



**SAS**  
Stressteel, Inc.

**SAS Thread Bars and Accessories**  
**Hollow Bars and Strand Anchors**  
**Formwork Bars and Ultra Low Temperature Steel**

**SAS SYSTEMS**



**MAX AICHER**  
UNTERNEHMENSGRUPPE

# SAS Stressteel Inc.

## company overview

SAS Stressteel is your trusted partner for the most challenging projects.

SAS Systems have long been the preferred material for the most advanced applications. Our unique approach to supply perfectly matched connectors and related accessories has made SAS Systems the most recognized partner in the world of advanced engineering.

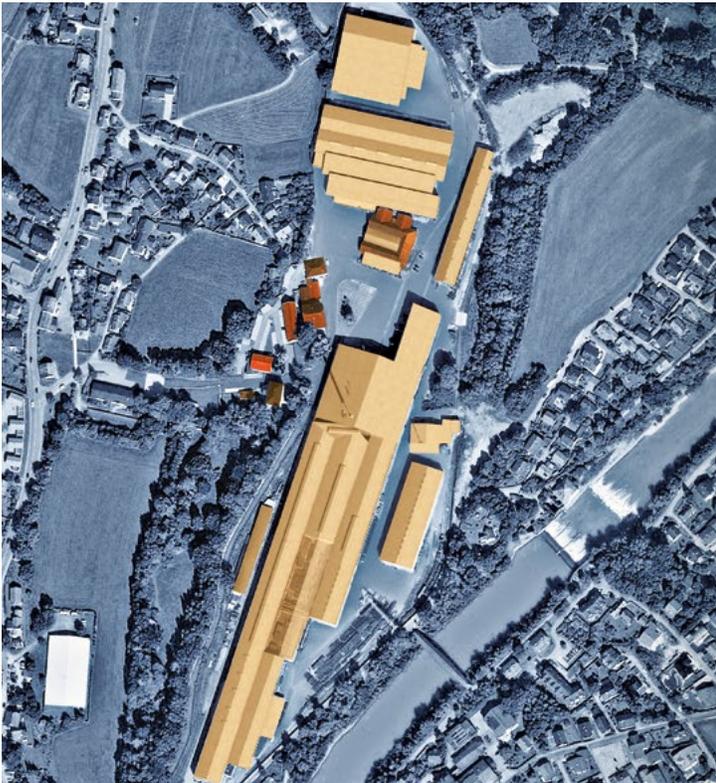
Our high strength reinforcement systems have been used in some of the most iconic landmark buildings in the US and worldwide.

The product range of SAS Systems features various grades of high quality hot-rolled threaded bars, hollow core bars and strand systems. With bars ranging from  $\frac{3}{4}$  to 3 in diameter, we are able to

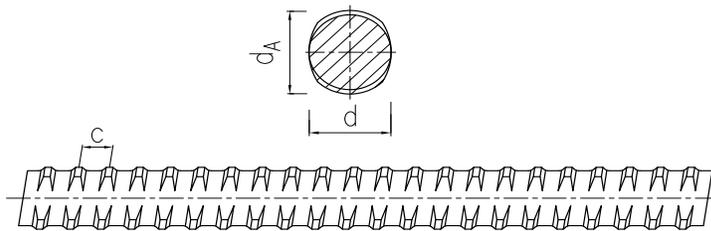
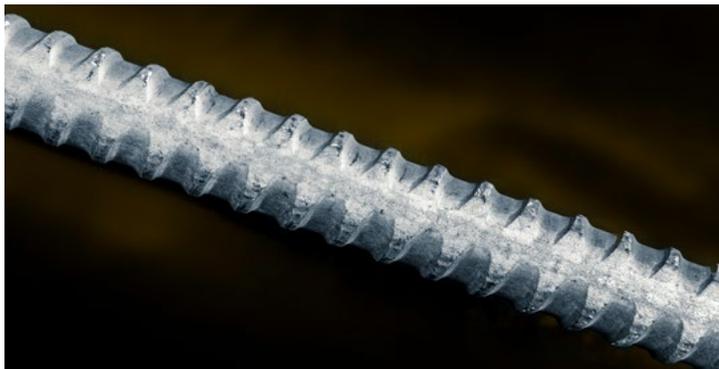
design perfectly engineered solutions for your project. Readily available grades of threaded bars are grade 75, grade 80, grade 97, grade 100 and grade 150 for post-tensioning applications.

