### MATERIALS AND THEIR PROPERTIES

**Aluminum Alloys**
- **Casting**: (2xxx, 7xxx, 8xxx)
- ** wrought**: (1xxx, 2xxx, 3xxx, 4xxx, 5xxx, 6xxx)
- ** forged**: (7xxx, 8xxx)

**Copper Alloys**
- **High-Copper**: (90% - 99% Cu)
- **Brass**: (C2xxx, C5xxx)
- **Bronze**: (C5xxx)
- **Aluminum Bronze**: (C3xxx)
- **Manganese Bronze**: (C5xxx)
- **Silicon Bronze**: (C5xxx)
- **Copper Silicon Alloys**: (C5xxx)

**Magnesium Alloys**
- **A, L, O, P, W series**: (2xxx, 3xxx, 4xxx & 4xxLxx, 5xxx & 5xxLxx)

**Carbon Steels**
- **Free-Machining**: Low Carbon steels, 1012 - 1015, 1018 - 1020, 1045, 1060...
- **Stainless Steels**:
  - **303, 304, 316, 321, 347, 310S, 321, 321S**: (300 series)
  - **410, 414, 4140, 4145, 4146**: (400 series)

**High Speed Steel**
- **W1**: (Excluding A2)

**Tool Steels**
- **A, L, P, W series**

**Titanium Alloys**
- **Ti-6Al-4V, Ti-6Al-2Sn-4Zr-2Mo, Ti-6Al-7Nb, Ti-5Al-2Sn-3Mo-3Zr**: (6xxx series)

**High Temp Alloys**
- **Inconel, Haynes**: (600 series)
- **MarMote**: (690 series)

**Hardness Range**:
- **28-28 Rc**
- **29-37 Rc**
- **38-45 Rc**

**Product Notes**:
- Due to a varying diameter, an Effective Cutter Diameter must be determined for Chip Load selection and RPM calculation.

**Effective Cutter Diameter**
- **Cutter Diameter** - 2x Radius

**Chip Loads** (IPT) in table pertain to machining with OD and radius engaged on one side of part.
- If radius and OD are engaged on both sides of part, reduce posted chip load values by 40%
- If radius only is engaged on one side of part, increase posted chip load values by 20%
- If radius only is engaged on both sides of part, reduce posted chip load values by 25%

**General Notes**:
- All posted speed and feed parameters are suggested starting values that may be increased given optimal setup conditions. Chip loads reflect uncoated cutters and may be increased 10% - 20% if coated. For ferrous materials with hardness ≤ 28 Rc, chip loads can be increased 10% - 20%.
- If you require additional information, Harvey Tool has a team of technical experts available to assist you through even the most challenging applications. Please contact us at 800-645-5609 or Harveytech@harveyperformance.com.

**WARNING:** Cutting tools may shatter under improper use. Government regulations require use of safety glasses and other appropriate safety equipment in the vicinity of use.