

MET - METRIC CONNECTION PRODUCTS

THREADED RODS, NUTS AND WASHERS

- Metric threaded products for creating connections and joints
- Available in carbon steel and stainless steel for use in service classes 1, 2 and 3 (EN 1995 1-1)

MGS 1000

THREADED ROD

CODE	rod	nominal diameter		L		pcs
		[mm]	[in]	[mm]	[in]	
MGS10008	M8	8.0	0.32	1000	39 3/8	10
MGS100010	M10	10.0	0.40	1000	39 3/8	10
MGS100012	M12	12.0	0.48	1000	39 3/8	10
MGS100014	M14	14.0	0.56	1000	39 3/8	10
MGS100016	M16	16.0	0.63	1000	39 3/8	10
MGS100018	M18	18.0	0.71	1000	39 3/8	10
MGS100020	M20	20.0	0.79	1000	39 3/8	10
MGS100022	M22	22.0	0.87	1000	39 3/8	10
MGS100024	M24	24.0	0.95	1000	39 3/8	10
MGS100027	M27	27.0	1.07	1000	39 3/8	10
MGS100030	M30	30.0	1.18	1000	39 3/8	10

Steel class 4.8 - zinc plated
DIN 975
 $F_u = 420 \text{ MPa} = 60 \text{ ksi}$



MGS 1000

THREADED ROD

CODE	rod	nominal diameter		L		pcs
		[mm]	[in]	[mm]	[in]	
MGS10888	M8	8.0	0.32	1000	39 3/8	1
MGS11088	M10	10.0	0.40	1000	39 3/8	1
MGS11288	M12	12.0	0.48	1000	39 3/8	1
MGS11488	M14	14.0	0.56	1000	39 3/8	1
MGS11688	M16	16.0	0.63	1000	39 3/8	1
MGS11888	M18	18.0	0.71	1000	39 3/8	1
MGS12088	M20	20.0	0.79	1000	39 3/8	1
MGS12488	M24	24.0	0.95	1000	39 3/8	1
MGS12788	M27	27.0	1.07	1000	39 3/8	1

Steel class 8.8 - zinc plated
DIN 975
 $F_u = 830 \text{ MPa} = 120 \text{ ksi}$



MGS 2200

THREADED ROD

CODE	rod	nominal diameter		L		pcs
		[mm]	[in]	[mm]	[in]	
MGS220012	M12	12.0	0.48	2200	86 5/8	1
MGS220016	M16	16.0	0.63	2200	86 5/8	1
MGS220020	M20	20.0	0.79	2200	86 5/8	1

Steel class 4.8 - zinc plated
DIN 975
 $F_u = 420 \text{ MPa} = 60 \text{ ksi}$



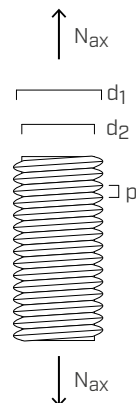
MGS RODS STATIC VALUES

TENSILE STRENGTH

rod	d ₁ [mm] [in]		d ₂ [mm] [in]		p	A _{resist} [mm ²] [in ²]		CHARACTERISTIC VALUES	
								steel class	
								4,8	8,8
								N _{ax,k} [kN]	N _{ax,k} [kN]
M8	8.0	0.32	6.47	0.255	1.25	36.6	0.057	13.2	26.4
M10	10.0	0.40	8.16	0.321	1.50	58.0	0.090	20.9	41.8
M12	12.0	0.48	9.85	0.388	1.75	84.3	0.131	30.3	60.7
M14	14.0	0.56	11.55	0.455	2.00	115.0	0.178	41.4	82.8
M16	16.0	0.63	13.55	0.533	2.00	157.0	0.243	56.5	113.0
M18	18.0	0.71	14.93	0.588	2.50	192.0	0.298	69.1	138.2
M20	20.0	0.79	16.93	0.667	2.50	245.0	0.380	88.2	176.4
M22	22.0	0.87	18.93	0.745	2.50	303.0	0.470	109.1	218.2
M24	24.0	0.95	20.32	0.800	3.00	353.0	0.547	127.1	254.2
M27	27.0	1.07	23.32	0.918	3.00	459.0	0.711	165.2	330.5
M30	30.0	1.18	25.71	1.012	3.50	561.0	0.870	202.0	403.9

Characteristic values according to EN 1993.