With warehouses located in Roseland (New Jersey, USA), Fremont (California, USA) and Hamilton (Ontario, Canada) we are well represented to satisfy your needs. In addition, we have local technical sales and engineering professionals located throughout North America. Our team is ready to assist you with your next project.

Our parent company, the Max Aicher Group, operates various steel mills throughout North America and Europe, including the Stahlwerk Annahuetten, the oldest continually operating steel mill in the world, dating back to the year 1537.



# SAS thread bars grade 75/80 for geotechnical and reinforcing applications based on ASTM A615



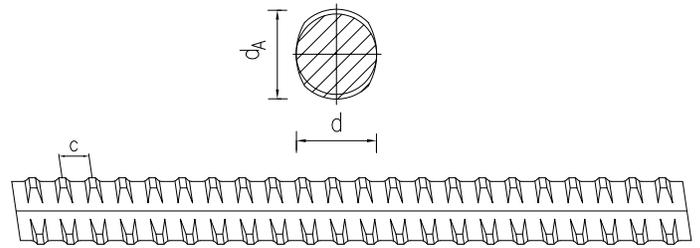
SAS thread bar hot rolled, ribbed - left hand thread

SAS Stressteel Inc. carries a full line of matching accessories from Hex Nuts to "couplers", including oversized versions for hot dipped galvanized and epoxy coated applications. Our SAS grade 75/80 bars conform to ASTM A615.

areas of application	nominal diameter			yield load [kips]	ultimate load [kips]	cross section area [in <sup>2</sup> ]	weight [lb/ft]	item No.	elongation	
	#	[in]	[mm]						A <sub>gt</sub> [%]	A <sub>t10</sub> [%]
<b>SAS grade 75</b>										
 reinforcing systems	4		12	13.1	15.1	0.175	0.60	120GL		
			14	17.9	20.7	0.239	0.81	140GL		
	5	5/8	16	23.4	26.8	0.312	1.06	160GL		
	6	3/4	20	36.5	42.5	0.487	1.66	200GL		
	8	1	25	57.1	65.6	0.761	2.59	250GL		
 geotechnical systems	9	1 1/8	28	71.6	82.5	0.955	3.25	280GL	6	10
	10	1 1/4	32	93.5	106.8	1.246	4.24	320GL		
	11	1 3/8	36	118.6	136.0	1.581	5.37	360GL		
	13	1 5/8	40	146.5	167.5	1.953	6.63	400GL		
	14	1 3/4	43	168.8	193.8	2.251	7.66	430GL		
	16	2	50	227.9	262.1	3.038	10.35	500GL		
	24	3	75	513.6	546.3	6.848	23.30	750GL	5	---
<b>SAS grade 80</b>										
 reinforcing systems	8	1	25	60.9	79.9	0.761	2.59	250GL		
	9	1 1/8	28	76.4	100.3	0.955	3.25	280GL		
	10	1 1/4	32	99.7	130.8	1.246	4.24	320GL	6	10
 geotechnical systems	11	1 3/8	36	126.5	166.0	1.581	5.37	360GL		
	14	1 3/4	43	180.1	236.4	2.251	7.66	430GL		
	18	2 1/4	57.5	322.0	408.7	4.025	13.69	575GL		---
	20	2 1/2	63.5	392.7	498.0	4.909	16.71	635GL	5	---

# SAS thread bars grade 97/100

high strength reinforcement systems (HSRS®)  
according to AC 237 / ICC approved grade 97



