

EFFECT OF ALLOY ELEMENTS

Alloy element	Hardnes	Strength	Yeld Strength	Elongation	Reduction of Cross Section Area	Impact Strength	Elasticity	High tempetarure strength	Cooling speed	Cementide forming	Abrasion resistance	Forging ability	Machinability	Oxide tendency	Corrosion resistance
Si	↑	↑	↑	↓	~	↓	↑	↑	↓	↓	↓	↓	↓	↓	-
Mn [*]	↑	↑	↑	~	~	~	↑	~	↓	~	↓	↑	↓	~	-
Mn ^{**}	↓	↑	↓	↓	~	-	-	-	↓	-	-	↓	↓	↓	-
Cr	↑	↑	↑	↓	↓	↓	↑	↑	↓	↑	↑	↓	-	↓	↓
Ni [*]	↑	↑	↑	~	~	~	-	↑	↓	-	↓	↓	↓	↓	-
Ni ^{**}	↓	↑	↓	↑	↑	↑	-	↑	↓	-	-	↓	↓	↓	↑
Al	-	-	-	-	↓	↓	-	-	-	-	-	↓	-	↓	
W	↑	↑	↑	↓	↓	-	-	↑	↓	↑	↑	↓	↓	↓	-
V	↑	↑	↑	~	~	↑	↑	↑	↓	↑	↑	↑	-	↓	↑
Co	↑	↑	↑	↓	↓	↓	-	↑	↑	-	↑	↓	~	↓	-
Mo	↑	↑	↑	↓	↓	↑	-	↑	↓	↑	↑	↓	↓	↑	-
S	-	-	-	↓	↓	↓	-	-	-	-	-	↓	↑	-	↓
P	↑	↑	↑	↓	↓	↓	-	-	-	-	-	↓	↓	↓	↑

× Pearlitic steels

× Austenitic Steels

↑
Increases

↓
Decreases

~
Unchangeable

-
Not known - Unimportant