builders in the field, shop and office—or in transit between any of these places. It’s just one idea for a mobile app to promote use of steel in buildings and bridges or facilitate the inspection of bolt assemblies on the fly. The source code for this app will be in the public domain at www.github.com and will be available for improvements or modifications. We’d love to hear your feedback on it as well as whether you have any other mobile app ideas you think might help make steel design and construction easier (see the sidebar for more on the latter). Contact us at solutions@aisc.org or 866.ASK.AISC. **MSC**