MET

THREADED RODS, NUTS AND WASHERS

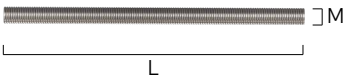
- Metric threaded products for connections and joints
- Available in carbon steel and A2 austenitic stainless steel for outdoor applications (SC3) up to 1 km from the sea and on T4 class timber

MGS 1000 - 4.8

THREADED ROD

CODE	rod	L [mm]	*rod [in]*	*L [in]*	pcs
MGS10008	**M8**	1000	*0.32*	*39 3/8*	10
MGS100010	**M10**	1000	*0.40*	*39 3/8*	10
MGS100012	**M12**	1000	*0.48*	*39 3/8*	10
MGS100014	**M14**	1000	*0.56*	*39 3/8*	10
MGS100016	**M16**	1000	*0.63*	*39 3/8*	10
MGS100018	**M18**	1000	*0.71*	*39 3/8*	10
MGS100020	**M20**	1000	*0.79*	*39 3/8*	10
MGS100022	**M22**	1000	*0.87*	*39 3/8*	10
MGS100024	**M24**	1000	*0.95*	*39 3/8*	10
MGS100027	**M27**	1000	*1.07*	*39 3/8*	10
MGS100030	**M30**	1000	*1.19*	*39 3/8*	10

4.8 steel class - electrogalvanized
DIN 975

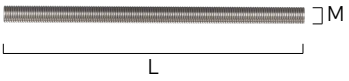


MGS 1000 - 8.8

THREADED ROD

CODE	rod	L [mm]	*rod [in]*	*L [in]*	pcs
MGS10888	**M8**	1000	*0.32*	*39 3/8*	1
MGS11088	**M10**	1000	*0.40*	*39 3/8*	1
MGS11288	**M12**	1000	*0.48*	*39 3/8*	1
MGS11488	**M14**	1000	*0.56*	*39 3/8*	1
MGS11688	**M16**	1000	*0.63*	*39 3/8*	1
MGS11888	**M18**	1000	*0.71*	*39 3/8*	1
MGS12088	**M20**	1000	*0.79*	*39 3/8*	1
MGS12488	**M24**	1000	*0.95*	*39 3/8*	1
MGS12788	**M27**	1000	*1.07*	*39 3/8*	1

8.8 steel class - electrogalvanized
DIN 975

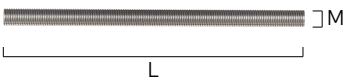


MGS 2200 - 4.8

THREADED ROD

CODE	rod	L [mm]	*rod [in]*	*L [in]*	pcs
MGS220012	**M12**	2200	*0.48*	*86 5/8*	1
MGS220016	**M16**	2200	*0.63*	*86 5/8*	1
MGS220020	**M20**	2200	*0.79*	*86 5/8*	1

4.8 steel class - electrogalvanized
DIN 975



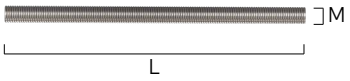
MGS AI 975

A2
AISI 304

THREADED ROD

CODE	rod	L [mm]	*rod [in]*	*L [in]*	pcs
AI9758	**M8**	1000	*0.32*	*39 3/8*	1
AI97510	**M10**	1000	*0.40*	*39 3/8*	1
AI97512	**M12**	1000	*0.48*	*39 3/8*	1
AI97516	**M16**	1000	*0.63*	*39 3/8*	1
AI97520	**M20**	1000	*0.79*	*39 3/8*	1

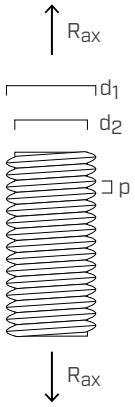
A2-70 (A2 | AISI304) stainless steel
DIN 975



MGS RODS STRUCTURAL VALUES

TENSILE STRENGTH

					steel class		
					4.8	8,8	A2
rod	**d_1** [mm]	**d_2** [mm]	**p** [mm]	**A_{resist}** [mm^2]	**$R_{ax,k}$** [kN]	**$R_{ax,k}$** [kN]	**$R_{ax,k}$** [kN]
M8	8	6,47	1,25	36,6	**13,2**	**26,4**	**23,1**
M10	10	8,16	1,50	58,0	**20,9**	**41,8**	**36,5**
M12	12	9,85	1,75	84,3	**30,3**	**60,7**	**53,1**
M14	14	11,55	2,00	115,4	**41,6**	**83,1**	-
M16	16	13,55	2,00	156,7	**56,4**	**112,8**	**98,7**
M18	18	14,93	2,50	192,5	**69,3**	**138,6**	-
M20	20	16,93	2,50	244,8	**88,1**	**176,3**	**154,2**
M22	22	18,93	2,50	303,4	**109,2**	**218,4**	-
M24	24	20,32	3,00	352,5	**126,9**	**253,8**	-
M27	27	23,32	3,00	459,4	**165,4**	**330,8**	-
M30	30	25,71	3,50	560,6	**201,8**	**403,6**	-



Characteristic values according to EN 1993.
The design values are obtained from the characteristic values as follows: $R_{ax,d} = R_{ax,k} / \gamma_{M2}$.
The coefficient γ_{M2} should be taken according to the current regulations used for the calculation.

