

# GENERAL CATALOGUE



**chiavette unificate** S.p.A.  
together in movement



**chiavette unificate** S.p.A.

**Chiavette Unificate SpA** sells its products worldwide and is located in Italy close to Bologna.

The Company started its activities in 1952: since then Chiavette always tried to follow the requirements and the developments of this sector and offers products that made and continue to make the history of the Company. From the craft stage during the first years to the industrial production based on high technology, we manufacture mechanical components, which are necessary for the motion of different systems and machineries. The company focuses on continuous improvements, consolidated management and production systems, details accuracy, the central role of people, quick innovation, and service efficiency; these values enable us to reach the customer's trust and transparency.

That's why we are **"together in movement"**. We're moving with you: we widened our range of products dedicated to our customers. Among our product range we have the Tescubal rod ends and spherical bearings (steel-bronze or steel-steel coupling), the Tesno rod ends and spherical bearings (steel-PTFE coupling), which are high resistance solutions, self lubricating and able to guarantee excellent performances even in case of heavy applications; the ball joints, axial joints and self aligning joints; the clevises and their accessories; the keys; the rod assemblies... Several solutions made of mild steel, stainless steel and aluminium. On the other hand special solutions and according to drawings can be easily supplied and managed, delivered directly to the customer's production line.

We always want to give you the right products according to your requirements and a dynamic service, which enables you to save time and money.

All together, these are the strengths of Chiavette Unificate S.p.A.

In our catalogue you can find our complete range of products, which are manufactured according to our Quality System certified by TÜV. You can deepen these informations visiting our web site [www.chiavette.com](http://www.chiavette.com), so that we can better know each other and work together, since the people of Chiavette Unificate S.p.A. will surely move with you.



A Company Certified According to UNI EN ISO 9001:2015

together in movement

# ELECTROLYTIC COATINGS

This chapter specifies the characteristics required by electrolytic zinc coatings applied on components manufactured by Chiavette Unificate in carbon or tied steel, whose main purpose is to protect against corrosion, classify the types of coating, indicating the criteria of choice and prescribing the information to be put in the drawing.

The following tables are in accordance with the contents of ISO

COATING DESIGNATION CODE		ALTERNATIVE DESIGNATION	THICKNESS [ μm ]	CHROMATE TREATMENT	RESISTANCE IN SALT SPRAY	
					WHITE RUST [ h ]	RED RUST [ h ]
Fe/Zn	5c1A	A2J	5	A	6	24
Fe/Zn	5c1B	A2K		B	12	36
Fe/Zn	5c2C	A2L		C	48	72
		A2L CrIII				
Fe/Zn	5c2D	A2M		D	72	96
Fe/Zn	5Bk	A2S	Bk	12	-	
Fe/Zn	8c1A	A3J	8	A	6	48
Fe/Zn	8c1B	A3K		B	24	72
Fe/Zn	8c2C	A3L		C	72	120
		A3L CrIII				
Fe/Zn	8c2D	A3M		D	96	144
Fe/Zn	8Bk	A3S	Bk	24	72	
Fe/Zn	12c1A	A4J	12	A	6	72
Fe/Zn	12c1B	A4K		B	24	96
Fe/Zn	12c2C	A4L		C	72	144
		A4L CrIII				
Fe/Zn	12c2D	A4M		D	96	168
Fe/Zn	12Bk	A4S	Bk	24	96	

### Description of the main designation (Fe/Zn 8c1A):

CLASS	DESIGNATION	TYPE	CHARACTERISTIC APPEARANCE	CORROSION PROTECTION
1	A	clear	Transparent, clear, sometimes with bluish tone	Low, for example against the formation of spots from handling or against high humidity in mildly corrosive conditions
	B	white	Transparent and slightly iridescent	
2	C	Iridescent	Iridescent yellow	High, including protection against certain organic vapors
	D	Opaque	Olive green with brown or bronze tones	
	Bk	Black	slightly iridescent Black	Different grades of protection against corrosion