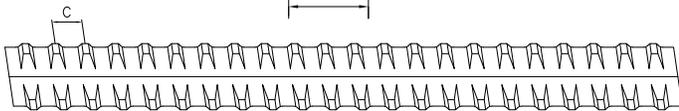
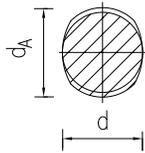
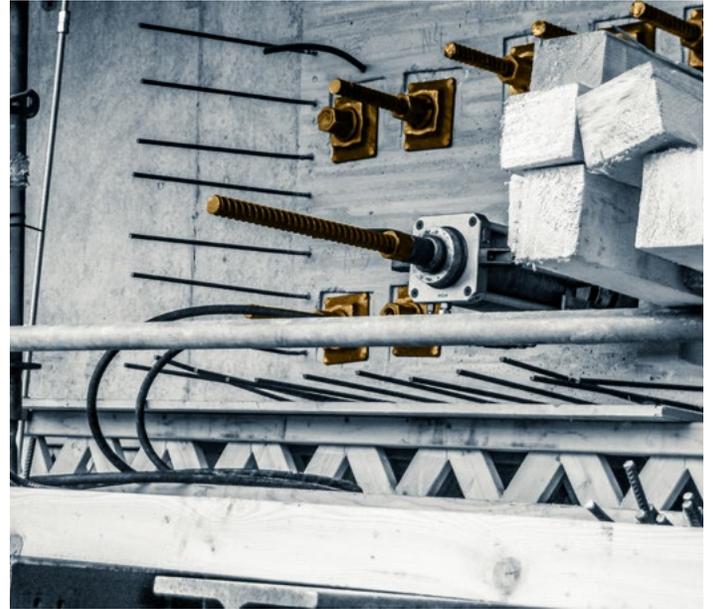
SAS thread bar hot rolled, ribbed - right hand thread

SAS grade 97/100 is the perfect solution when high strength reinforcement is demanded. Equally well suited for tension and compression applications SAS grade 97/100 has been used to realize the most sophisticated projects in modern engineering. Combined with innovative design and value engineered solutions, our products can be used as a high strength alternative to common reinforcement in the construction of high rise buildings and deep foundation elements. SAS grade 97 carries its own ICC approval for high strength reinforcing.

areas of application	nominal diameter			yield load	ultimate load	cross section area	weight	item no.	elongation	
	#	[in]	[mm]	[kips]	[kips]	[in <sup>2</sup> ]	[lb/ft]		A <sub>gt</sub> [%]	A <sub>10</sub> [%]
<b>SAS grade 97</b>										
	6	3/4	18	38.2	45.9	0.394	1.34	180AT		
	7	7/8	22	57.1	68.3	0.589	2.00	220AT		
geotechnical systems	8	1	25	73.8	88.3	0.761	2.59	250AT		
	9	1 1/8	28	92.6	110.8	0.955	3.25	280AT		
	10	1 1/4	30	106.3	127.0	1.096	3.73	300AT		10
tunneling & mining	11	1 3/8	35	144.6	173.1	1.491	5.07	350AT	5	
	14	1 3/4	43	218.3	261.2	2.251	7.66	430AT		
high-strength reinforcement	16	2	50	295.1	353.0	3.043	10.35	500AT		
	18	2 1/4	57.5	390.5	466.9	4.025	13.69	575AT		---
	20	2 1/2	63.5	476.2	569.7	4.909	16.71	635AT		---
	24	3	75	664.2	794.7	6.848	23.30	750AT		---
<b>SAS grade 100</b>										
	6	3/4	18	39.4	45.3	0.394	1.34	180AT		
geotechnical systems	7	7/8	22	58.9	67.7	0.589	2.00	220AT		
	8	1	25	76.1	87.5	0.761	2.59	250AT		
tunneling & mining	9	1 1/8	28	95.5	109.8	0.955	3.25	280AT		
	10	1 1/4	30	109.6	126.0	1.096	3.73	300AT		10
	11	1 3/8	35	149.1	171.5	1.491	5.07	350AT	5	
high-strength reinforcement	14	1 3/4	43	225.1	258.9	2.251	7.66	430AT		
	16	2	50	304.3	350.0	3.043	10.35	500AT		
	18	2 1/4	57.5	402.5	462.9	4.025	13.69	575AT		---
	20	2 1/2	63.5	490.9	564.5	4.909	16.71	635AT		---

