



The influence of alloy elements on the properties of steel stainless steel

Alloy element	Hardness	Strength	Yield strength	Elongation	Constriction	Impact strength	Elasticity	Heat fastness	Ramp loading	Carbides formation	Abrasion resistance	Forgeability	Machinability	Able to nitrate	Corrosion fastness
Silicon (Si)	↑	↑	↑↑	↓	~	↓	↑↑↑	↑	↓	↓	↓	↓	↓	↓	-
Manganese (Mn) in pearlitic steel	↑	↑	↑	~	~	~	↑	~	↓	~	↓↓	↑	↓	~	-
Manganese (Mn) in autenitische steel	↓↓↓	↑	↓	↑↑↑	~	-	-	-	↓↓	-	-	↓↓↓	↓↓↓	-	-
Chromium (Cr)	↑↑	↑↑	↓↓↓	↓	↓	↓	↑	↑	↓↓↓	↓↓↓	↑	↓	-	↑↑	↑↑↑
Nickel (Ni) at pearlitic steel	↑	↑	↑	~	~	~	-	↑	↓↓	-	↓↓	↓	↓	-	-
Nickel (Ni) in austenitic steel	↓↓	↑	↓	↑↑↑	↑↑	↑↑↑	-	↑↑↑	↓↓	-	-	↓↓↓	↓↓↓	-	↑↑
Aluminum (Al)	-	-	-	-	↓	↓	-	-	-	-	-	↓↓	-	↑↑↑	-
Tungsten (W)	↑	↑	↑	↓	↓	~	-	↑↑↑	↓↓	↑↑	↑↑↑	↓↓	↓↓	↑	-
Vanadium (V)	↑	↑	↑	~	~	↑	↑	↓↓	↑↑	↑↑↑↑	↑↑	↑	-	↑	↑
Cobalt (Co)	↑	↑	↑	↓	↓	↓	-	↑↑	↑↑	-	↑↑↑	↓	~	-	-
Molybdenum (Mo)	↑	↑	↑	↓	↓	↑	-	↑↑	↓↓	↑↑↑	↑↑	↓	↓	↑↑	-
Copper (Cu)	↑	↑	↑↑	~	~	~	-	↑	-	-	-	↓↓↓	~	-	↑
Sulfur (S)	-	-	-	↓	↓	↑	-	-	-	-	-	↓↓↓	↑↑↑	-	↓
Phosphorus (P)	↑	↑	↑	↓	↓	↓↓↓	-	-	-	-	-	↓	↑↑	-	-

↑ = increase ↓ = decrease ~ = approximately unchanged - = not characteristic or unknown