

# **MATERIALS AVAILABLE IN THE COLLEGE OF ENGINEERING MACHINE SHOP**

**Created by Mike Allen – July 31, 2003**

## **COLD ROLLED STEEL**

ASTM-1018 stocked in common sizes from 1/8" to 2" thickness and 3/4", 1", 2", 4", 6", 10", and 12" widths. We are not able to stock all common sizes, and we do not have full lengths, i.e. 12 feet, in all of these sizes.  
ASTM-1018 has good machinability, and is easily welded. The tensile strength is 85,000 psi, and the yield strength is 70,000 psi.

ASTM-12L-14 stocked in round sizes from 1/8" to 6" diameters in 1/8" increments.  
ASTM-12L14 is a leaded free machining carbon steel, this grade is not considered very weldable, (high sulphur content). The tensile strength is 78,000 psi, and the yield strength is 70,000 psi.

## **HOT ROLLED STEEL AND STRUCTURAL SHAPES**

The College of Engineering Machine Shop does not stock hot rolled flats, rounds, plates, sheets, or structural shapes. Some of these materials are in stock as drop, clip, or leftovers from various projects.

Square and rectangular tubing is typically ASTM-500, tensile strength 45,000 psi and yield strength 39,000 psi. It may be mechanically joined or welded by commonly used techniques and practices.

The hot rolled flats and rounds are typically ASTM A-36, tensile strength 58/80,000 psi, and yield strength 36,000 psi. This material is used for general-purpose structural members that involve mild cold bending, mild hot forming, punching, and welding.

## **ALUMINUM**

6061-T6 stocked in most of the common sizes as the cold rolled steel rounds, flats, and in plate. 6061-T6 has most of the good qualities of aluminum; it is machineable and weldable. Tensile strength 45,000 psi and yield strength 40,000 psi.

5052 sheets are stocked in a limited quantity and gauges; this gauge has excellent cold forming workability and good welding characteristics. Tensile strength is 33,000 psi and yield strength is 28,000 psi.

## **MISCELLANEOUS**

The Machine Shop has a limited stock of acrylics, polycarbonates, nylon, Delran, Teflon, and UHMW. There is some brass rounds in stock. A limited selection of plumbing fittings is also available. Hardware available includes nuts, bolts, washers, key stock, "O" rings, cotter keys, set screws, dowel pins, roll pins, machine screws/nuts, etc. Some sprockets and chain, an assortment of bearings, (flange, roller, pedestal, etc.) are available as are some drill stock material and some flat ground stock.

## **SUPPLIER**

### Steel and aluminum

Valley Steel  
Fort Collins  
800 666 9473

EMJ  
Denver  
800 336 5365  
[www.emjmetals.com](http://www.emjmetals.com)

Big Pete's Welding  
Laramie  
742 7765

Vincent Metal Goods  
Denver  
800 365 7876

### Miscellaneous Parts

The Machine Shop has a comprehensive catalog library in the shop, from manufactures and suppliers. The Thomas Register is also a good reference.

## **MATERIALS ACQUISITION**

Please, check with one of the shop personnel before using any materials in the shop inventory, since some of the inventory has been acquired for use in specific research projects.

For your cost estimations the following factors can be applied:

#### Steel

Cost: \$1.55/lb  
Density: 0.28 lb/in<sup>3</sup>

Aluminum cost: \$3.00/lb.: 0.10 lb/cubic inch or lbs./linear foot

Cost: \$3.50/lb  
Density: 0.10 lb/in<sup>3</sup>

#### Miscellaneous materials

Cost: Market Price from catalogs or quotes  
Density: Specifications from catalogs or quotes

Thank You:

Mike, Mikey, and Korey

Shop Personnel