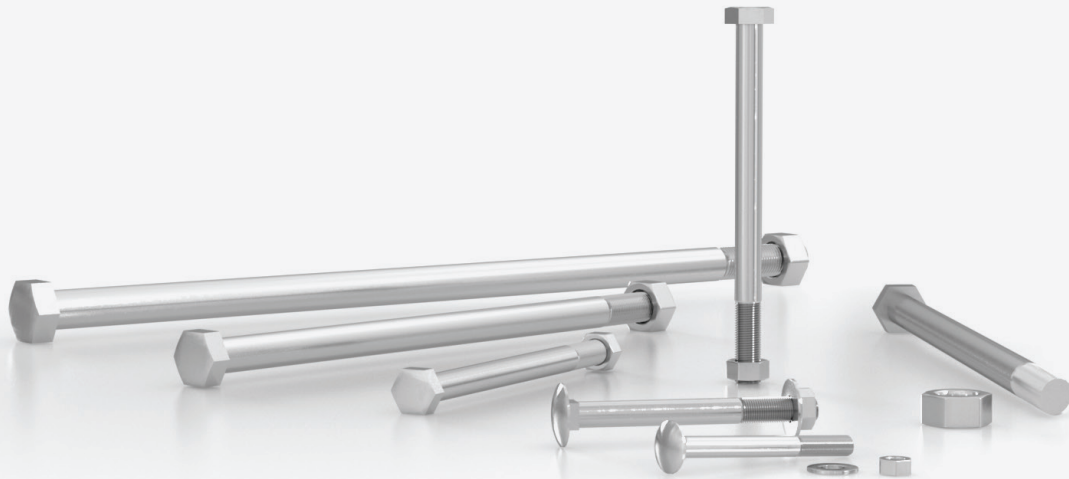


KOS - KOT



Hexagonal / round head bolt

Bright zinc plated carbon steel and A2 stainless steel versions available



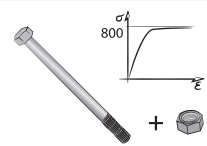
CE MARKING

Cylindrical metal fastener with CE marking according to EN14592



SPECIAL STEEL

Carbon steel of strength grade 8.8 for all hexagonal head bolts (KOS)



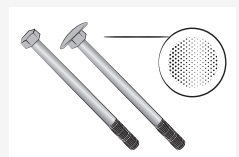
INCORPORATED NUT

Hexagonal and round head bolt supplied with an incorporated nut (for the carbon steel version)



OUTDOOR VERSION

Available also in AISI304/A2 stainless steel for outdoor applications (service class 3)



FIELD OF USE

Timber-to-timber and steel to timber shear connections

- solid timber
- glulam (Glued Laminated Timber)
- XLAM (Cross Laminated Timber)
- LVL (Laminated Veneer Lumber)
- wood-based panels

CALCULATION ACCURACY

CE marking guarantees the usage suitability. The designer can always be certain to perform calculations based on the correct parameters, according to the reference Standards (Eurocode or others)

