

Reinforcement Steel Bars (Rebar)

Advanced technology to meet the market requirements and superior surface quality are some of the prominent features of Qatar Steel's rebar.



Rebar Specification

Characteristics	BS 4449:2005 Gr B500B	BS 4449:2005 Gr B500C	ASTM A615 Gr 60	ASTM A615 Gr 75	ASTM A615 Gr 80	Q690 (YS> 600MPa)	ISO 6935-2 :2007 B500B-R	SASO ASTM A615:2015
-----------------	--------------------------	--------------------------	-----------------------	-----------------------	-----------------------	-------------------------	--------------------------------	------------------------

Chemical Composition

Carbon (C) %	0.22 Max	0.22 Max	—	—	—	32 Max	0.32 Max	—
Phosphorous (P) %	0.05 Max	0.05 Max	0.05 Max	0.05 Max	0.05 Max	05 Max	0.060	0.05 Max
Sulphur (S) %	0.05 Max	0.05 Max	0.05 Max	0.05 Max	0.05 Max	05 Max	0.060	0.05 Max
Nitrogen (N) ppm	120 Max	120 Max	120 Max	120 Max	120 Max	20 Max	120 Max	120 Max
CE (%)	0.48 Max	0.48 Max	—	—	—	-	—	—

Mechanical & Physical Properties

Yield Strength, MPa (min)	500 – 650	500 – 650	420	520	550	600	500	420
Tensile Strength, MPa (min)	—	—	620	690	725	740	—	620
TS/YS (min)	1.08	> = 1.15, < 1.35	—	—	—	—	1.08	—
Elongation (%), (min)	—	—	9	7	7	7	14	9
Agt (%) (min)	5	7.5	—	—	—	—	5	—
Bend Angle	90°	90°	180°	180°	180°	180°	160° to 180°	180°
Re-bend Angle	From 90° Back by at least 20°	From 90° Back by at least 20°	—	—	—	—	90° Back by at least 20°	—

Weldability

[illegible]

Application

RCC Construction	RCC Construction in seismic zone	RCC Construction	RCC Construction	High Raise Towers	High Raise Towers / Highly loaded RCC structure	RCC Construction	RCC Construction
------------------	----------------------------------	------------------	------------------	-------------------	---	------------------	------------------

Note: Bend and Rebend tests are performed as specified in respective standards using proper mandrel diameters

Technical Features

BS4449:2005 GrB500B rebars are produced with low carbon equivalent & Weldable, whereas ASTM A615 Gr60, Gr75, Gr80, QS600, ISO 6935-2:2007 B500B-R and SASO ASTM A615:2015 are Non-Weldable	BS4449:2005 GrB500B rebars have High Yield Strength i.e., minimum 500 Mpa compared to ASTM A615 Gr60, without compromising on ductility
BS4449:2005 GrB500B rebars have High Strength Compared to ASTM A615 Gr60 which reduce steel consumption & congestion in structure, in turn reduces overall cost of project	BS4449:2005 GrB500B rebars have better bend performance, due to severe bend & re-bend angle. Rebars confirming to BS 4449:2005 specification are subjected to fatigue testing and survive minimum 5 million stress cycles. QS 600 with yield strength > 600 MPa. Over the years, rebar with yield strength 420 MPa, 500 MPa etc., confirming to BS 4449 / ASTM A615 specification were available in Qatar/GCC region. Rebar with higher strength i.e., YS > 600 MPa will reduce the steel consumption by around 20% in construction, which in turn lowers the overall cost of structure using QS 600 grade can also lead to reduction in column size of heavily loaded structure and there is relief from rebar congestion.

Nominal Dimensions, Weight & Tolerance On Knots

Designation	Nominal Dia. (d) (mm)	Nominal Cross Section Area (mm²)	Unit Mass (kg/m)	Maximum of Average Knot Space (mm)	Height of Knot		Ltgd/Ri Width (mm)	Nominal Mass kg/piece		
					Min (mm)	Max (mm)		6m	9m	12m
D8	08	50.27	0.395	5.6	0.3	0.6	3.14	2.37	3.56	4.74
D10	10	78.54	0.617	7.0	0.4	0.8	3.9	3.7	5.55	7.40
D12	12	113.1	0.888	8.4	0.5	1.0	4.7	5.33	7.99	10.66
D14	14	153.9	1.21	9.8	0.6	1.2	5.5	7.26	10.89	14.52
D16	16	201.1	1.58	11.2	0.7	1.4	6.3	9.48	14.22	18.96
D18	18	254.5	2.00	12.6	0.8	1.6	7.1	12.00	18.00	24.00
D20	20	314.2	2.47	14.0	1.0	2.0	7.9	14.82	22.23	29.64
D22	22	380.1	2.98	15.4	1.1	2.2	8.6	17.88	26.82	35.76
D25	25	490.9	3.85	17.5	1.3	2.6	9.8	23.10	34.65	46.20
D28	28	615.8	4.83	19.6	1.4	2.8	11.0	28.98	43.47	57.96
D30	30	706.9	5.55	21.0	1.5	3.0	11.8	33.30	49.95	66.60
D32	32	804.2	6.31	22.4	1.6	3.2	12.6	37.86	56.79	75.72
D36	36	1017.9	7.990	25.2	1.8	3.6	14.1	47.94	71.99	95.88
D40	40	1256.6	9.864	28.0	2.0	4.0	15.7	59.18	88.78	118.37

