

# ASTM A563

## GRADE B

# CARBON STEEL

BOLTING MATERIAL FOR STRUCTURAL PURPOSE

The ASTM A563 specification covers the chemical and mechanical requirements for carbon and alloy steel nuts used on bolts, studs, and threaded fasteners. According to the A563 specification, . Additionally, the specification allows for the substitution of ASTM A194 grade 2H nuts in lieu of A563 grade DH nuts due to the lack of availability of grade DH nuts in nominal sizes 3/4" and larger.

Hot-dip galvanized nuts must be tapped oversize to allow for the added thickness of the zinc on the threads of the externally threaded fastener. These allowances are addressed in the chart below and a more detailed explanation of this issue can be found in the Frequently Asked Questions section of this site.

### Chemical Properties

C	P
0.58	0.13 Max

### Characteristic Standard

Materials&Manufacture	ASTM A563M Class 10S
Finish(Self Colour/Black)	ASTM A563M
Mechanical Properties	ASTM A563M Class 10S
Dimensions&Tolerances	ANSI B18.2.6M
Threads	ASME B1.13M tolerance class 6H
Workmanship	ASTM F812/F812M
Product marking	ASTM A563M Class 10S

### A563M Nut Proof Loads & Nut Hardness

Nominal Size, & Thread Pitch d,	Proof Loads		Hardness	
	10 S		10 S	
	Self Colour/Black (6H fit)	Self Colour/Black (6H fit)	min	max
M16 x 2	195		26	38
M20 x 2.5	305		26	38
M22 x 2.5	377		26	38
M24 x 3	439		26	38
M27 x 3	571		26	38
M30 x 3.5	698		26	38
M36 x 4	1020		26	38

### Mechanical Properties Nuts with UNC, 8 UN, 6 UN and Coarser Pitch Threads

#### Proof Load Stress, ksi(A)

TYPE	1/4" TO 1"		1 1/8" TO 1 1/2"		Hardness		
	Non-Zinc Coated	Zinc Coated	Non-Zinc Coated	Zinc Coated	BHN	HRB	HRC
HEX	120	90	105	79	121-302	69 Min	32 Max
HEAVY HEX	133	100	116	87	121-302	69 Min	32 Max
HEX THICK	133	100	116	87	121-302	69 Min	32 Max

### Mechanical Properties Nuts with UNF, 12 UN and Finer Pitch Threads

#### Proof Load Stress, ksi(A)

TYPE	1/4" TO 1"		1 1/8" TO 1 1/2"		Hardness		
	Non-Zinc Coated	Zinc Coated	Non-Zinc Coated	Zinc Coated	BHN	HRB	HRC
HEX	109	82	94	70	121-302	69 Min	32 Max
HEAVY HEX	120	90	105	79	121-302	69 Min	32 Max
	120	90	105	79	121-302	69 Min	32 Max

### A563M Nut Dimension

Nominal Size, & Thread Pitch d,	s		e		m		dw <sup>1)</sup>	c		Total runout of bearing surface
	Width across flats		Width across corners		Thickness		Bearing face diameter	Washer face thickness		
	max	min	max	min	max	min	min	max	min	
M16 x 2	27.00	26.16	31.18	29.56	17.1	16.4	24.9	0.8	0.4	0.47
M20 x 2.5	34.00	33.00	39.26	27.29	20.7	19.4	31.4	0.8	0.4	0.58
M22 x 2.5	36.00	35.00	41.57	39.55	23.6	22.3	33.3	0.8	0.4	0.63
M24 x 3	41.00	40.00	47.34	45.20	24.2	22.9	38.0	0.8	0.4	0.72
M27 x 3	46.00	45.00	53.12	50.85	27.6	26.3	42.8	0.8	0.4	0.80
M30 x 3.5	50.00	49.00	57.74	55.37	30.7	29.1	46.6	0.8	0.4	0.87
M36 x 4	60.00	58.00	69.28	66.44	36.6	35.0	55.9	0.8	0.4	1.05

### Heat Treatment

Quenched & Tempered @ 425° C Min

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