

## Grade 422 (X20CrMoWV12-1)

### Material Designation

S42200 / Grade 616	UNS
S42200 / Grade B4B	UNS
422	AISI
B50A951	GE

### Standards

ASTM A437
ASTM A565
GE B50A951

### Chemical Composition Mass-%

	C	Si	Mn	P	S	Cr	Ni	Mo	V	W
min.	0,20	0,20	0,50	-	-	11,0	0,5	0,90	0,20	0,90
max.	0,25	0,50	1,00	0,020	0,010	12,5	1,0	1,25	0,30	1,25

Customer specific restrictions upon request

### Properties

Stainless, heat resistant martensitic Cr-steel with good scaling and oxidation resistance. A good creep strength is achieved by Vanadium-addition.

Resistant to steam and fresh water, atmospheric corrosion as well as mild acids and alkalines. (PREN ~ 17).

### Delivery Condition

✘ quench., tempered, stress relieved (+QT +SR)

### Application Area

Components for high mechanical loads requiring creep resistance at working temperatures up to 1075 °F in slightly corrosive environments.

### Typical Applications

- ✘ Turbine blades
- ✘ Compressors and rotors
- ✘ High temperature fasteners
- ✘ Bolting material and components
- ✘ Inlet valves

### Mechanical Properties

Yield strength [ksi]	Tensile strength [ksi]	Reduction of area [%]	Elong. [%]	Hardness [HBW]	Impact toughness [ft·lb] CVN	Stress rupture test 1200 °F, min. 25 h [ksi]
≥ 110	≥ 140	≥ 35	≥ 13	302 - 352 <sup>1)</sup> 285 - 331 <sup>2)</sup>	≥ 8 <sup>1)</sup> ≥ 10 <sup>2)</sup>	≥ 26

<sup>1)</sup> ASTM A565 condition HT, <sup>2)</sup> GE B50A951 condition A1

### Heat Treatment Guideline Values

	Temperature [°F] / Duration	Cooling medium
Quenching and tempering (+QT)	1875 - 1925 (Hardening) ≥ 1150 (Tempering) / min. 2 h	Oil, polymer, air Air
Stress relieving (+SR)	≥ 1100	Air

### Quality

- ISO 9001
- ISO 14001
- ISO 50001
- Approvals acc. to standards like ABS, BV, DNV ...
- Customer specific approval certificates

### Innovation

- Fully automated ultrasonic testing up to dia. 37.4"
- CO<sub>2</sub>-reduction by innovative heat treatment solutions

### Flexibility

- Product range from fine wire to forging
- Directly from stock close at hand

### Individuality

- Dimensions
- Tolerances
- Surface qualities
- Delivery conditions

### Your personal contact:

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