



# E STEEL SDN BHD (891338-A)

NO 3, Lorong Sungai Puloh 7/KU 6,  
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## Martensitic Stainless Steel 440A, 440B, 440C

**Stainless Steel 440C ( 1.4125 ) is capable of attaining, after heat treatment, the highest strength, hardness and wear resistance of all the stainless alloys. Its very high carbon content is responsible for these characteristics, which make SS440C particularly suited to such applications as ball bearings and valve parts.**

- Hardenable high-carbon chromium steels designed to provide stainless properties with maximum hardness
- Have maximum hardness together with high strength and corrosion resistance in the hardened and stress relieved condition
- Always used in the hardened or hardened and stress relieved conditions
- None of the alloys has its full corrosion resistance either in the annealed or in the hardened and tempered condition
- Wide applications where good corrosion resistance along with high hardness or abrasion resistance is required

### • Standard of 440C Stainless Steel and Equivalent Steel Grades

Country	USA	BS & DIN	Japan
Standard	ASTM A276	EN 10088	JIS G4303
Grades	S44004/440C	X105CrMo17/1.4125	SUS440C

### 4. ASTM 440C Stainless Steel Mechanical Properties

Tempering Temperature (°C)	Tensile Strength (MPa)	Yield Strength 0.2% Proof (MPa)	Elongation (% in 50mm)	Hardness Rockwell (HRC)	Impact Charpy V (J)
Annealed*	758	448	14	269HB max#	—
204	2030	1900	4	59	9
260	1960	1830	4	57	9
316	1860	1740	4	56	9
371	1790	1660	4	56	9

### Applications of stainless Steel 440C

- Used in numerous applications in areas where a very hard and abrasion resistant stainless is called for
- Applications include pivot pins, dental and surgical instruments, cutlery valve parts, ball bearings, nozzles, hardened steel balls and seats for oil well pumps, plus valve parts



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## Corrosion Resistance

These stainless steels have good corrosion resistance in the hardened and stress relieved conditions. Hence, they should, usually, be used only in that condition. These steels are resistant to such conditions as fresh water, steam, crude oil, gasoline, perspiration, and alcohol.

<b>Composition</b>			
<b>Property</b>	<b>SS 440A</b>	<b>SS 440B</b>	<b>SS 440C</b>
Carbon	.60 - .75	.75 - .95	.95 - 1.2
Manganese	1.00 max	1.00 max	1.25 max
Silicon	1.00 max	1.00 max	1.00 max
Phosphorus	.04 max	.04 max	.04 max
Sulfur	.03 max	.03 max	.04 max
Chromium	16.0 - 18.0	16.0 - 18.0	16.5 - 18.0
Molybdenum	.75 max	.75 max	.75 max
Nickel	.50 max	NA	NA

<b>Mechanical Properties</b>						
<b>Property</b>	<b>SS440A</b>		<b>SS440B</b>		<b>SS440C</b>	
	<b>Annealed</b>	<b>Hardened &amp; Stress Relieved</b>	<b>Annealed</b>	<b>Hardened &amp; Stress Relieved</b>	<b>Annealed</b>	<b>Hardened &amp; Stress Relieved</b>
Ultimate tensile strength, psi	105,000	260,000	107,000	280,000	110,000	285,000
0.2% Yield strength, psi	60,000	240,000	62,000	270,000	65,000	275,000
Elongation, % in 2"	20	5	18	3	14	2
Reduction of area, %	45	20	35	15	25	10
Rockwell hardness	B95	C51	B96	C55	B97	C57
Impact strength Izod V-Notch, ft-lbs	NA	3-6	NA	2-5	NA	1-5



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### **Hardening of 440C Steel**

Stainless steel 440C grade can be hardened by heating at 760°C (1400°F). Temperature can be increased up to 1010°C (1850°F) followed by quenching in warm oil or cool in air. However, don't overheat, because when overheated, full hardness cannot be obtained.

### **Machinability**

Because of the high carbon content, these alloys have an abrasive action on cutting tools. In the annealed condition, their machinability rating is about 40% compared to Bessemer oven stock (AISI B1112). As heat treated, the 440 series stainless steel are difficult to machine because of their high hardness. For parts that require extensive machining, the free-machining versions, SUS 440F or SUS440F Se, offer improved machining properties.

### **Formability**

If annealed for maximum softness, SUS 440A, SUS 440B, and SUS 440C Stainless Steels can be moderately cold formed with only slightly more difficulty than the lower carbon, lower chromium grades of stainless steel. They can also be hot headed. Preheating in the range of 1400 - 1500° F insures the best results in hot working. Parts should be furnace cooled after hot working to prevent cracking.

### **Heat Treatment**

**PROCESS ANNEAL:** Heat at 1350-1450° F then cool very slowly in the furnace.

**FULL ANNEAL:** Heat uniformly at 1550-1600° F soak and cool slowly in furnace to 1000-1250° F at a rate of 20-50° F per hour, then cool in air, oil, or water.

**HARDENING:** Preheat slowly to 1450° F and soak, then raise temperature to 1850-1950° F, quench in warm oil or air. Products hardness of C55-58 Rockwell.

**STRESS RELIEVE:** Heat to 300-800° F for 1 to 3 hours, air cool.