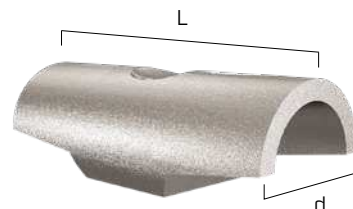
The design values are obtained from the characteristic values as follows: $N_{ax,d} = N_{ax,k} / \gamma_{M2}$.



DADO SIMPLEX

Cast iron

CODE	rod	L		d		hole		pcs
		[mm]	[in]	[mm]	[in]	[mm]	[in]	
SIMPLEX12	M12	54	2 1/8	22	0.87	24	0.95	100
SIMPLEX16	M16	72	2 13/16	28.5	1.13	32	1.26	100



STATIC VALUES WITH SIMPLEX NUT WITHDRAWAL

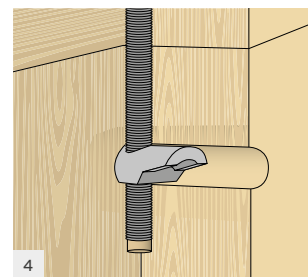
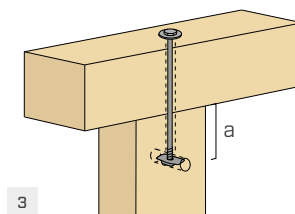
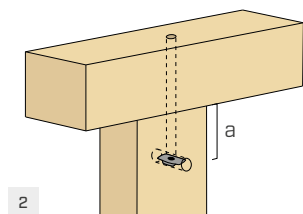
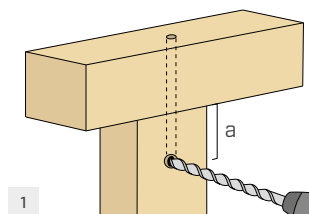
BEARING STRESS RESISTANCE OF WOOD

CODE	rod	d		L _{ef}		R _{v,k} [kN]	a	
		[mm]	[in]	[mm]	[in]		[mm]	[in]
SIMPLEX12	M12	22	0.87	32.0	1 1/4	6.4	155	6 1/8
SIMPLEX16	M16	28.5	1.13	43.5	1 11/16	10.4	200	7 7/8

a = minimum distance from the end of the element

The strength values have been determined according to EN 1995 1-1, with $\rho_k = 350 \text{ kg/m}^3$

INSTALLATION



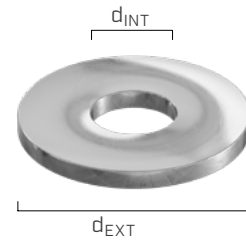
ULS 9021

WASHER

CODE	rod	d _{INT}		d _{EXT}		s		pcs
		[mm]	[in]	[mm]	[in]	[mm]	[in]	
ULS8242	M8	8.4	0.331	24	0.945	2	0.079	200
ULS10302	M10	10.5	0.413	30	1.181	2,5	0.098	200
ULS13373	M12	13	0.512	37	1.457	3	0.118	100
ULS15443	M14	15	0.591	44	1.732	3	0.118	100
ULS17503	M16	17	0.669	50	1.969	3	0.118	100
ULS20564	M18	20	0.787	56	2.205	4	0.157	50
ULS22604	M20	22	0.866	60	2.362	4	0.157	50

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

S235 steel - zinc plated
DIN 9021 (ISO 7093*)



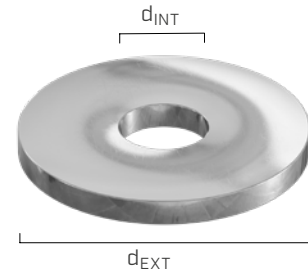
ULS 440

WASHER

CODE	rod	d _{INT}		d _{EXT}		s		pcs
		[mm]	[in]	[mm]	[in]	[mm]	[in]	
ULS11343	M10	11	0.433	34	1.339	3	0.118	200
ULS13444	M12	13.5	0.531	44	1.732	4	0.157	200
ULS17565	M16	17.5	0.689	56	2.205	5	0.197	50
ULS22726	M20	22	0.866	72	2.835	6	0.236	50
ULS24806	M22	24	0.945	80	3.150	6	0.236	25

* ISO 7094 differs from DIN 440 R in the surface hardness.

