



ASTM A563

Scope - This specification covers the chemical and mechanical requirements for carbon and alloy steel nuts used on bolts, studs, and externally threaded fasteners.

Grades	A	Carbon steel
	B	Carbon steel
	C	Carbon steel, quenched and tempered
	D	Carbon steel, quenched and tempered
	DH	Carbon steel, quenched and tempered
	C3	Weathering steel, quenched and tempered
	DH3	Weathering steel, quenched and tempered

	Grade	Material Markings	Style	Size, in.	Proof Load, ksi		Hardness, HBN
					Black	Galv.	
Mechanical Properties	A		Hex	¼ to 1-½	90	68	116 - 302
			Heavy Hex	¼ to 4	100	75	116 - 302
	B		Heavy Hex	¼ to 1	133	100	121 - 302
			Heavy Hex	1-⅛ to 1-½	116	87	121 - 302
	C		Heavy Hex	¼ to 4	144	144	143 - 352
	C3						
	D	D	Heavy Hex	¼ to 4	150	150	248 - 352
	DH	DH	Heavy Hex	¼ to 4	175	150	248 - 352
DH3	DH3						

Chemical Properties	Element	Grades O, A, B, C				D		DH	
	Carbon	0.55 max					0.55 max	0.20 - 0.55	
Manganese						0.30 min	0.60 min		
Phosphorus	0.12 max					0.04 max	0.04 max		
Sulfur	0.15 max*					0.05 max	0.05 max		
		Classes for Grade C3*						DH3	
		A	B	C	D	E	F		N
Carbon	0.33 - 0.40	0.38 - 0.48	0.15 - 0.25	0.15 - 0.25	0.20 - 0.25	0.20 - 0.25		0.20 - 0.53	
Manganese	0.90 - 1.20	0.70 - 0.90	0.80 - 1.35	0.40 - 1.20	0.60 - 1.00	0.90 - 1.20		0.40 min	
Phosphorus	0.040 max	0.06 - 0.12	0.035 max	0.040 max	0.040 max	0.040 max	0.07 - 0.15	0.046 max	
Sulfur	0.050 max	0.050 max	0.040 max	0.050 max	0.040 max	0.040 max	0.050 max	0.050 max	
Silicon	0.15 - 0.35	0.30 - 0.50	0.15 - 0.35	0.25 - 0.50	0.15 - 0.35	0.15 - 0.35	0.20 - 0.90		
Copper	0.25 - 0.45	0.20 - 0.40	0.20 - 0.50	0.30 - 0.50	0.30 - 0.60	0.20 - 0.40	0.25 - 0.55	0.20 min	
Nickel	0.25 - 0.45	0.50 - 0.80	0.25 - 0.50	0.50 - 0.80	0.30 - 0.60	0.20 - 0.40	1.00 max	0.20 min**	
Chromium	0.45 - 0.65	0.50 - 0.75	0.30 - 0.50	0.50 - 1.00	0.60 - 0.90	0.45 - 0.65	0.30 - 1.25	0.45 min	
Vanadium			0.020 min						
Molybdenum		0.06 max		0.10 max				0.15 min**	
Titanium				0.05 max					

*Selection of a class shall be at the option of the manufacturer. **Nickel or Molybdenum may be used.

Recommended Mating Materials	See ASTM A307, A325, A354, A449, A490
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