### Alternative designation example: A3J

A METAL/COATING ALLOY			3 COATING THICKNESS			J FINISH AND CHROMATE TREATMENT		
DESIGNATION	SYMBOL	ELEMENT	DESIGNATION.	COATING THICKNESS [ μm ]		DESIGNATION.	FINISH	CHARACTERISTIC APPEARANCE
A	Zn	Zinc		1 metal coating	2 metals coating	J	Bright	No color
			2	5	2+3	K		from bluish to bluish iridescent
			3	8	3+5	L		from yellowish reflex to iridescent yellow brown
			4	12	4+8	M		from opaque olive to olive brown
						S	Semi-bright	from brown-black to black

Designations 1A – 1B – 2C CrIII are Chrome VI free according to European Community Directives: 2002/95/EC concerning the restriction of certain hazardous substances in electrical and electronic devices (Directive RoHS); 2002/96/EC about waste of electrical and electronic devices (RAEE).



## Other types of protection coatings

**Iron-zinc alloy:** Black alkaline zinc-iron alloy process

This minimum 8 micron thickness treatment guarantees a resistance to salt corrosion (ASTM B117) up to:

500 h to iron corrosion and up to 250 h to white oxide, for black color;

700 h to iron corrosion and up to 400 h to white oxide, for yellow color

**Zinc-Nickel alloy:** The process of Zn.Ni alloy (12-16% nickel content) guarantees the max. resistance to corrosion, applying few micron thickness, even in case of high temperatures (up to +200 C). Process of Zn.Ni alloy, black or grey color.

This process is complying with the EU Directives 2000/53/EC (RoHS), 2002/96 (WEEE) and guarantees a resistance as requested by the automotive sector specifications. To increase the resistance, it is possible to apply a sealer after the coating.

**CHROMITING:** Passivation for zinc electrolytic plating treatments and zinc alloys. This process is complying with the EU Directives 2000/53/EC (RoHS), 2002/96 (WEEE), slightly iridescent, with high resistance to corrosion.

Up to 400 hours in salt spray with 7um thickness, without white rust (ASTM B117) and without any need of a sealer. The

thermal shock does not adversely affect corrosion resistance (test performed for 8 hours at 120 ).

Chromiting far exceeds the standard achieved by conventional hexavalent chrome yellow and green.

Chromiting is the process that had the largest number of awards in the automotive sector and which has the most use on an industrial scale.

To increase the resistance it is possible to use a sealer.

**Sealing:** The sealers can be applied to the passive layers after the processes of galvanizing and zinc alloys. They increase the resistance to corrosion.

**NIPLOY PROCESS:** The Niploy process is an exclusively chemical Nickel plating process with an high content of phosphorus, which allows to obtain a uniform deposit on treated surfaces, non-porous and highly resistant to corrosion and wear.

The deposit which arises from the Niploy treatment process ensures, thanks to the structure of the carry and the presence of phosphorus, a high resistance to corrosion, making it usable in application areas as pharmaceuticals and food, instead of stainless steel.

**DACROMET®:** DACROMET® is an inorganic coating based on zinc and aluminium flakes in a chromium binder. The anticorrosion performances are particularly high in case of thin treatments (from 5 to 10 m). DACROMET® is the reference technology concerning threaded fasteners for the automotive industry.

**GEOMET®:** Il GEOMET® is a water-based coating, composed of zinc and aluminium flakes in an inorganic binder. It is chromium free (neither Chrome VI nor Chrome III).

