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ASTM A453 Grade 660 Class A Specification

ASTM A453 Grade 660 Class A Specification provides a yield strength viz. 85 ksi [585 MPa] respectively for use in high temperature service for bolting components such as Stud bolts, screws, nuts, hex bolts & various other fasteners for pressure vessel and valve flanges. *A453 Grade 660 Class A* is equivalent to class D when manufactured in single age hardened condition. *A453 Grade 660 CI A* Studs and nuts are capable of meeting impact test requirements of 40 joules minimum at - 196 Degrees Centigrade. *ASTM A453 Grade 660 Class A* is produced in various other forms like wire rods, round bars, shafts, castings, forgings, threaded bars, threaded rods, wires, tubings, sheets, plates, welding rods, hex bars, Rivets & Springs. Class A is stress rupture tested for 100 Hours at 650°C in finished condition. Class A Bolting can be certified under nace provided the hardness is controlled and not over 35HRC.

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ASTM A453 Grade 660 Class A Properties

Chemical Composition

Grade	ASTM A453 Grade 660 Class A	
UNS Number	S66286	
Elements	Content, %	Product Analysis Variation, Over or Under, %
Carbon (C)	0.08 max	0.01 over
Manganese (Mn)	2.00 max	0.04
Phosphorus (P)	0.040 max	0.005 over
Sulfur (S)	0.030 max	0.005 over
Silicon (Si)	1.00 max	0.05
Nickel (Ni)	24.0-27.0	0.2
Chromium (Cr)	13.5-16.0	0.2
Molybdenum (Mo)	1.00-1.50	0.05
Titanium (Ti)	1.90-2.35	0.05
Aluminum (Al)	0.35 max	0.05 over
Vanadium (V)	0.10-0.50	0.03
Boron (B)	0.001-0.010	0.0004 under to 0.001 over

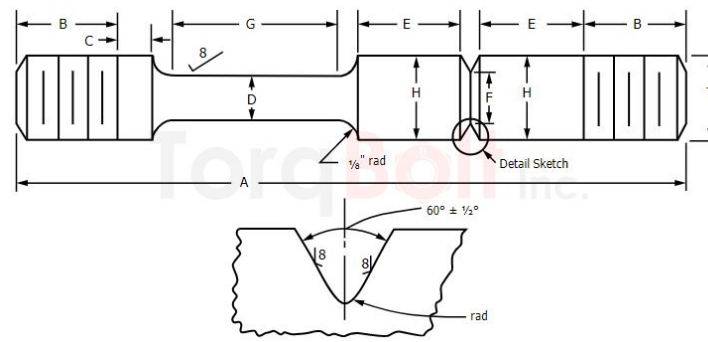
Mechanical Properties

Grade	ASTM A453/A453M Grade 660	
Class	A	
Tensile Strength, min	ksi	130
	MPa	895
Yield Strength (0.2 % Offset), min	ksi	85
	MPa	585
Elongation in 4× Diam, min, %	15	
Reduction of Area, min, %	18	
Brinell Hardness Number	248-341	
Approximate Rockwell Hardness, B and C	min	24 HRC
	max	37 HRC

[Download PDF DataSheet](#)



Stress Rupture Test



Grade	Class	Test Temperature, °F [°C]	Stress, min		Time to Rupture, min, h ^A	Elongation, min, %
			ksi	MPa		
ASTM A453/A453M Grade 660	A	1200 [650]	56	385	100	5

(A) The combination bar specimen shown in Fig. 1 shall be tested continuously at the temperature and at the minimum stress specified or at a greater stress and shall rupture in a time not less than that specified.
 (A) When it is necessary to heat treat or heat treat and pickle after cold finishing, because of special hardness or mechanical property requirements, the permissible variations are generally double those shown in the table.
 (B) For size tolerances of sizes over 4 in. [100 mm], the manufacturer should be consulted.

Heat Treatment

Annealing & Ageing Cycles

Grade Symbol	Class	Solution Treatment	Hardening Treatment
ASTM A453/A453M Grade 660	A	1650 ± 25 °F [900 ± 14 °C], hold 2 h, min, and liquid quench	1325 ± 25 °F [720 ± 14 °C], hold 16 h, air cool

(A) Times refer to the minimum time material is required to be at temperature.

Continuous Heat Treatment Charge Sizes

Diameter, in. [mm]	Weight, lb [kg]
To 1 ³ / ₄ [44]	3000 [1400]
Over 1 ³ / ₄ [44] to 2 ¹ / ₂ [63]	6000 [2700]
Over 2 ¹ / ₂ [63]	12000 [5400]

Lot / Batch Sizes

Diameter, in. [mm]	Maximum Lot Size, lb [kg]
1 ¹ / ₂ [38] and under	200 [90]
Over 1 ¹ / ₂ [38] to 1 ³ / ₄ [44], incl	300 [140]
Over 1 ³ / ₄ [44] to 2 ¹ / ₂ [63], incl	600 [270]
Over 2 ¹ / ₂ [63]	20 pieces

Marking Requirements

Grade	Marking
ASTM A453/A453M GRADE 660 CLASS A	TB 660A M1/M2/R1/R2

Bolting Threading Types

Specification	Grade	UNS No.	CLASS	Type			
ASTM A453/A453M	Grade 660	S66286	Class A	M1	M2	R1	R2

ASTM A453 Grade 660 Class A Product Range

Based on the application & Usage



BARS / RODS



FORGINGS



HEAVY HEX NUTS



BOLTS



HEX BOLTS



SOCKET HEAD CAP SCREWS



PUSH BOLTS / RODS



HEX CAP SCREWS



SET SCREWS / GRUB SCREWS



WASHERS



COUNTERSUNK SCREWS



U BOLT

STUD BOLTS

ASTM A453 Grade 660 Class A Related Keywords

- A453 gr 660 cl a
- A453 gr 660a
- A453 gr.660 cl.a
- ASTM A453 gr. 660 cl a
- A453 grade 660 class a
- ASTM A453 grade 660 class a
- ASTM A453 grade 660 class a
- SA 453 gr 660 class a
- SA 453-660a
- SA-453-660 a
- A453 660a
- A453 gr 660 a
- A453 gr 660 bolts
- A453 gr 660 class a
- A453 gr 660a bolts
- ASTM A453 660a
- A453 grade 660 bolts
- ASTM A453 gr. 660 cl.a
- ASTM A453 grade 660 a
- ASTM A453 grade 660 bolts
- SA 453 660 a
- SA 453 gr 660 a
- SA 453 grade 660 class a
- SA 453-660 a
- SA 453-660 type a

Specifications

- ASTM A453
- ASTM A638
- EN 10269
- EN 10083-3
- ISO 3506-5
- DIN 267

Surface Treatments

- Xylan 1070 / 1014 / 1400 / 1424
- Xylar 2 / 101
- SermaGard 1105 / 1280
- Dacromet 320 / 500
- TakeCoat 1000 Ceramic
- Magnigard
- MolyKote

Certifications

- ISO 9001 - 2015 Certified
- PED 2014/68/EC
- API 6A ; API 20E; API 20F
- NACE MR0175/ISO 15156-2
- NORSOK M-650
- DFAR
- MERKBLATT AD 2000 W2/W7/W10

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SATISFACTION SURVEY