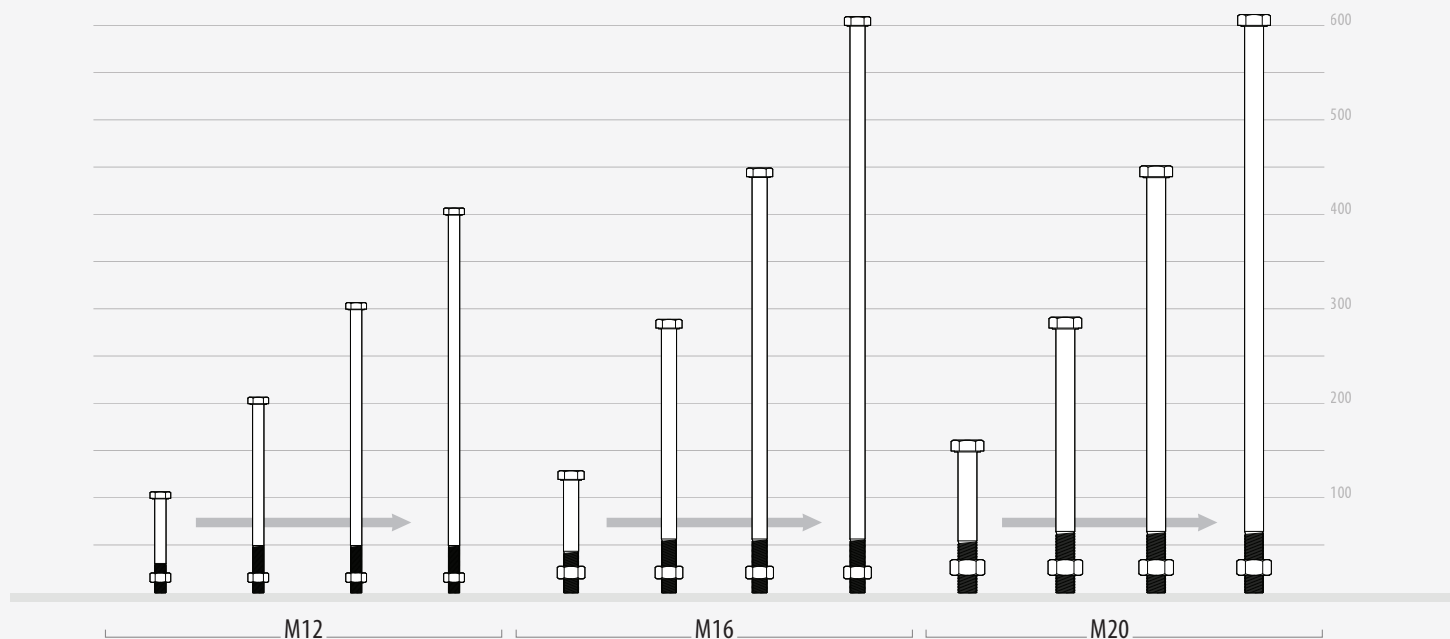
8.8 STRENGTH CLASS AND NUT INCLUDED

Strength grade 8.8 guarantees an excellent strength performance and allows to reduce the number of bolts. Bolts are supplied with nuts included in the box.



PRODUCT RANGE

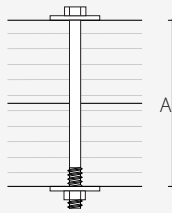
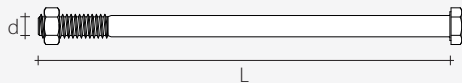
KOS hexagonal head bolts: strength grade 8.8, nut included. KOT round head bolts: strength grade 4.8, nut included. The A2 stainless steel versions and EKS hexagonal head bolts (8.8 strength grade for steel structures) are supplied without nuts.



CODES AND DIMENSIONS

KOS – HEXAGONAL HEAD BOLT WITH NUT

Strength grade 8.8 – Bright zinc plated
DIN 601 (ISO 4016*)



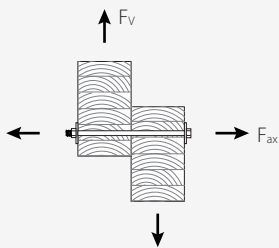
d [mm]	code	L [mm]	A max [mm]	pcs/box
M12	KOS12100B	100	75	25
	KOS12120B	120	95	25
	KOS12140B	140	115	25
	KOS12160B	160	135	25
	KOS12180B	180	155	25
	KOS12200B	200	175	25
	KOS12220B	220	195	25
	KOS12240B	240	215	25
	KOS12260B	260	235	25
	KOS12280B	280	255	25
	KOS12300B	300	275	25
	KOS12320B	320	295	25
	KOS12340B	340	315	25
	KOS12360B	360	335	25
	KOS12380B	380	355	25
	KOS12400B	400	375	25
M16	KOS16120B	120	85	15
	KOS16140B	140	105	15
	KOS16150B	150	115	15
	KOS16160B	160	125	15
	KOS16180B	180	145	15
	KOS16200B	200	165	15
	KOS16220B	220	185	15
	KOS16240B	240	205	15
	KOS16260B	260	225	15
	KOS16280B	280	245	15
	KOS16300B	300	265	15
	KOS16320B	320	285	15
	KOS16340B	340	305	15
	KOS16360B	360	325	15
	KOS16380B	380	345	15
	KOS16400B	400	365	15
	KOS16420B	420	385	15
	KOS16440B	440	405	15
	KOS16460B	460	425	15
	KOS16480B	480	445	15
	KOS16500B	500	465	15
	KOS16520B	520	485	15
	KOS16540B	540	505	15
	KOS16560B	560	525	15
	KOS16580B	580	545	15
	KOS16600B	600	565	15