## Standards comparison table

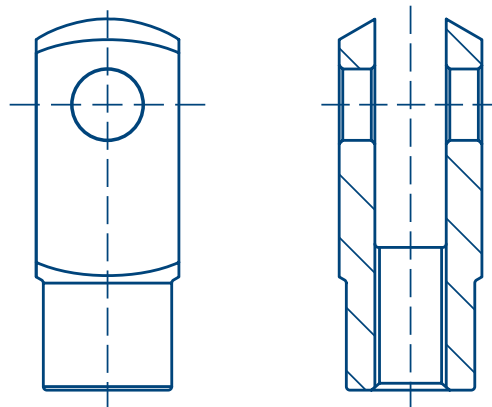
Standard material	Europe	Italy (IT)	Germany (DE)	France (FR)	Sweden (SE)	U.K.	Spain (ES)	U.S.A.
W. Nr.	EN	UNI	DIN	AFNOR	SS	B.S.	UNE	SAE/AISI
1.1186	C40	C40	Ck40	XC42H1	-	080M40	F1141	1040
1.1191	C45	C45	Ck45	XC 45	1672	080M46	F.1140	1045
1.0603	1 CS 67	C67	C67	XC 65	-	080A67	-	1070
1.0715	11SMn30	CF 9SMn28	9SMn28K	S250Pb	1912	230M07	F.2111	12L14
1.0718	11SMnPb30	CF 9SMnPb28	9SMnPb28K	S250Pb	1914	-	F.2112	12L13
1.0765	36SMnPb14	35SMnPb10	36SMnPb14	35MF6Pb	-	-	F.2132	-
1.3505	100Cr6	100Cr6	100Cr6	100Cr6	2258	2S135	F.1310	52100
1.7033	34Cr4	34Cr4	34Cr4	32C4	-	530A32	F.8221	5132
1.4301	X 5CrNi18-10	X 5CrNi18-10	X 5CrNi18-10	Z5CN18-09	2332	304S15	F.3504	304
1.4305	X8CrNiS 18-9	X10CrNiS18-09	X8CrNiS18-9	Z8CNF18-09	2346	303S22	F.3508	303
1.4401	X5CrNiMo17-12-2	X5CrNiMo1712	X5CrNiMo17-12-2	Z7CND17-12-02	2347	316S17	F.3534	316
1.4404	X2CrNiMo17-12-2	X 2CrNiMo1712	X2CrNiMo17132	Z3CND17-11-02	2348	316S14	F.3533	316L
1.4571	X6CrNiMoTi17-12-2	X6CrNiMoTi1712	X6CrNiMoTi17-12-2	Z6CNDT17-12	2350	320S18	F.3535	316Ti
1.4021	X20Cr13	X20Cr13	X20Cr13	Z20Cr13	2303	420S37	F.3402	420
1.6587	17NiCrMo6-4	18NiCrMo5	17NiCrMo6-4	18NCD6	2523	815M17	-	4317
1.6510	39NiCrMo3	39NiCrMo3	36CrNiMo4	40NCD3	-	-	F.1282	9840
1.7225	42CrMo4	42CrMo4	42CrMo4	42CD4	2244	708M40	F.1252	4140

# 1. PRODUCT DESCRIPTION

Clevises are mechanical linking units suitable for the transmission of static forces.

The pins or the lockable pins, used in conjunction with the clevises, have the function of connecting the clevis with the mechanical part for the transmission of the force. They are standard products, which are produced according to the norms and the indicated dimensional tables.

All our products can be supplied galvanized or unplated.



# 2. TECHNICAL DATA

- Clevis type G DIN 71752 norm
- Clevis type G . . FG DIN 71752 norm with thread ISO 8140
- Clevis type G . . CN t CNOMO 06 07 14 norm
- Mating piece for clevis type G . . FG according to dimensional tables
- Pin type PDIN DIN 1434 norm
- Pin type PKS according to dimensional tables
- Pin type PI according to dimensional tables
- Pin type PC according to dimensional tables

**Material:** Automatic Steel 11SMnPb30 (1.0718) COLD-DRAWN (+C) EN 10277-3 NORM

- Clevis type G . . STAINLESS STEEL DIN 71752 norm
- Clevis type G . . FG STAINLESS STEEL DIN 71752 norm with thread ISO 8140
- Mating piece for clevis type G . . FG STAINLESS STEEL according to dimensional tables
- Pin type PI . . STAINLESS STEEL according to dimensional tables

**Material:** Stainless Steel AISI 303 (1,4305) COLD-DRAWN (+C) EN 10088-3 NORM

- Clevis type GA . . DIN 71752 norm
- Clevis type GA . . FG DIN 71752 norm with thread ISO 8140
- Pin type PKSAL . . according to dimensional tables

**Material:** Aluminium 2011 (11S) anodized COLD-DRAWN EN 754 NORM

- Lockable pin type PM according to dimensional tables
- Lockable pins type PMC according to dimensional tables

**Material:** Pin - automatic steel 11SMnPb30 (1,0718)

**Material:** Spring - carbon steel C67 (1,0603)

## Static load

By static load we mean the maximum radial load which, when applied to the forks in a static way, does not create permanent deformations or prejudice its functioning.

The values of the maximum permissible load were obtained by calculation and then verified on significant samples taken from our production series.