# SAS stress bars grade 150

## post-tensioning bars based on ASTM A722 TYPE II



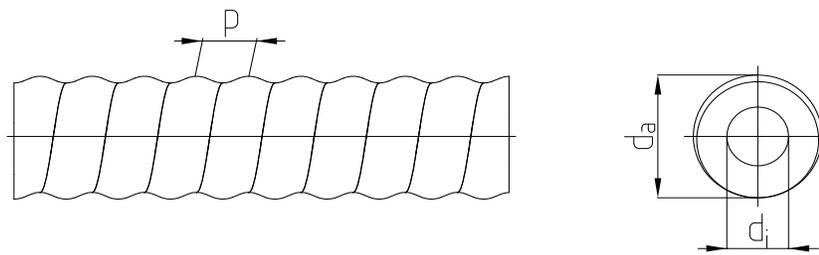
**SAS thread bar hot rolled, ribbed - right hand thread**

SAS post-tensioning bars are an integral part of modern post-tensioning solutions in bridge construction, structural engineering and the retrofitting of structures. Due to the manufacturing process, SAS grade 150 steel bars, as compared to standard bars, feature a distinct and well defined yield point while at the same time possessing high strength and ductility.

areas of application	nominal diameter		yield load	ultimate load	cross section area	weight	item no.	elongation	
	[in]	[mm]	[kips]	[kips]	[in <sup>2</sup> ]	[lb/ft]		A <sub>gt</sub> [%]	A <sub>10</sub> [%]
<b>SAS grade 150</b>									
 <b>geotechnical systems</b>	3/4	18	51.7	57.3	0.374	1.32	180WR	5	7
	1	26.5	118.0	130.4	0.854	3.01	265WR		
	1-1/4	32	170.9	190.0	1.246	4.39	320WR		
 <b>post-tensioning systems</b>	1-3/8	36	215.8	240.5	1.581	5.56	360WR	4	---
	1-5/8	40	267.5	296.7	1.948	6.86	400WR		
	1-7/8	47	370.9	409.2	2.689	9.47	470WR		
	2-1/4	57	484.5	600.5	4.001	14.08	570W		
	2-1/2	65	625.0	774.9	5.163	18.21	650W		
	3	75	829.5	1027.8	6.848	24.12	750W	---	

# SAS hollow bars and accessories

## self-drilling hollow bar systems and accessories



SAS Stressteel carries a full line of hollow bar accessories to ensure accelerated production. Various types of drill bits are available to suit a variety of soil and ground conditions.

Type	Unit	R38	R51	RR64	RR76	RR108
Ratio		H0500-38	H0800-51	H1200-64	H1600-76	H2400-108
$d_o$	[in]	1.50	1.97	2.52	3.03	4.25
$d_i$	[in]	0.73	1.14	1.52	2.03	3.25
$p$	[in]	0.50	0.50	0.32	0.32	0.32
$S_o$	[in <sup>2</sup> ]	1.147	1.783	2.666	3.519	5.503
weight	[lbs/ft]	3.9	6.0	9.1	12.0	18.7
$F_y$	[kips]	89.9	141.6	213.6	269.8	400.2
$F_u$	[kips]	112.4	179.8	269.8	359.7	539.5

# SAS strand anchors

## domestic and non-domestic strand solutions available

With one of the most sophisticated strand machines available, we are proud to offer domestic and non-domestic strand options to be used in the most challenging projects. From the initial design help to the final product, SAS Stressteel has established itself at the top of the industry.

