

MERCALLI XII

Structural Components and Systems

ASTM A1554-36 ALLTHREAD ROD TENSILE CAPACITY							
D	0.500"	0.625"	0.750"	0.875"	1.000"	1.125"	1.250"
n	13	11	10	9	8	7	7
A_{TS}	0.142	0.226	0.334	0.462	0.606	0.763	0.969
A_N	0.196	0.307	0.442	0.601	0.785	0.994	1.227
P_{A-TS}	2716	4326	6402	8838	11594	14609	18549
FS_{TS}	3.03	3.03	3.03	3.03	3.03	3.03	3.03
P_{Y-TS}	5108	8136	12041	16622	21807	27478	34888
P_{U-TS}	8230	8136	12041	16622	21807	27478	34888
P_{A-N}	4271	6673	9609	13079	17082	21620	26691
FS_N	1.93	1.96	2.02	2.05	2.06	2.05	2.11

Design Criteria:

AISC Manual of Steel Construction, ASD, Thirteenth Edition

Allowable Rod Tensile Capacity (P_{A-N}) Based on Nominal Rod Area

Allthread Rod Material:

Based on ASTM A1554, Grade 36

$F_Y = 36000$ psi

Rod Yield Strength

$F_U = 58000$ psi

Rod Ultimate Strength

$D =$ Nominal Rod Diameter

Inches²

$n =$ Thread Pitch

Threads Per Inch

$A_{TS} = (\pi/4) \times [D - 0.9743/n]^2$

Tensile Stress Area (Inches²)

$A_N = \pi \times D^2/4$

Nominal Rod Area (Inches²)

$P_{A-TS} = 0.33 \times F_U \times A_{TS}$

Allowable Tensile Capacity (lbs) - Based on Tensile Stress Area

$P_{Y-TS} = 1.00 \times F_Y \times A_{TS}$

Yield Tensile Capacity (lbs) - Based on Tensile Stress Area

$P_{U-TS} = 1.00 \times F_U \times A_{TS}$

Ultimate Tensile Capacity (lbs) - Based on Tensile Stress Area

$P_{A-N} = 0.75 \times F_U \times A_N / \Omega$

Allowable Tensile Capacity (lbs) - Based on Nominal Rod Area

$\Omega = 2.00$

Safety Factor (ASD)

$FS_{TS} = P_{U-TS} / P_{A-TS}$

Factor of Safety (lbs) - Based on Tensile Stress Area

$FS_N = P_{U-TS} / P_{A-N}$

Factor of Safety (lbs) - Based on Nominal Rod Area