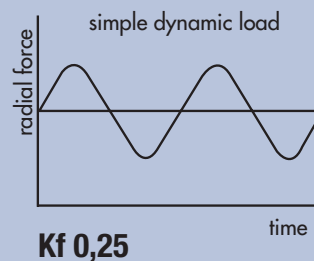
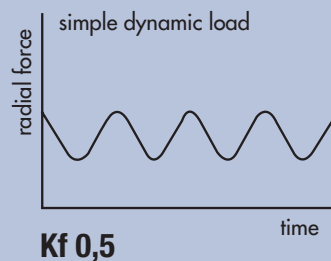
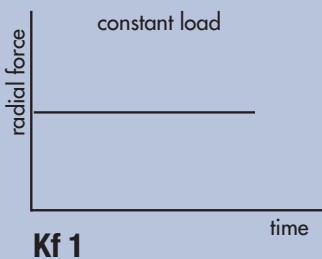
In the tables of dimensions the permissible static loads ( $C_o$ ) which are indicated have been calculated on the basis of a minimum safety factor of 2.5 times with respect to the breaking static load.

Where pulsating or alternating loads are used, it is necessary to reduce the permissible static load introducing the safety coefficient  $K_f$ :

$$Fr_{amm.} = C_o \times K_f$$

- Fr amm.** = maximum permissible load on the fork ( daN )  
**C<sub>o</sub>** = permissible radial static load on the fork ( daN )  
**K<sub>f</sub>** = load coefficient  
**Fr** = radial force applied ( daN )

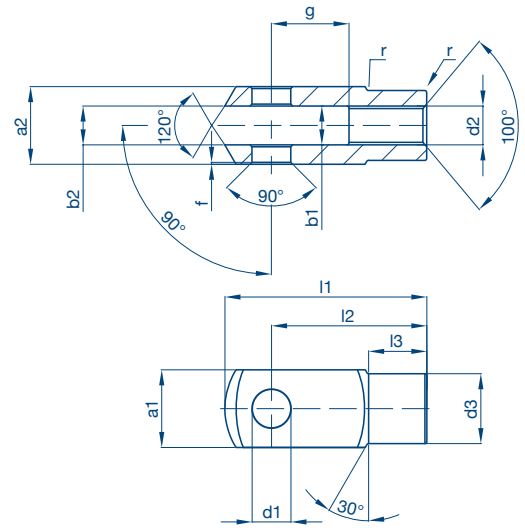
*It is important always to verify the following condition:*



## 3. TOLERANCES

The constructional tolerances refer to current regulations or to those specified in the tables of dimensions.