d [mm]	code	L [mm]	A max [mm]	pcs/box
M20	KOS20120B	120	75	10
	KOS20140B	140	95	10
	KOS20160B	160	115	10
	KOS20180B	180	135	10
	KOS20200B	200	155	10
	KOS20220B	220	175	10
	KOS20240B	240	195	10
	KOS20260B	260	215	10
	KOS20280B	280	235	10
	KOS20300B	300	255	10
	KOS20320B	320	275	10
	KOS20340B	340	295	10
	KOS20360B	360	315	10
	KOS20380B	380	335	10
	KOS20400B	400	355	10
	KOS20420B	420	375	10
	KOS20440B	440	395	10
	KOS20460B	460	415	10
	KOS20480B	480	435	10
	KOS20500B	500	455	10
	KOS20520B	520	475	10
	KOS20540B	540	495	10
	KOS20560B	560	515	10
	KOS20580B	580	535	10
	KOS20600B	600	555	10

The maximum thickness A is evaluated considering a nut and two ULS DIN 440 washers.

* Standard ISO 4016 differs from DIN 601 with regards to parameters k and Ch for M12 diameter.

EXTERNAL LOADS

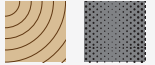


MATERIAL AND DURABILITY

KOS: strength GRADE 8.8 bright zinc plated carbon steel.
To be used in Service class 1 and 2 (EN 1995:2008).

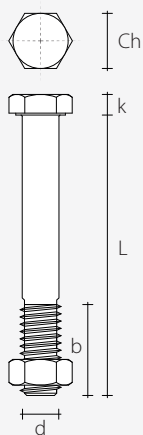
FIELD OF USE

Timber to timber joints
Steel to timber joints



GEOMETRY AND MECHANICAL PROPERTIES

KOS



Nominal diameter	d	[mm]	M12	M16	M20
Key	Ch	[mm]	19	24	30
Head thickness	k	[mm]	7,5	10,0	12,5
Thread length	b	[mm] L ≤ 125 mm	30	38	46
		[mm] 125 < L ≤ 200 mm	36	44	52
		[mm] L > 200 mm	49	57	65

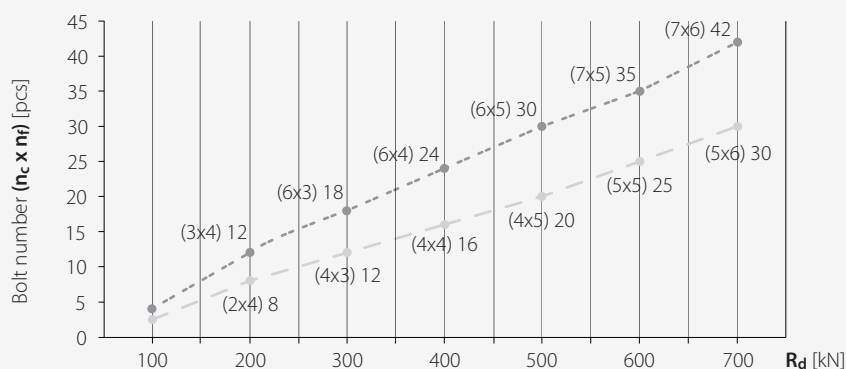
Geometry according to DIN 601 (ISO 4016)

	steel	8.8	8.8	8.8
Material	$f_{u,k}$ [N/mm ²]	800	800	800
	$f_{y,k}$ [N/mm ²]	640	640	640
Characteristic value for yield moment	$M_{y,k}$ [Nmm]	153000	324000	579000

Mechanical parameters according to CE marking, in accordance with EN 14592

CALCULATION EXAMPLE - COMPARISON BETWEEN STRENGTH GRADE 4.8 AND 8.8

STRENGTH AND NUMBER OF FASTENERS



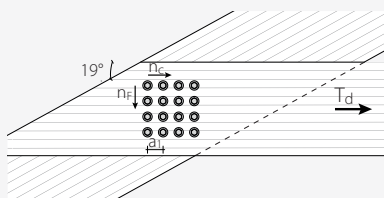
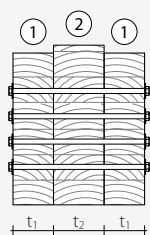
TYPE: truss with double lower chord members fastened to upper chord member through bolts.
Timber-timber-timber joint.