With various approvals, from the City of LA to the California Department of Transportation (Caltrans), SAS Stressteel strand anchors have been chosen to be the perfect solution for a variety of infrastructure projects.

SAS Stressteel strand anchors are manufactured in accordance with the Post-Tensioning Institute (PTI) recommendations for pre-stressed rock and soil anchors. SAS strand anchors are meeting all required standards as set forth in the ASTM A416.

Advantages using SAS Stressteel strand anchors

- Highest quality strand available (domestic and non-domestic)
- Sophisticated strand machine ensuring highest industry standard wax and grease process, ensuring individual coverage of each 7 strand wire.
- Class 1 (permanent application) and Class 2 (temporary application) corrosion protection available
- Additional corrosion protection of anchor heads and hardware available.
- Shop drawing and engineering assistance to our customers
- Stressing equipment with up to date calibration available on rental basis
- Short lead time



# SAS stressteel formworks bars

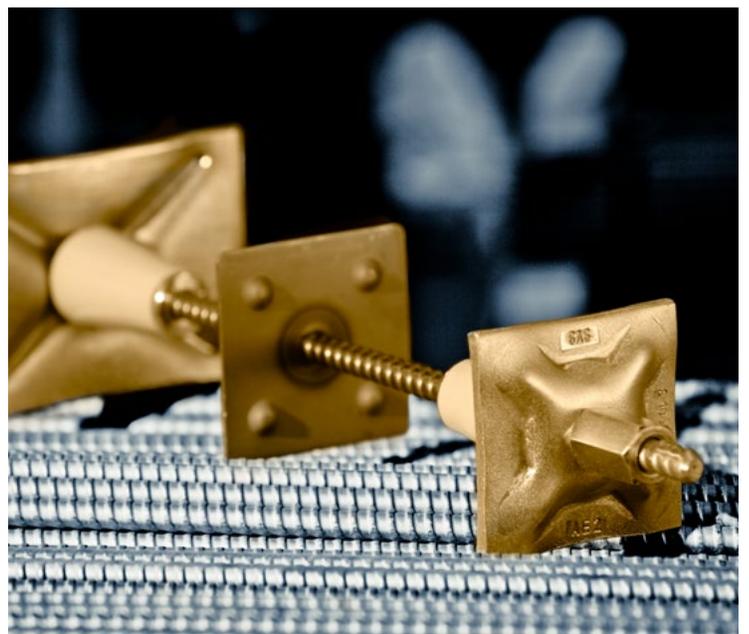
## weldable and non-weldable bars including all related accessories

SAS form ties and SAS formwork accessories are used worldwide by well-known leading formwork companies and building contractors to connect and anchor concrete formworks and scaffolding in civil and structural engineering projects.

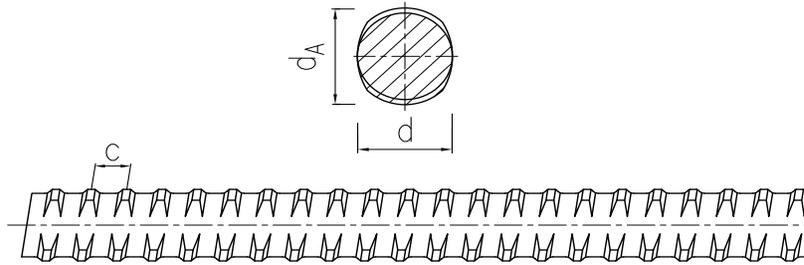
Although form ties make up only a relatively minor part of the overall formwork system costs, they are of essential structural importance. They absorb and transfer all forces acting onto the formworks and working platforms. Therefore, maximum quality and reliability must be absolutely ensured.