# DIN 71752



Dimensions mm

DESIGNATION	d1	g	a1	a2	b1	b2	d2	d3	f	l1	l2	l3	r	static load Co.(daN)	weight ≈ (kg)	
	H9	±0,5	h11	+0,30 -0,16	B13	tol.		Regular thread 6H	Fine pitch thread 6H	±0,3	±0,2	±0,5	tol.			±0,2
G4X8	4	8	8	8	4	4	M4x0,70	8	0,5	21	16	±0,3	6	0,5	320	0,005
G4X16	4	16	8	8	4	4	M4x0,70	8	0,5	29	24		6	0,5	32	0,007
G5X10	5	10	10	10	5	5	M5x0,80	9	0,5	26	20	±0,3	7,5	0,5	500	0,009
G5X20	5	20	10	10	5	5	M5x0,80	9	0,5	36	30		7,5	0,5	500	0,013
G6X12	6	12	12	12	6	6	M6x1,00	10	0,5	31	24	±0,3	9	0,5	720	0,015
G6X24	6	24	12	12	6	6	M6x1,00	10	0,5	43	36		9	0,5	720	0,022
G8X16	8	16	16	16	8	8	M8x1,25	14	0,5	42	32	±0,3	12	0,5	1280	0,037
G8X16 FG	8	16	16	16	8	8	M8x1,00	14	0,5	42	32		12	0,5	1280	0,037
G8X32	8	32	16	16	8	8	M8x1,25	14	0,5	58	48	±0,3	12	0,5	1280	0,054
G8X32 FG	8	32	16	16	8	8	M8x1,00	14	0,5	58	48		12	0,5	1280	0,054
G10X20	10	20	20	20	10	10	M10x1,50	18	0,5	52	40	±0,3	15	0,5	2000	0,074
G10X20 FG	10	20	20	20	10	10	M10x1,25	18	0,5	52	40		15	0,5	2000	0,074
G10X40	10	40	20	20	10	10	M10x1,50	18	0,5	72	60	±0,3	15	0,5	2000	0,116
G10X40 FG	10	40	20	20	10	10	M10x1,25	18	0,5	72	60		15	0,5	2000	0,116
G12X24	12	24	24	24	12	12	M12x1,75	20	0,5	62	48	±0,4	18	0,5	2880	0,121
G12X24 FG	12	24	24	24	12	12	M12x1,25	20	0,5	62	48		18	0,5	2880	0,121
G12X48	12	48	24	24	12	12	M12x1,75	20	0,5	86	72	±0,4	18	0,5	2880	0,175
G12X48 FG	12	48	24	24	12	12	M12x1,25	20	0,5	86	72		18	0,5	2880	0,175
G14X28	14	28	27	27	14	14	M14x2,00	24	1	72	56	±0,4	22,5	1	3380	0,178
G14X28 FG	14	28	27	27	14	14	M14x1,50	24	1	72	56		22,5	1	3380	0,178
G14X56	14	56	27	27	14	14	M14x2,00	24	1	101	85	±0,4	22,5	1	3380	0,258
G14X56 FG	14	56	27	27	14	14	M14x1,50	24	1	101	85		22,5	1	3380	0,258
G16X32	16	32	32	32	16	16	M16x2,00	26	1	83	64	±0,4	24	1	5120	0,282
G16X32 FG	16	32	32	32	16	16	M16x1,50	26	1	83	64		24	1	5120	0,282
G16X64	16	64	32	32	16	16	M16x2,00	26	1	115	96	±0,4	24	1	5120	0,411
G16X64 FG	16	64	32	32	16	16	M16x1,50	26	1	115	96		24	1	5120	0,411

For left-hand thread add "LH" (ex. G16x32 LH)

Technical reading from page 44 to page 45

## MATERIAL

automatic steel 11SMnPb30 (1.0718)

## Surface protection:

- Zinc plating according to EN ISO 4042, Fe/Zn 8c...
- Chromate treatment (passivation) example: type A please add 1A (G20x40 1A)
- Surface treatment table at page 6
- Without any indication, the clevis will be supplied oiled and unplated

## Tolerances:

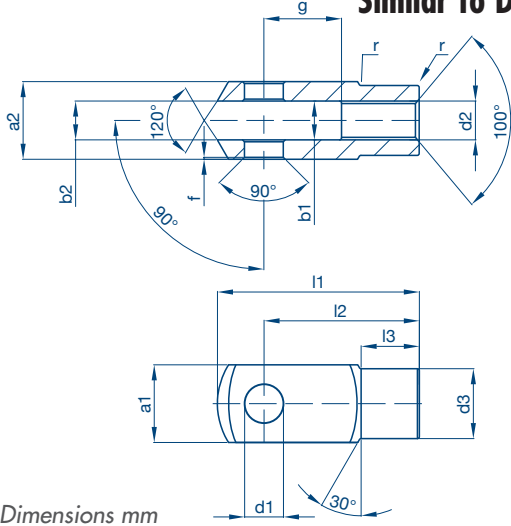
The dimensional tolerances shown in the table make reference to zinc plated products.

Series  
**G**

CLEVISES

chiavette unificate

Similar to DIN 71752 (measures not included in the standard)