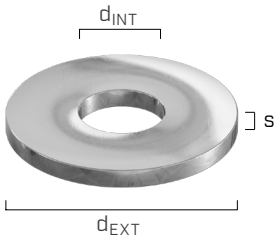
ULS 9021

WASHER

CODE	rod	d_{INT} [mm]	d_{EXT} [mm]	s [mm]	*d_{INT} [in]*	*d_{EXT} [in]*	*s [in]*	pcs
ULS8242	**M8**	8,4	24,0	2,0	*0.34*	*0.95*	*0.08*	200
ULS10302	**M10**	10,5	30,0	2,5	*0.4*	*1.19*	*0.10*	200
ULS13373	**M12**	13,0	37,0	3,0	*0.5*	*1.46*	*0.12*	100
ULS15443	**M14**	15,0	44,0	3,0	*0.6*	*1.74*	*0.12*	100
ULS17503	**M16**	17,0	50,0	3,0	*0.7*	*1.97*	*0.12*	100
ULS20564	**M18**	20,0	56,0	4,0	*0.8*	*2.21*	*0.16*	50
ULS22604	**M20**	22,0	60,0	4,0	*0.9*	*2.37*	*0.16*	50

* ISO 7093 differs from DIN 9021 in the surface hardness.

HV 100 steel - electrogalvanized
DIN 9021 (ISO 7093*)

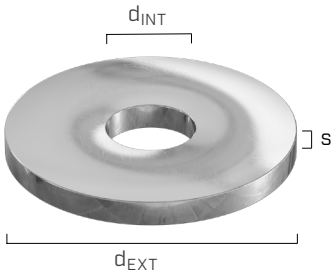


ULS 440

WASHER

CODE	rod	d_{INT} [mm]	d_{EXT} [mm]	s [mm]	*d_{INT} [in]*	*d_{EXT} [in]*	*s [in]*	pcs
ULS11343	**M10**	11,0	34,0	3,0	*0.44*	*1.34*	*0.12*	200
ULS13444	**M12**	14,0	44,0	4,0	*0.56*	*1.74*	*0.16*	200
ULS17565	**M16**	17,0	56,0	5,0	*0.67*	*2.21*	*0.20*	50
ULS22726	**M20**	22,0	72,0	6,0	*0.87*	*2.84*	*0.24*	50
ULS24806	**M22**	24,0	80,0	6,0	*0.95*	*3.15*	*0.24*	25

HV 100 steel - electrogalvanized
DIN 440 R

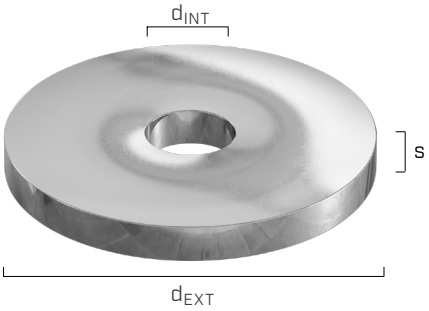


ULS 1052

WASHER

CODE	rod	d_{INT} [mm]	d_{EXT} [mm]	s [mm]	*d_{INT} [in]*	*d_{EXT} [in]*	*s [in]*	pcs
ULS14586	**M12**	14,0	58,0	6,0	*0.56*	*2.29*	*0.24*	50
ULS18686	**M16**	18,0	68,0	6,0	*0.71*	*2.68*	*0.24*	50
ULS22808	**M20**	22,0	80,0	8,0	*0.87*	*3.15*	*0.32*	25
ULS25928	**M22**	25,0	92,0	8,0	*0.99*	*3.63*	*0.32*	20
ULS271058	**M24**	27,0	105,0	8,0	*1.07*	*4.14*	*0.32*	20