Our accessories meet equally high quality standards. As a rule, they are tested up to the bar's ultimate load. SAS Stressteel offers Formwork Ties in 15mm (5/8"), 20mm (7/8") and 26.5mm (1 inch) diameters.

areas of application	nominal diameter		yield load [kips]	ultimate load [kips]	cross section area [in <sup>2</sup> ]	weight [lb/ft]	item no.	elongation	
	[in]	[mm]						A <sub>9</sub> [%]	A <sub>10</sub> [%]
<b>SAS grade 160 FA</b>									
 <i>formwork ties</i>	5/8	15	35.7	43.8	0.274	0.97	150FA	3	7
	3/4	20	63.6	77.6	0.487	1.72	200FA		
	1	26.5	111.3	136.2	0.854	3.01	265FA	2	
<b>SAS grade 150 FC</b>									
 <i>formwork ties</i>	5/8	15	35.7	41.8	0.274	0.97	150FC	3	7
	3/4	20	63.6	74.2	0.487	1.72	200FC		
<b>SAS grade 150 E</b>	1	26.5	118.0	130.4	0.854	3.01	265E	2	7



# SAS ULTS cryogenic bars for the construction of LNG Tanks SAS ULTS 500/600 SAS ULTS Ultra Low Temperature Steel (-165°C)



SAS thread bar hot rolled, ribbed - left hand thread

SAS Stressteel ULTS has been developed for the construction of large scale LNG Tanks. SAS ULTS has been used for a variety of LNG projects throughout the world and has surpassed all required testing to be used in such demanding applications.

SAS 500/600 fulfills all the requirements set forth in the updated DIN EN 14620-3, the internationally adapted standard for ULTS material testing.

SAS 500/600 ULTS is the threaded bar solution and cost cutting alternative to cryogenic rebar. The very high ductility of the material exceeds the requirements of the standards for ultra-low temperature applications. All known advantages of the thread bar geometry persist in this cryogenic material. Full line of accessories available to revolutionize the way LNG tanks are manufactured.

areas of application	nominal diameter			yield load [kips]	ultimate load [kips]	cross section area [in <sup>2</sup> ]	weight [lb/ft]	item No.	elongation		
	#	[in]	[mm]						A <sub>gt</sub> [%]	A <sub>t0</sub> [%]	
 Ultra Low Temperature Steel	<b>SAS 500/600 - ULTS</b>										
		4		12	12.8	15.3	0.175	0.60	120UT		
				14	17.3	20.7	0.239	0.81	140UT		
		5	5/8	16	22.5	27.2	0.312	1.06	160UT		≥5
		6	3/4	20	36.0	42.3	0.487	1.66	200UT		(A <sub>g</sub> > 3.0) (NSR ≥ 1.0)
		8	1	25	55.1	66.3	0.761	2.59	250UT		(Yield ratio ≥ 1.15)
		9	1 1/8	28	69.7	83.2	0.955	3.25	280UT		acc. EN14620-3:2006
		10	1 1/4	32	91.1	108.4	1.246	4.24	320UT		



## SAS Stressteel accessories

SAS Stressteel Inc. carries a complete line of perfectly matched accessories to our thread bar and hollow bar products.

All SAS System accessories comply with the highest quality standards to ensure perfect connectivity between the individual system components. In addition, we offer oversized accessories to be used with hot-dipped galvanized and epoxy coated bars for special applications where additional corrosion protection is desired or required.

All our accessories are designed to carry the nominal load capacity of the respective bars to ensure ultimate safety. Custom solutions are available on request. Please contact us for more information.











## SAS thread bars grade 80/97/100 for geotechnical and reinforcing applications based on ASTM A615

SAS grade 80	#	8	9	10	11	14	18	20
	[in]	1	1 1/8	1 1/4	1 3/8	1 3/4	2 1/4	2 1/2
	[mm]	25	28	32	36	43	57.5	63.5
Item no.		250GL	280GL	320GL	360GL	430GL	575GL	635GL
max. d <sub>A</sub>	[in]	1.14	1.26	1.42	1.61	1.89	2.48	2.76
$f_{yk} (f_{0,2k}) / f_{tk} / A_{gt}^{1)}$		80 ksi / 105 ksi / ≥ 5%						
F <sub>yk</sub> (F <sub>0,2k</sub> )	[kips]	60.9	76.4	99.7	126.5	180.1	322.0	392.7
F <sub>tk</sub>	[kips]	79.9	100.3	130.8	166.0	236.4	422.6	515.5
A	[in <sup>2</sup> ]	0.761	0.955	1.246	1.581	2.251	4.025	4.909
G	[lb/ft]	2.59	3.25	4.24	5.37	7.66	13.69	16.71