S235 steel - zinc plated
DIN 440 R (ISO 7094*)
F_y = 235 MPa = 34 ksi

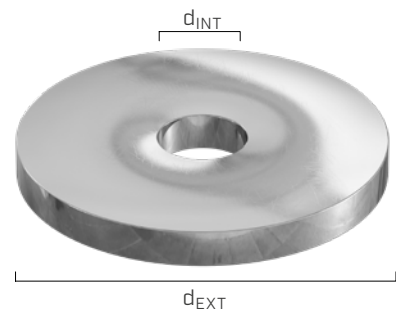


ULS 1052

WASHER

CODE	rod	d _{INT}		d _{EXT}		s		pcs
		[mm]	[in]	[mm]	[in]	[mm]	[in]	
ULS14586	M12	14	0.551	58	2.283	6	0.236	50
ULS18686	M16	18	0.709	68	2.677	6	0.236	50
ULS22808	M20	22	0.866	80	3.150	8	0.315	25
ULS25928	M22	25	0.984	92	3.622	8	0.315	20
ULS271058	M24	27	1.063	105	4.134	8	0.315	20

S235 steel - zinc plated
DIN 1052
F_y = 235 MPa = 34 ksi



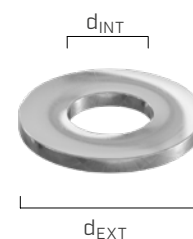
ULS 125

WASHER

CODE	rod	d _{INT}		d _{EXT}		s		pcs
		[mm]	[in]	[mm]	[in]	[mm]	[in]	
ULS81616	M8	8.4	0.331	16	0.630	1.6	0.063	1000
ULS10202	M10	10.5	0.413	20	0.787	2	0.079	500
ULS13242	M12	13	0.512	24	0.945	2.5	0.098	500
ULS17303	M16	17	0.669	30	1.181	3	0.118	250
ULS21373	M20	21	0.827	37	1.457	3	0.118	250
ULS25444	M24	25	0.984	44	1.732	4	0.157	200
ULS28504	M27	28	1.102	50	1.969	4	0.157	100
ULS31564	M30	31	1.220	56	2.205	4	0.157	20

* ISO 7089 differs from DIN 125 A in the surface hardness.

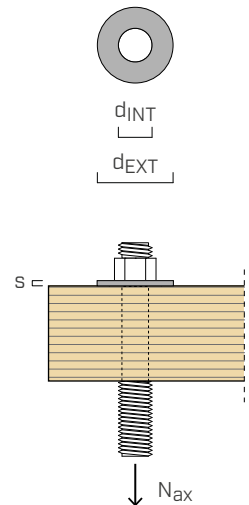
S235 steel - zinc plated
DIN 125 A (ISO 7089*)
F_y = 235 MPa = 34 ksi