HV 100-250 steel - electrogalvanized
DIN 1052

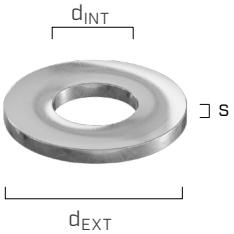


ULS 125

WASHER

CODE	rod	d_{INT} [mm]	d_{EXT} [mm]	s [mm]	*d_{INT} [in]*	*d_{EXT} [in]*	*s [in]*	pcs
ULS81616	**M8**	8,4	16,0	1,6	*0.34*	*0.63*	*0.07*	1000
ULS10202	**M10**	10,5	20,0	2,0	*0.42*	*0.79*	*0.08*	500
ULS13242	**M12**	13,0	24,0	2,5	*0.52*	*0.95*	*0.10*	500
ULS17303	**M16**	17,0	30,0	3,0	*0.67*	*1.19*	*0.12*	250
ULS21373	**M20**	21,0	37,0	3,0	*0.83*	*1.46*	*0.12*	250
ULS25444	**M24**	25,0	44,0	4,0	*0.99*	*1.74*	*0.16*	200
ULS28504	**M27**	28,0	50,0	4,0	*1.11*	*1.97*	*0.16*	100
ULS31564	**M30**	31,0	56,0	4,0	*1.23*	*2.21*	*0.16*	20

HV 100 steel - electrogalvanized
DIN 125 A (ISO 7089)



ULS AI 9021

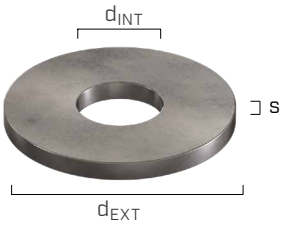
A2
AISI 304

WASHER

CODE	rod	d_{INT} [mm]	d_{EXT} [mm]	s [mm]	*d_{INT} [in]*	*d_{EXT} [in]*	*s [in]*	pcs
AI90218	**M8**	8,4	24,0	2,0	*0.34*	*0.95*	*0.08*	500
AI902110	**M10**	10,5	30,0	2,5	*0.42*	*1.19*	*0.10*	500
AI902112	**M12**	13,0	37,0	3,0	*0.52*	*1.46*	*0.12*	200
AI902116	**M16**	17,0	50,0	3,0	*0.67*	*1.97*	*0.12*	100
AI902120	**M20**	22,0	60,0	4,0	*0.87*	*2.37*	*0.16*	50

* ISO 7093 differs from DIN 9021 in the surface hardness.

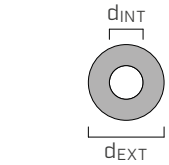
A2 | AISI304 stainless steel
DIN 9021 (ISO 7093-1*)

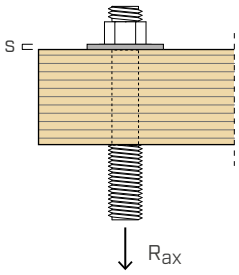


ULS WASHERS STRUCTURAL VALUES

PULL-THROUGH RESISTANCE IN THE TIMBER

rod	standard	d_{INT} [mm]	d_{EXT} [mm]	s [mm]	$R_{ax,k}$ [kN]
M10	ULS 9021	10,5	30,0	2,5	**4,65**
	ULS 440	11,0	34,0	3,0	**6,10**
	ULS 1052	-	-	-	**-**
	ULS 125	10,5	20,0	2,0	**1,71**
M12	ULS 9021	13,0	37,0	3,0	**7,07**
	ULS 440	14,0	44,0	4,0	**10,25**
	ULS 1052	14,0	58,0	6,0	**18,66**
	ULS 125	13,0	24,0	2,5	**2,40**
M16	ULS 9021	17,0	50,0	3,0	**13,02**
	ULS 440	17,0	56,0	5,0	**16,77**
	ULS 1052	18,0	68,0	6,0	**25,33**
	ULS 125	17,0	30,0	3,0	**3,60**
M20	ULS 9021	22,0	60,0	4,0	**18,35**
	ULS 440	22,0	72,0	6,0	**27,69**
	ULS 1052	22,0	80,0	8,0	**34,85**
	ULS 125	21,0	37,0	3,0	**5,47**
M24	ULS 9021	-	-	-	**-**
	ULS 440	-	-	-	**-**
	ULS 1052	27,0	105,0	8,0	**60,65**
	ULS 125	25,0	44,0	4,0	**7,72**





CRITICAL ISSUE: WASHER HEAD PULL-THROUGH INTO TIMBER

GENERAL PRINCIPLES:

- Characteristic values according to EN 1995-1-1.
- Design values can be obtained from characteristic values as follows:

$$R_{ax,d} = \frac{R_{ax,k} \cdot k_{mod}}{\gamma_M}$$

The coefficients γ_M and k_{mod} should be taken according to the current regulations used for the calculation.

- For the calculation process a timber characteristic density ρ_k = 385 kg/m^3 has been considered.
- The pull-through resistance of a washer is proportional to its contact surface with the timber element.

