





































# KLINGER<sup>®</sup> EXPERT

## Bolt Grade and Quality Cross Reference

Standard	Grade or Class	KLINGER Expert Alternative	Material	Nominal Product Diameters (inches)	Minimum Yield Strength (psi)	Minimum Tensile Strength (psi)	Identification Marking
SAE J429	Grade 1	4.6	Low Carbon Steel	¼ - 1½	36,000	60,000	
	Grade 2	5.8	Low Carbon Steel	¼ - ¾	57,000	74,000	
		4.6		>¾ - 1½	36,000	60,000	
	Grade 4	8.8	Medium Carbon Steel	¼ - 1½	100,000	115,000	
	Grade 5	8.8	Medium Carbon Steel	¼ - 1	92,000	120,000	
		6.9		>1 - 1½	81,000	105,000	
	Grade 5.1	8.8	Medium Carbon Steel	¼ - ½	92,000	120,000	
	Grade 5.2	8.8	Low Carbon Martensitic Steel	¼ - 1	92,000	120,000	
	Grade 7	B7	Medium Carbon Steel	¼ - 1½	115,000	133,000	
Grade 8	10.9	Medium Carbon Alloy	¼ - 1½	130,000	150,000		
Grade 8.1	10.9	Medium Carbon Alloy	¼ - 1½	130,000	150,000		
ASTM A325	Type 1	8.8	Medium Carbon Steel	½ - 1	92,000	120,000	
		6.9		>1 - 1½	81,000	105,000	
	Type 2	8.8	Low Carbon Martensitic Steel	½ - 1	92,000	120,000	
		6.9		>1 - 1½	81,000	105,000	
	Type 3	8.8	Atmospheric Corrosion Resistant Steel	½ - 1	92,000	120,000	
		6.9		>1 - 1½	81,000	105,000	

Standard	Grade or Class	KLINGER Expert Alternative	Material	Nominal Product Diameters (inches)	Minimum Yield Strength (psi)	Minimum Tensile Strength (psi)	Identification Marking
ASTM A193 (High Temperature Service)	Grade B5	6.9	5% Chromium Ferritic Steel	¼ - 4	80,000	100,000	
	Grade B6	B80	13% Chromium Ferritic Steel	¼ - 4	85,000	110,000	
	Grade B7	B7	AISI 4140 or 4142	¼ - 2½	105,000	125,000	
				>2½ - 4	95,000	115,000	
				>4 - 7	75,000	100,000	
	Grade B16	B16	CrMoVa Alloy Steel	¼ - 2½	105,000	125,000	
				>2½ - 4	95,000	110,000	
				>4 - 8	85,000	100,000	
	Grade B8 Class 1	B8	AISI 304	¼ and over	30,000	75,000	
	Grade B8C Class 1	B8	AISI 347	¼ and over	30,000	75,000	
	Grade B8M Class 1	B8	AISI 316	¼ and over	30,000	75,000	
	Grade B8T Class 1	B8	AISI 321	¼ and over	30,000	75,000	
	Grade B8 Class 2	B8X	AISI 304 Strain Hardened	¼ - ¾	100,000	125,000	
				>¾ - 1	80,000	115,000	
				>1 - 1¼	65,000	105,000	
				>1¼ - 1½	50,000	100,000	
	Grade B8C Class 2	B8X	AISI 347 Strain Hardened	¼ - ¾	100,000	125,000	
				>¾ - 1	80,000	115,000	
				>1 - 1¼	65,000	105,000	
				>1¼ - 1½	50,000	100,000	
	Grade B8M Class 2	B80A	AISI 316 Strain Hardened	¼ - ¾	95,000	110,000	
				>¾ - 1	80,000	100,000	
				>1 - 1¼	65,000	95,000	
				>1¼ - 1½	50,000	90,000	
Grade B8T Class 2	B8X	AISI 321 Strain Hardened	¼ - ¾	100,000	125,000		
			>¾ - 1	80,000	115,000		
			>1 - 1¼	65,000	105,000		
			>1¼ - 1½	50,000	100,000		

Standard	Grade or Class	KLINGER Expert Alternative	Material	Nominal Product Diameters (inches)	Minimum Yield Strength (psi)	Minimum Tensile Strength (psi)	Identification Marking
ASTM A320 (Low Temperature Service)	Grade L7	B7	AISI 4140 or 4142	¼ - 2½	105,000	125,000	
	Grade B8 Class 1	B8	AISI 304	¼ and over	30,000	75,000	
	Grade B8M Class 1	B8	AISI 316	¼ and over	30,000	75,000	
	Grade B8 Class 2	B8X	AISI 304 Strain Hardened	¼ - ¾	100,000	125,000	
				>¾ - 1	80,000	115,000	
				>1 - 1¼	65,000	105,000	
				>1¼ - 1½	50,000	100,000	
	Grade B8M Class 2	B80A	AISI 316 Strain Hardened	¼ - ¾	95,000	110,000	
				>¾ - 1	80,000	100,000	
				>1 - 1¼	65,000	95,000	
>1¼ - 1½				50,000	90,000		
ASTM 307	Grade A	4.6	Low Carbon Steel	¼ - 4	36,000	60,000	
	Grade B	4.6	Low Carbon Steel	¼ - 4	36,000	60,000	
ISO R898	Class 4.6	4.6	Medium Carbon Steel	All sizes thru 1½	36,000	60,000	
	Class 5.8	5.8	Medium Carbon Steel	All sizes thru 1½	57,000	74,000	
	Class 8.8	8.8	Alloy Steel	All sizes thru 1½	92,000	120,000	
	Class 10.9	10.9	Alloy Steel	All sizes thru 1½	130,000	150,000	
	Class 12.9	12.9	Alloy Steel	All sizes thru 1½	160,000	177,000	

**Note:** This cross reference is based on yield strengths and is for reference only. It is intended to help the user determine the nearest bolt/stud grade equivalent when what is employed is not found in KLINGER Expert. Bolt grades and/or qualities may not be exactly equivalent but should provide a comparable bolt that can be used in the KLINGER Expert program. In future versions of KLINGER Expert, a larger selection of UNC bolt grades may be added and make this cross reference obsolete.

*The ability of a gasket to make and maintain a seal depends not only on the style and quality of the gasket material, but also on medium being sealed, the flange design, the amount of pressure applied to the gasket by the bolts and how the gasket is assembled onto the flanges and tightened. These factors are beyond the manufacturer's control.*

**KLINGER Thermoseal**

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