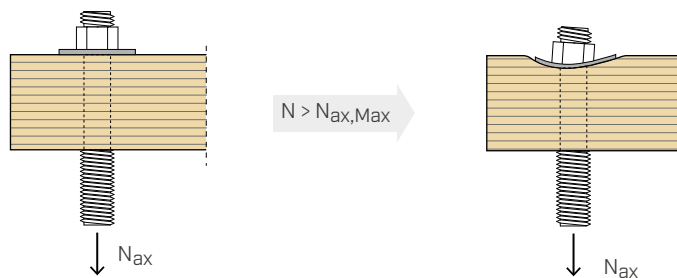
ULS WASHERS STATIC VALUES

PULL-THROUGH RESISTANCE IN THE TIMBER

rod	standard	d _{INT}		d _{EXT}		s		CHARACTERISTIC VALUES
		[mm]	[in]	[mm]	[in]	[mm]	[in]	N _{ax,k} [kN]
M10 10 mm 0.40 in	DIN 125 A	10.5	0.413	20.0	0.787	2.0	0.079	1.71
	DIN 9021	10.5	0.413	30.0	1.181	2.5	0.098	4.65
	DIN 440 R	11.0	0.433	34.0	1.339	3.0	0.118	6.10
	DIN 1052	-	-	-	-	-	-	-
M12 12 mm 0.48 in	DIN 125 A	13.0	0.512	24.0	0.945	2.5	0.098	2.40
	DIN 9021	13.0	0.512	37.0	1.457	3.0	0.118	7.07
	DIN 440 R	13.5	0.531	44.0	1.732	4.0	0.157	10.33
	DIN 1052	14.0	0.551	58.0	2.283	6.0	0.236	18.66
M16 16 mm 0.63 in	DIN 125 A	17.0	0.669	30.0	1.181	3.0	0.118	3.60
	DIN 9021	17.0	0.669	50.0	1.969	3.0	0.118	13.02
	DIN 440 R	17.5	0.689	56.0	2.205	5.0	0.197	16.67
	DIN 1052	18.0	0.709	68.0	2.677	6.0	0.236	25.33
M20 20 mm 0.79 in	DIN 125 A	21.0	0.827	37.0	1.457	3.0	0.118	5.47
	DIN 9021	22.0	0.866	60.0	2.362	4.0	0.157	18.35
	DIN 440 R	22.0	0.866	72.0	2.835	6.0	0.236	27.69
	DIN 1052	22.0	0.866	80.0	3.150	8.0	0.315	34.85
M24 24 mm 0.95 in	DIN 125 A	25.0	0.984	44.0	1.732	4.0	0.157	7.72
	DIN 9021	-	-	-	-	-	-	-
	DIN 440 R	24.0	0.945	80.0	3.150	6.0	0.236	34.31
	DIN 1052	27.0	1.063	105.0	4.134	8.0	0.315	60.65



CRITICALITY: WASHER HEAD PULL-THROUGH INTO TIMBER



GENERAL PRINCIPLES:

- Characteristic values according to EN 1995-1-1.
- The design values are obtained from the characteristic values as follows:

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

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 density $\rho_k = 385 \text{ kg/m}^3$ has been considered.
- The pull-through resistance of a washer is proportional to its contact surface with the timber element.

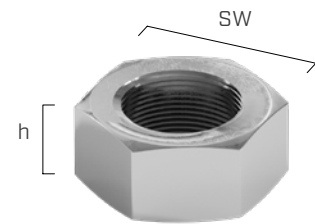
MUT 934

HEXAGONAL NUT

CODE	rod	h		SW		pcs
		[mm]	[in]	[mm]	[in]	
MUT9348	M8	6.5	0.256	13	0.512	400
MUT93410	M10	8	0.315	17	0.669	500
MUT93412	M12	10	0.394	19	0.748	500
MUT93414	M14	11	0.433	22	0.866	200
MUT93416	M16	13	0.512	24	0.945	200
MUT93418	M18	15	0.591	27	1.063	100
MUT93420	M20	16	0.630	30	1.181	100
MUT93422	M22	18	0.709	32	1.260	50
MUT93424	M24	19	0.748	36	1.417	50
MUT93427	M27	22	0.866	41	1.614	25
MUT93430	M30	24	0.945	46	1.811	25

* ISO 4032 differs from DIN 934 in diameters M10 and M12 for parameters h and SW and diameters M10, M12, M14 and M22.