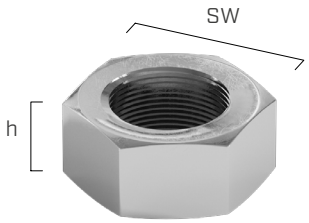
MUT 934

HEXAGONAL NUT

CODE	rod	SW [mm]	h [mm]	*h [in]*	pcs
MUT9348	**M8**	13	6,5	*1/4*	400
MUT93410	**M10**	17	8,0	*5/16*	500
MUT93412	**M12**	19	10,0	*3/8*	500
MUT93414	**M14**	22	11,0	*7/16*	200
MUT93416	**M16**	24	13,0	*1/2*	200
MUT93418	**M18**	27	15,0	*9/16*	100
MUT93420	**M20**	30	16,0	*5/8*	100
MUT93422	**M22**	32	18,0	*11/16*	50
MUT93424	**M24**	36	19,0	*3/4*	50
MUT93427	**M27**	41	22,0	*7/8*	25
MUT93430	**M30**	46	24,0	*15/16*	25

* ISO 4032 differs from DIN 934 for parameter h and, for diameters M10, M12, M14 and M22 also for the SW parameter.

8 steel class - electrogalvanized
DIN 934 (ISO 4032*)

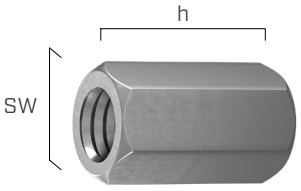


MUT 6334

CONNECTING NUT

CODE	rod	SW [mm]	h [mm]	*h [in]*	pcs
MUT633410	**M10**	17	30,0	*1 3/16*	10
MUT633412	**M12**	19	36,0	*1 7/16*	10
MUT633416	**M16**	24	48,0	*1 7/8*	25
MUT633420	**M20**	30	60,0	*2 3/8*	10

8 steel class - electrogalvanized
DIN 6334



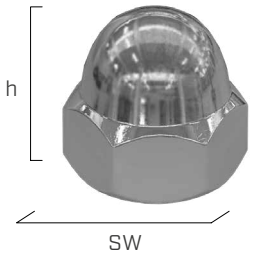
MUT 1587

BLIND NUT

CODE	rod	SW [mm]	h [mm]	*h [in]*	pcs
MUT15878S	**M8**	13	15,0	*9/16*	200
MUT158710S	**M10**	17	18,0	*11/16*	50
MUT158712S	**M12**	19	22,0	*7/8*	50
MUT158714S	**M14**	22	25,0	*1*	50
MUT158716S	**M16**	24	28,0	*1 1/8*	50
MUT158718S	**M18**	27	32,0	*1 1/4*	50
MUT158720S	**M20**	30	34,0	*1 5/16*	25
MUT158722S	**M22**	32	39,0	*1 9/16*	25
MUT158724S	**M24**	36	42,0	*1 5/8*	25

Single-piece turned nut.

6 steel class - electrogalvanized
DIN 1587



MUT AI 934

A2
AISI 304

HEXAGONAL NUT

CODE	rod	SW [mm]	h [mm]	*h [in]*	pcs
AI9348	**M8**	13	6,5	*1/4*	500
AI93410	**M10**	17	8,0	*5/16*	200
AI93412	**M12**	19	10,0	*3/8*	200
AI93416	**M16**	24	13,0	*1/2*	100
AI93420	**M20**	30	16,0	*5/8*	50

* ISO 4032 differs from DIN 934 for parameter h and, for diameters M10 and M12 also for the SW parameter.

A2-70 (A2 | AISI304) stainless steel
DIN 934 (ISO 4032*)

MUT AI 985

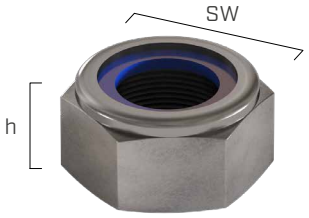
SELF-LOCKING NUT

A2
AISI 304

CODE	rod	SW [mm]	h [mm]	*h* *[in]*	pcs
AI9858	**M8**	13	8,0	*5/16*	500
AI98510	**M10**	17	10,0	*3/8*	200
AI98512	**M12**	19	12,0	*1/2*	200
AI98516	**M16**	24	16,0	*5/8*	100

* ISO 10511 differs from DIN 995 for parameter h and, for diameters M10 and M12 also for the SW parameter.

A2-70 (A2 | AISI304) stainless steel
DIN 985 (ISO 10511*)



MUT AI 1587

BLIND NUT

A2
AISI 304

CODE	rod	SW [mm]	h [mm]	*h* *[in]*	pcs
AI158710	**M10**	17	18,0	*11/16*	100
AI158712	**M12**	19	22,0	*7/8*	100
AI158716	**M16**	24	28,0	*1 1/8*	50
AI158720	**M20**	30	34,0	*1 5/16*	25

Single-piece turned nut.

A2 | AISI304 stainless steel
DIN 1587