SAS grade 97	#	6	7	8	9	10	11	14	16	18	20
	[in]	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 3/4	2	2 1/4	2 1/2
	[mm]	18	22	25	28	30	35	43	50	57.5	63.5
Item no.		180AT	220AT	250AT	280AT	300AT	350AT	430AT	500AT	575AT	635AT
max. d <sub>A</sub>	[in]	0.83	0.98	1.10	1.26	1.34	1.58	1.89	2.17	2.48	2.76
$f_{yk} (f_{0,2k}) / f_{tk} / A_{gt}^{1)}$		97 ksi / 116 ksi / ≥ 5%									
F <sub>yk</sub> (F <sub>0,2k</sub> )	[kips]	38.2	57.1	73.8	92.6	106.3	144.6	218.4	295.2	390.4	476.2
F <sub>tk</sub>	[kips]	45.7	68.3	88.3	110.8	127.1	173.0	261.1	353.0	466.9	569.4
A	[in <sup>2</sup> ]	0.394	0.589	0.761	0.955	1.096	1.491	2.251	3.043	4.025	4.909
G	[lb/ft]	1.34	2.00	2.59	3.25	3.73	5.07	7.66	10.35	13.69	16.71

SAS grade 100	#	6	7	8	9	10	11	14	16	18	20
	[in]	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 3/4	2	2 1/4	2 1/2
	[mm]	18	22	25	28	30	35	43	50	57.5	63.5
Item no.		180AT	220AT	250AT	280AT	300AT	350AT	430AT	500AT	575AT	635AT
max. d <sub>A</sub>	[in]	0.83	0.98	1.10	1.26	1.34	1.58	1.89	2.17	2.48	2.76
$f_{yk} (f_{0,2k}) / f_{tk} / A_{gt}^{1)}$		100 ksi / 115 ksi / ≥ 5%									
F <sub>yk</sub> (F <sub>0,2k</sub> )	[kips]	39.4	58.9	76.1	95.5	109.6	149.1	225.1	304.3	402.5	490.9
F <sub>tk</sub>	[kips]	45.3	67.7	87.5	109.8	126.0	171.5	258.9	350.0	462.9	564.5
A	[in <sup>2</sup> ]	0.394	0.589	0.761	0.955	1.096	1.491	2.251	3.043	4.025	4.909
G	[lb/ft]	1.34	2.00	2.59	3.25	3.73	5.07	7.66	10.35	13.69	16.71

<sup>1)</sup> Percentage total elongation at maximum force

*Weight specifications of bar and accessories are average values. The actual values may deviate due to fabrication tolerances.*

# SAS thread bar

areas of application

nominal diameter  
Ø

yield load

ultimate load

cross section  
area

weight

item no.

elongation

# [in] [mm] [kips] [kips] [in<sup>2</sup>] [lb/ft] A<sub>gt</sub> [%] A<sub>10</sub> [%]

## SAS grade 75

 reinforcing systems

 geotechnical systems

		12	13.1	15.1	0.175	0.60	120GL	6	10
		14	17.9	20.7	0.239	0.81	140GL		
5	5/8	16	23.4	26.8	0.312	1.06	160GL		
6	3/4	20	36.5	42.5	0.487	1.66	200GL		
8	1	25	57.1	65.6	0.761	2.59	250GL		
9	1 1/8	28	71.6	82.5	0.955	3.25	280GL		
10	1 1/4	32	93.5	106.8	1.246	4.24	320GL		
11	1 3/8	36	118.6	136.0	1.581	5.37	360GL		
	1 5/8	40	146.5	167.5	1.953	6.63	400GL		
14	1 3/4	43	168.8	193.8	2.251	7.66	430GL		
16	2	50	227.9	262.1	3.038	10.35	500GL		
24	3	75	513.6	546.3	6.848	23.30	750GL	5	---

