



# Comparing Steel Plate Grades

The reality is there are many nuances associated with steel plate and failure to understand them will result in many problems throughout its use in a project. The information in this eBook is meant to clear up many misconceptions.

Carbon steel plate is manufactured for a variety of applications based on its carbon content. Low carbon steel plate, depending on its thickness offers characteristics such as maximum cold forming capability, weldability and improved machining. Medium carbon steel plates (.40 - .50) that are silicon killed offers better strength capabilities but have limited machining and welding properties. Other types of steel plate offer benefits for structure and construction applications, resistance to abrasion, and the ability to withstand high temperatures and pressures. Additionally, steel plate coils are available in low carbon, pickled and oiled, and black steel coils used for precision roller leveling. It may also be used for cutting standard and custom lengths up to 480".

# STEEL PLATE GRADES

We carry steel plate in a variety of grades here at Continental Steel & Tube Company. The following are our most common steel plate products for the application and grade.

## Structural Steel

Steel plate used in construction must meet certain criteria such as high strength, formability, ability to withstand subzero temperatures and weldability.

**A283:** This grade is the standard specification for low and intermediate tensile strength carbon steel plates. It covers four grades of carbon steel plates for general applications, such as manufacturing storage tanks and low pressure, temperature controlled vessels. It is formed through melt processing by either open-hearth, electric furnace, or basic-oxygen.

**A36:** This steel is produced using a minimum yield of 36,000 psi. It has all the qualities used in structural projects requiring weldments, bolting and riveting fabrications. You will find this grade of carbon steel used most often in the construction of buildings, bridges and oil rigs.

**ABS Grade A, Grade B, Grade ADH36, Grade DH36, and Grade EH36:** This steel is used almost exclusively in shipbuilding, especially in the construction of ships, barges, and marine equipment. It has a tensile strength of 58 to 71 ksi, and a minimum yield of 34 ksi.

**A514 T-1®:** This is a heat-treated steel that offers high strength capabilities, weldability, and has few preheat requirements. Used in construction, it provides excellent durability in subzero temperatures.

**A572 GR 50:** This steel has a 50,000 psi minimum strength level offering a combination of high strength along with formability and is very weldable. This steel is frequently used in applications such as pressure vessels and boilers. It also achieves successful results when used in less demanding commercial projects.

## HSLA Structural Steel

**A588:** High Strength Low-alloy structural steel that greatly improves atmospheric corrosion resistance, ideal for structural steel shapes such as channel, angles, and beams. It is primarily specified for use in welded bridges requiring light weight, durability, and corrosion resistance. It has a minimum yield strength of 50 ksi and a minimum tensile strength of 70 ksi. Popular examples include the coating on the U.S. Steel Tower in Pittsburgh and the Barclays Center in New York.

**A656 GR80:** Plate made from this low-alloy steel offers light weight and exceptional formability and weldability, making it ideal for use in structural applications such as crane booms, truck frames, construction equipment, and general fabrication. It has a minimum tensile strength of 90 ksi, and a minimum yield of 80 ksi.

## Pressure vessel quality (PVQ)

The carbon steel plate for applications requiring the capability to perform under high-pressure, high temperature conditions is manufactured according to strict ASTM standards.

**A285 GR C:** This grade offers moderate strength characteristics along with the ability for good forming. It is used in fusion-welded boilers and pressure vessels.

**A515 GR 70:** Plate made from this grade of steel offers improved strength compared to A285 steel. The plate incorporates a silicon kill, which allows for coarse austenitic grains. However, welding can be a challenge and requires a careful technique to ensure proper weldments.

**A516 GR 70:** This grade 70 steel plate possesses good strength characteristics. The silicon killed deoxidation process ensures an even consistency in the finished product. It also has a finer grain and notched toughness.

**SA537:** Plate made of Pressure Vessel Quality grade. It is typically used for manufacturing fusion welded pressure vessels and structures, where low temperature resistance to notch sensitivity and higher strength are required. Class 1 is normalized, with a tensile strength of 70-90 ksi and a minimum yield of 50 ksi. Class 2 has a tensile strength of 80-100 ksi and minimum yield strength of 60 ksi.

## Abrasion resistant steel

Developed according to a specific carbon-manganese specification, this steel plate is designed to withstand wear resistance many times better than ordinary steel plate.

**AR360:** This plate offers minimum Brinell rating of 360 and a tensile strength of 177,000 psi, ranking the material medium for hardness and strength. Uses for this steel include the manufacture of heavy construction equipment.

**AR400:** This steel provides a high degree of hardness and strength because of its quenched and tempered chrome-moly, boron treatment. AR400 plate is resistant to corrosion from atmospheric conditions and protects well against impact abrasion. Uses for this plate include material handling equipment for mining.

**AR500:** This grade of steel is fabricated through heat treatment to achieve through-hardening as well as improved welding and forming capabilities. With a tensile strength of 247 ksi and a minimum yield of 187 ksi, it provides extraordinary protection from wear, including rub wear, slide wear, and heavy wear. It is also able to withstand high impact stress, regardless of temperature.

# THE PURCHASING PROCESS

There is no trick to purchasing steel plate, so long as you follow a systematic approach. Start first by determining the specific grade of steel you need. Each type of steel has its own grade designation. The material grade is based upon the chemical composition of the steel, indicated by a letter/number grade. The basis for these grades comes from several grading systems developed by the American Iron and Steel Institute (AISI) and the Society of Automotive Engineers (SAE).

Once you know which grade of steel plate is required for your project, the next step is determining dimensions (thickness, width and length). Many companies offer a broad range of dimensions for steel plate. Continental Steel & Tube provides thickness dimensions from 3/16" up to 24" and widths to 120". These dimensions fit many application needs. If you have a need for a custom sized steel plate, for example, Continental Steel can use a hi-definition plasma cutter, a simple saw cut or water jet, to cut steel plate to accommodate your custom specifications.

It is possible to take customization into account and explore other plate options. Suppose your project calls for carbon steel plate, but the specs demand a stronger, lighter weight. Carbon steel may be specified, however, it is not the right product for the project. You may want to consider using comparable grades of stainless steel, titanium or nickel alloy plate, so long as the width requirement is 96" or less.

Steel plate rolled into pipe or used in building tankers offers one more customization option. With the appropriate dimensional requirements, we can quote for an exact radius. The final step is providing quantity and shipping information and your steel plate purchasing experience is complete.

## About Continental Steel & Tube

For more than 20 years, Continental Steel & Tube has established itself as a leading supplier and distributor of steel, titanium, stainless steel, nickel, aluminum, brass and bronze specialty metals. We are certified as an ISO 9001:2008 company. Our knowledgeable and dedicated staff assure customers of quick responses, competitive pricing and dependable deliveries from a large inventory. Learn more about steel plate products or any of the many metal products we offer by contacting us toll-free at 877.292.7092 or email [sales@continentalsteel.com](mailto:sales@continentalsteel.com).