Steel class 8 - zinc plated
DIN 934 (ISO 4032*)

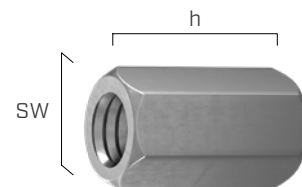


MUT 6334

CONNECTING NUT

CODE	rod	h		SW		pcs
		[mm]	[in]	[mm]	[in]	
MUT633410	M10	30	1 3/16	17	0.669	10
MUT633412	M12	36	1 7/16	19	0.748	10
MUT633416	M16	48	1 7/8	24	0.945	25
MUT633420	M20	60	2 3/8	30	1.181	10

Steel class 8 - zinc plated
DIN 6334



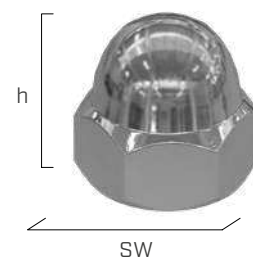
MUT 1587

BLIND NUT

CODE	rod	h		SW		pcs
		[mm]	[in]	[mm]	[in]	
MUT15878S	M8	15	0.591	13	0.512	200
MUT158710S	M10	18	0.709	17	0.669	50
MUT158712S	M12	22	0.866	19	0.748	50
MUT158714S	M14	25	0.984	22	0.866	50
MUT158716S	M16	28	1.102	24	0.945	50
MUT158718S	M18	32	1.260	27	1.063	50
MUT158720S	M20	34	1.339	30	1.181	25
MUT158722S	M22	39	1.535	32	1.260	25
MUT158724S	M24	42	1.654	36	1.417	25

Single-piece turned nut.

Steel class 8 - zinc plated
DIN 1587



MGS AI 975

THREADED ROD

CODE	rod	nominal diameter		L		pcs
		[mm]	[in]	[mm]	[in]	
AI9758	M8	8.0	0.32	1000	39 3/8	1
AI97510	M10	10.0	0.40	1000	39 3/8	1
AI97512	M12	12.0	0.48	1000	39 3/8	1
AI97516	M16	16.0	0.63	1000	39 3/8	1
AI97520	M20	20.0	0.79	1000	39 3/8	1

A2 | AISI304 stainless steel
DIN 975



A2
AISI 304

ULS AI 9021

WASHER

A2
AISI 304

CODE	rod	d _{INT}		d _{EXT}		s		pcs
		[mm]	[in]	[mm]	[in]	[mm]	[in]	
AI90218	M8	8.4	0.331	24	0.945	2	0.079	500
AI902110	M10	10.5	0.413	30	1.181	2,5	0.098	500
AI902112	M12	13	0.512	37	1.457	3	0.118	200
AI902116	M16	17	0.669	50	1.969	3	0.118	100
AI902120	M20	22	0.866	60	2.362	4	0.157	50

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

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



MUT AI 934

HEXAGONAL NUT

A2
AISI 304

CODE	rod	h		SW		pcs
		[mm]	[in]	[mm]	[in]	
AI9348	M8	6.5	0.256	13	0.512	500
AI93410	M10	8	0.315	16	0.630	200
AI93412	M12	10	0.394	18	0.709	200
AI93416	M16	13	0.512	24	0.945	100
AI93420	M20	16	0.630	30	1.181	50

* ISO 4032 differs from DIN 934 in diameters M10 and M12 for parameters h and SW.

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



MUT AI 985

SELF-LOCKING NUT

A2
AISI 304

CODE	rod	h		SW		pcs
		[mm]	[in]	[mm]	[in]	
AI9858	M8	8	0.315	13	0.512	500
AI98510	M10	10	0.394	17	0.669	200
AI98512	M12	12	0.472	19	0.748	200
AI98516	M16	16	0.630	24	0.945	100

* ISO 10511 differs from DIN 985 in diameters M10 and M12 for parameters h and SW.

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



MUT AI 1587

BLIND NUT

A2
AISI 304

CODE	rod	h		SW		pcs
		[mm]	[in]	[mm]	[in]	
AI158710	M10	18	0.709	17	0.669	100
AI158712	M12	22	0.866	19	0.748	100
AI158716	M16	28	0.102	24	0.945	50
AI158720	M20	34	0.339	30	1.181	25

Single-piece turned nut.

A2 | AISI304 stainless steel
DIN 1587