## SAS grade 80

18	2 1/4	57.5	322.0	408.7	4.025	13.69	575GL	5	---
20	2 1/2	63.5	392.7	498.0	4.909	16.71	635GL		---

## SAS 500 / 600 - ULTS

 Ultra Low Temperature Steel

		12	12.8	15.3	0.175	0.60	120UT	≥5 [A <sub>gt</sub> > 3,0] (NSR ≥ 1,0) (Yield ratio ≥ 1,15) acc. EN14620-3:2006
		14	17.3	20.7	0.239	0.81	140UT	
5	5/8	16	22.5	27.2	0.312	1.06	160UT	
6	3/4	20	36.0	42.3	0.487	1.66	200UT	
8	1	25	55.1	66.3	0.761	2.59	250UT	
9	1 1/8	28	69.7	83.2	0.955	3.25	280UT	
10	1 1/4	32	91.1	108.4	1.246	4.24	320UT	

## SAS grade 97

 geotechnical systems

 tunneling & mining

 high-strength reinforcement

6	3/4	18	38.2	45.9	0.394	1.34	180AT	5	10	
7	7/8	22	57.1	68.3	0.589	2.00	220AT			
8	1	25	73.8	88.3	0.761	2.59	250AT			
9	1 1/8	28	92.6	110.8	0.955	3.25	280AT			
10	1 1/4	30	106.3	127.0	1.096	3.73	300AT			
11	1 3/8	35	144.6	173.1	1.491	5.07	350AT			
14	1 3/4	43	218.3	261.2	2.251	7.66	430AT			
16	2	50	295.1	353.0	3.043	10.35	500AT			
18	2 1/4	57.5	390.5	466.9	4.025	13.69	575AT			---
20	2 1/2	63.5	476.2	569.7	4.909	16.71	635AT			---
24	3	75	664.2	794.7	6.848	23.30	750AT	---		

## SAS grade 150

 post-tensioning systems

 geotechnical systems

	3/4	18	51.7	57.3	0.374	1.32	180WR	5	7
	1	26.5	118.0	130.4	0.854	3.01	265WR		
	1 1/4	32	170.9	190.0	1.246	4.39	320WR		
	1 3/8	36	215.8	240.5	1.581	5.56	360WR		
	1 5/8	40	267.5	296.7	1.948	6.86	400WR		
	1 7/8	47	370.9	409.2	2.689	9.47	470WR		
	2 1/4	57	484.5	600.5	4.001	14.08	570W	4	---
	2 1/2	65	625.0	774.9	5.163	18.21	650W	---	
	3	75	829.5	1027.8	6.848	24.12	750W	---	

For 3/4" to 1-7/8" diameter bars, yield stress is 137 ksi (0.91 fu) and maximum jacking stress 120 ksi (0.80 fu)  
For 2-1/4" to 3" diameter bars, yield stress is 120 ksi (0.80 fu) and maximum jacking stress 105 ksi (0.70 fu)

## SAS grade 160 FA

 formwork ties

	5/8	15	35.7	43.8	0.274	0.97	150FA	3	7
	7/8	20	63.6	77.6	0.487	1.72	200FA		
	26.5	111.3	136.2	0.854	3.01	265FA	2		

## SAS grade 150 FC

 formwork ties

	5/8	15	35.7	41.8	0.274	0.97	150FC	3	7
	7/8	20	63.6	74.2	0.487	1.72	200FC		

## SAS grade 150 E

	1	26.5	118.0	130.4	0.854	3.01	265E	5	7
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accessories for all dimensions and applications available