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ASTM A706 Deformed and plain low alloy steel bars for concrete reinforcement with enhanced weld ability.

ASTM A706 covers deformed and plain low alloy steel bars for concrete reinforcement with restrictive mechanical properties and chemical composition in order to enhance weld ability. This specification covers bars and coils in two grades, Grade 60 and Grade 80. The grade designates the yield strength of the material, i.e. Grade 60 has a 60ksi minimum yield.

A706 Designation Numbers

Bar No.	Nominal Diameter
3	0.375″
4	0.500″
5	0.625″
6	0.750″
7	0.875″
8	1.000″
9	1.128″
10	1.270″
11	1.410″
14	1.693″
18	2.257″

A706 Mechanical Requirements

	Grade 60	Grade 80
Tensile, ksi	80	100
Yield, ksi	60-78	80-98
Elongation in 8″		
Bar size #3,4,5,6	14	12
7,8,9,10,11	12	12
14,18	10	10
*Tensile strength shall not be less than 1.25 times the actual yield strength		

A706 Chemical Requirements

Element	Max %
Carbon	0.30
Manganese	1.50
Phosphorous	0.035
Sulfur	0.045
Silicon	0.50

A706 Bend Test Requirements

Bar Designation#	Pin Dia, Grade 60	Pin Dia, Grade 80
3,4,5	3d	3-1/2d
6,7,8	4d	5d
9,10,11	6d	7d
14,18	8d	9d

Weldability

In addition to the above chemical requirements, A706 rebar must also have a carbon equivalent (CE) not exceeding 0.55%. The way to calculate this is to plug the chemical composition figures for a given heat lot of steel into the following formula:

CE = %C + (%Mn / 6) + (%Cu / 40) + (%Ni / 20) + (%Cr / 10) − (%Mo / 50) − (%V / 10)

Rebar produced to this specification shall be marked with the letter "W" to indicate weld ability.