Requirement for rib geometry
Height of transverse ribs 0.03d to 0.15d
Rib spacing, c 0.4d to 1.2d
Rib inclination, β 35° to 75°

The projection of transverse ribs shall extend over at least 75% of circumference of the product which shall be calculated from the nominal diameters.

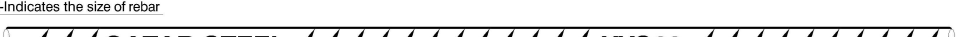
Longitudinal rib:

Where longitudinal rib are present, there height shall not exceed $0.10d$, where d is the nominal diameter of the product.

Rebar Marking

Deformed bars produced at Qatar Steel conform to various national and international standards such as, BS 4449:2005 Grade B500B/Grade B500C (Nuclear Grade & British), SASO ASTM A615:2015, ASTM A615 Grade 40/Grade 60/Grade 75/Grade 80 (American) & QS 600 (Qatar Steel High strength rebar).

The registered trade mark 'QATAR STEEL' is rolled on every deformed rebars at an interval of about one meter long with all identification marks.

BS4449:2005 Grade B500B and Nuclear grade	For local and Other Countries 
BS4449:2005 Grade B500C and Nuclear grade	
BS4449:2005 Grade B500B and Nuclear grade	For UAE 
QS600	
SASO ASTM A615:2015 ASTM A615 Gr60	XX-Indicates the size of rebar 
ISO6935-2 B500B-R	XX-Indicates the size of rebar 

Wire-Rod and Re-Bar In Coils



Product Size

Products	Size – MM											
Wire Rod	5.5	6.0	6.5	7.0	8.0	9.0	10	11	12	14	16	–
Rebar in Coil	—	—	—	—	8.0	–	10	–	12	14	16	–

Wire Rod Grades: SAE1006/ SAE1008/ SAE1012/ SAE1018/ SAE1042/ SAE 1045/ SAE1060/ SAE1065/SAE1070/ SAE1080

Rebar in Coil: ASTM A615 GR60/ BS4449:1997: GR460B / BS4449:2005 GRB500B / ISO 6935-2

Coil Weight & Dimension	Metallurgical Standard
-------------------------	------------------------

Inner Diameter (MM): 850 – 950

Decarburization : 1% max of wire rod diameter

Outer Diameter (MM): 1100-1200

Surface Defect : 1% max of wire rod diameter

Coil Weight (Kg) : 1050 -1200

Cold Up-settability : 67% (Billet route)

Chemical & Mechanical Properties

Grade	%C	%Mn	%Si	%P	%S	Ys-N/mm ²	Ts-N/mm ²	%El	%Agt.
SAE 1006	0.08 Max.	0.25 – 0.40	0.15 Max	0.035 Max	0.025 Max	240 – 290	340 – 415	35 Min	–
SAE 1008	0.06 – 0.10	0.30 – 0.50	0.15 Max	0.035 Max	0.025 Max	250 – 300	350 – 425	30 Min	–
SAE 1012	0.10 – 0.15	0.30 – 0.60	0.15 Max.	0.035 Max	0.025 Max	275 – 325	400 – 475	30 Min	–
SAE 1018	0.15 – 0.20	0.60 – 0.90	0.10-0.35	0.035 Max	0.025 Max	300 – 350	450 – 525	22 Min	–
ASTM A615 GR60	0.22Max.	0.60 – 1.00	0.35 Max	0.035 Max	0.025 Max	420 Min.	620 Min.	9 Min.	–
BS4449: 1997 GR460B	0.22Max.	0.60 – 1.00	0.35 Max	0.035 Max	0.025 Max	460 Min.	Ys x 1.08. Min	14 Min.	5% Min
BS4449 :2005 GRB500B	0.22Max.	0.60 – 1.00	0.35 Max	0.035 Max	0.025 Max	500-650.	Ys x 1.08 Min.	–	5% Min

Dimensional Tolerances of Wire Rods:

Standard	Wire Rod Size (mm)	Tolerance +/- (mm)	Out of Round (mm)	Remarks
QS FZE	5.5 – 16.0	0.20	0.30 MM	QS FZE Tolerance is Half of ASTM Tolerance
ASTM A510	5.5 – 16.0	0.40	0.60 MM	General requirements

Coil Identification

Each coil will have tag with unique coil number and Heat number.