STANDARD: EN 1995:2008 - $\gamma_m = 1.30$ (connections)
- $k_{mod} = 0.9$ (short-term load - snow)

Legenda

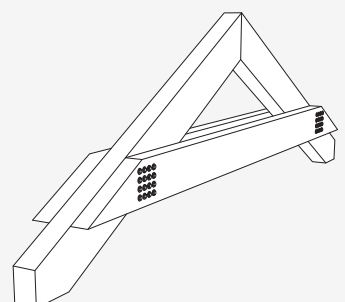
- ◆--- Bolts strength gr. 4.8
- Bolts strength gr. 8.8

CALCULATION MODEL AND HYPOTHESES



External joists $t_1 = 160$ mm
Internal joists $t_2 = 200$ mm
Diameter $d = 20$ mm

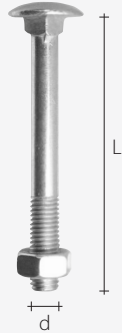
$a_1 = 100$ mm
 T_d = design axial load on lower chord
 R_d = design strength of lower chord



KOT

Round head bolt with nut

Strength grade 4.8 - Bright zinc plated carbon steel
DIN 603 (ISO 8677*)



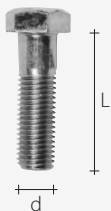
d [mm]	code	L [mm]	pcs/box
M8	KOT850	50	200
	KOT860	60	200
	KOT870	70	200
	KOT880	80	200
	KOT890	90	100
	KOT8100	100	100
	KOT8120	120	100
	KOT8140	140	100
M10	KOT10100	100	100
	KOT10120	120	50
	KOT10130	130	50
	KOT10140	140	50
	KOT10150	150	50
	KOT10160	160	50
	KOT10180	180	50
	KOT10200	200	50
	KOT10220	220	50
M12	KOT12200	200	25
	KOT12220	220	25
	KOT12240	240	25
	KOT12260	260	25
	KOT12280	280	25
	KOT12300	300	25

* Standard ISO 8677 differs from DIN 603 with regards to parameters k and Ch for M10 and M12 diameters.

EKS

Hexagonal head bolt with nut

Strength grade 8.8 Bright zinc plated carbon steel
DIN 933 (ISO 4014) – full thread (*)
DIN 931 (ISO 4017) – partial thread (**)



d [mm]	code	thread	L [mm]	pcs/box
M20	EKS2040	•	40	25
	EKS2050	•	50	25
	EKS2060	•	60	25
	EKS2070	••	70	25
	EKS2080	••	80	25
	EKS20100	••	100	25
M24	EKS2440	•	40	25
	EKS2450	•	50	25
	EKS2460	•	60	25
	EKS2465	•	65	25
	EKS2470	•	70	25
	EKS2480	••	80	25
	EKS2485	••	85	25

AI 601

Hexagonal head bolt

A2 stainless steel

DIN 931 (ISO 4017*)



AISI 304

A2

d [mm]	code	L [mm]	pcs/box
M10	AI60110100	100	50
	AI60110120	120	50
	AI60110140	140	50
	AI60110160	160	50
	AI60110180	180	50
	AI60110200	200	50
M12	AI60112100	100	10
	AI60112120	120	10
	AI60112140	140	10
	AI60112160	160	10
	AI60112180	180	10
	AI60112200	200	10
	AI60112220	220	10
	AI60112240	240	10
M16	AI60116120	120	10
	AI60116140	140	10
	AI60116150	150	10
	AI60116160	160	10
	AI60116180	180	10
	AI60116200	200	10
	AI60116220	220	10
	AI60116240	240	10
	AI60116260	260	10
	AI60116280	280	10
	AI60116300	300	10

* Standard ISO 8677 differs from DIN 931 with regards to parameters k and Ch for M10 and M12 diameters.

AI 603

Round head bolt

A2 stainless steel

DIN 603 (ISO 8677*)



AISI 304

A2

d [mm]	code	L [mm]	pcs/box
M8	AI603850	50	50
	AI603860	60	50
	AI603870	70	50
	AI603880	80	50
	AI603890	90	50
	AI6038100	100	50
	AI6038120	120	50
	AI6038140	140	50
M10	AI6031070	70	50
	AI6031080	80	50
	AI6031090	90	50
	AI60310100	100	50
	AI60310110	110	50
	AI60310120	120	50
	AI60310130	130	50
	AI60310140	140	50
	AI60310150	150	50
	AI60310160	160	50
	AI60310180	180	50
	AI60310200	200	50
M12	AI60310220	220	50
	AI60312140	140	50
	AI60312160	160	50
	AI60312180	180	50
	AI60312200	200	50
	AI60312220	220	50
	AI60312240	240	50
	AI60312280	280	50
	AI60312300	300	50

* Standard ISO 8677 differs from DIN 603 with regards to parameters k and Ch for M10 and M12 diameters.