



# CARBON GRADE COMPARISON CHART: ASTM A106 VS ASTM A53

CHEMICAL

	ASTM A106		ASTM A106		ASME SA106		ASME SA106		ASTM A53		API 5L-44	
	Gr. B		Gr. C		Gr. B		Gr. C		Gr. B		B PSL1	
	Heat Analysis		Heat Analysis		Heat Analysis		Heat Analysis		Heat Analysis		Heat Analysis	
<b>Product check</b>	Product Analysis per request, matches heat specification		Product Analysis per request, matches heat specification		Product Analysis per request, matches heat specification		Product Analysis per request, matches heat specification		Product Analysis per request, matches heat specification		Product Analysis required, matches heat specification	
<b>Chemistry</b>	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
<b>Carbon (C)</b>		0.300		0.350		0.300		0.350		0.300		0.280
<b>Manganese (MN)</b>	0.290	1.060*	0.290	1.060*	0.290	1.060*	0.290	1.060*	0.290	1.200*		1.200**
<b>Phosphorus (P)</b>		0.035		0.035		0.035		0.035		0.050		0.030
<b>Sulfur (S)</b>		0.035		0.035		0.035		0.035		0.045		0.030
<b>Silicon (SI)</b>	0.100		0.100		0.100		0.100					
<b>Copper (CU)</b>		0.400		0.400		0.400		0.400		0.400		0.500
<b>Nickel (NI)</b>		0.400		0.400		0.400		0.400		0.400		0.500
<b>Chrome (CR)</b>		0.400		0.400		0.400		0.400		0.400		0.500
<b>Molybdenum (MO)</b>		0.150		0.150		0.150		0.150		0.150		0.150
<b>Vanadium (V)</b>		0.080		0.080		0.080		0.080		0.080		
<b>Columbium (CB)</b>						0.020						
<b>CB+V+TI</b>												0.150%
<b>Cr+Cu+Mo+Ni+V</b>		1.0%		1.0%		1.0%		1.0%		1.0%		
<b>Flattening test</b>	Capable statement		Capable statement		Capable statement		Capable statement		Capable statement			
<b>Carbon Equivalent (CE)</b>												
<b>Product Analysis</b>											Test Required	
<b>Hydro</b>	60% of P=2St/D		60% of P=2St/D		60% of P=2St/D		60% of P=2St/D		60% of P=2St/D		60% of P=2St/D	
<b>NDE -Mtl Marked NDE</b>		optional		optional		optional		optional		optional		optional
<b>Heat Treat Options</b>												
<b>As Rolled</b>	Yes		Yes		Yes		Yes		Yes		Yes	
<b>Normalizing or Normalizing Rolled</b>	Yes		Yes		Yes		Yes		Yes		Yes	
<b>Quenched &amp; Tempering</b>	Yes		Yes		Yes		Yes		Yes		Yes	

MECHANICAL

	Gr. B		Gr. C		Gr. B		Gr. C		Gr. B		B PSL1	
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
<b>TENSILE</b>	60,000		70,000		60,000		70,000		60,000		60,000	
<b>YIELD</b>	35,000		40,000		35,000		40,000		35,000		35,000	
<b>ELOG. (2"strip)</b>	30%		30%		30%		30%		30%		35%	
<b>Elongation Formula</b>	e=625 000 [1940] A0.2/U 0.9		e=625 000 [1940] A0.2/U 0.9		e=625 000 [1940] A0.2/U 0.9		e=625 000 [1940] A0.2/U 0.9		e=625 000 [1940] A0.2/U 0.9		e=625 000 [1940] A0.2/U 0.9	
<b>ELOG. (50mm Round sample)</b>	22%		20%		22%		20%					

\*For each reduction of 0.01% below the specified carbon maximum, an increase of 0.06% manganese above the specified maximum will be permitted up to a maximum of 1.35%.

\*\*For each reduction of 0.01% below the specified carbon maximum, an increase of 0.05% manganese above the specified maximum will be permitted up to a maximum of 1.65% for Grades B-X42, or 1.75% max for Grades X52-X70.

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