

Talk to the Home Metal Shop Club

Pete Sandy

Houston

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Who the xxxx is Pete Sandy ?

Free Machining Steels

Alloying Elements That Influence Machinability

- Detractors :-

Hardness, Microstructure – C, Mn, Ni, Cr, Mo, S

De-oxidizers – Si, Al, Ti, Zr

Strengtheners – Cd, V, B

- Enhancers :-

Traditional additives - S, Pb, Bi, Te, Se

Non Traditional additives - Ca

Other Factors That Affect Machinability

- Physical Mechanical Properties, Heat Treatment, Geometry, Coating
- Speed, Feed and Depth of Cut
- Type of Cutter – Material, Geometry, Coating, Condition
- Rigidity of Cutter – Impacts ‘Chatter’, Accuracy/Repeatability/Tolerances
- Machine Power Available
- Cutting Fluid – Cooling, Flow, Concentration, Temp, Viscosity

All above variables work together as a System – Changing one will have positive or negative impact on others

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Steel - Aluminum - Magnesium - Machinability Index Chart

Metals and Materials Table of Content | Metal Products Distributor
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The following is a simplified general Steel - Aluminum - Magnesium
Machinability Index Chart. Carbon steel 1212 is the universal reference
(1212 = 100%)

Carbon steels:	Index Percent Relative to 1212 Carbon Steel
1212	100%
1015	72%
1018	78%
1020	72%
1022	78%
1030	70%
1040	64%
1042	64%
1050	54%
1095	42%
1117	91%
1137	72%
1141	70%
1141 annealed	81%
1144	76%
1213	136%
12L14	170%
1215	136%

Alloy steels:	Index Percent Relative to 1212 Carbon Steel:
2355 annealed	70%
4130 annealed	72%
4140 annealed	66%

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Continuous Cooling Transformation (CCT) Diagram