Series

G

CLEVISES

Dimensions mm

DESIGNATION	d1	g	a1	a2	b1	b2	d2		d3	f	l1	l2	l3	r	static load Co.(daN)	weight ≈ (kg)
	H9	±0,5	h11	+0,30 -0,16	B13	Tol.	regular thread 6H	fine pitch thread 6H	±0,3	±0,2	±0,5	Tol.	±0,2			
G18X36	18	36	36	36	18	18	M18x2,50		30	1	94	72	27	1,5	6480	(kg)
G18X36 FG	18	36	36	36	18	18		M18x1,5	30	1	94	72	27	1,5	6480	0,39
G20X40	20	40	40	40	20	20	M20x2,50		34	1	105	80	30	1,5	8000	0,55
G20X40 FG	20	40	40	40	20	20		M20x1,50	34	1	105	80	30	1,5	8000	0,55
G20X80	20	80	40	40	20	20	M20x2,50		34	1	145	120	30	1,5	8000	0,80
G20X80 FG	20	80	40	40	20	20		M20x1,50	34	1	145	120	30	1,5	8000	0,80
G25X50	25	50	50	50	25	25	M24x3,00		42	1	132	100	36	1,5	12500	1,10
G25X50 FG	25	50	50	50	25	25		M24x2,00	42	1	132	100	36	1,5	12500	1,10
G30X54	30	54	55	55	30	30	M30x3,50		48	1	148	110	38	2	12500	1,46
G30X54 FG	30	54	55	55	30	30		M30x2,00	48	1	148	110	38	2	12500	1,46
G35X72	35	72	70	70	35	35	M36x4,00		60	1	188	144	40	3	24500	3,27
G35X72 FG	35	72	70	70	35	35		M36x2,00	60	1	188	144	40	3	24500	3,27
G42X84	42	84	85	85	42	42	M42x4,50		70	3	232	168	63,5	5	35500	5,30
G42X84 FG	42	84	85	85	42	42		M42x2,00	70	3	232	168	63,5	5	35500	5,30
G50X96 FG	50	96	96	96	50	50		M48x2,00	82	3	265	192	73	5	41000	7,90

For left-hand thread add "LH" (ex. G20x40 LH)  
 Technical reading from page 44 to page 45

**MATERIAL**

automatic steel 11SMnPb30 (1.0718)

**Surface protection:**

- Zinc plating according to EN ISO 4042, Fe/Zn 8c...
- Chromate treatment (passivation) example: type A please add 1A (G20x40 1A)
- Surface treatment table at page 6
- Without any indication, the clevis will be supplied oiled and unplated

**Tolerances:**

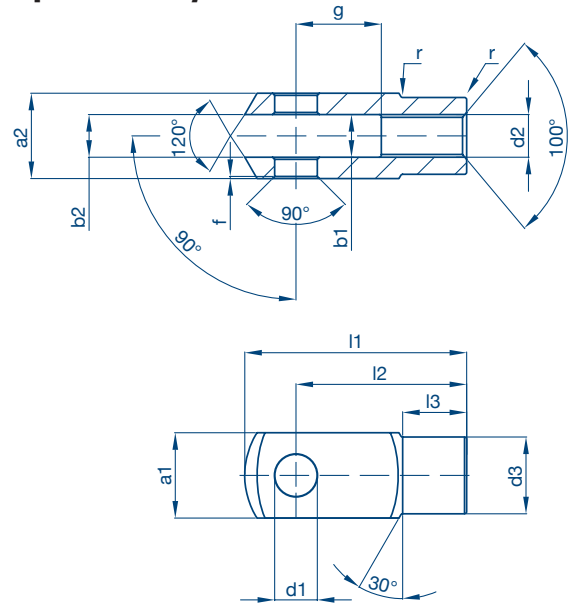
The dimensional tolerances shown in the table make reference to zinc plated products.



## DIN 71752 Thread ISO 8140 CETOP for pneumatic cylinders

Series  
**G/FG**

**CLEVISSES**



Dimensions mm

DESIGNATION	CYLINDER Ø	d1	g	a1	a2	b1	b2	d2	d3	f	l1	l2	l3	r	static load Co.(daN)	weight ≈ (kg)
		H9	±0,5	h11	+0,30 -0,16	B13	Tol.	6H	±0,3	±0,2	±0,5	Tol.	±0,2			
G4X8	8-10	4	8	8	8	4	4	M4x0,70	8	0,5	21	16	6	0,5	320	0,005
G6X12	12-16	6	12	12	12	6	6	M6x1,00	10	0,5	31	24	9	0,5	720	0,015
G8X16	20	8	16	16	16	8	8	M8x1,25	14	0,5	42	32	12	0,5	1280	0,036
G10X20 FG	25-32	10	20	20	20	10	10	M10x1,25	18	0,5	52	40	15	0,5	2000	0,070
G12X24 FG	40	12	24	24	24	12	12	M12x1,25	20	0,5	62	48	18	0,5	2880	0,121
G16X32 FG	50-63	16	32	32	32	16	16	M16x1,50	26	1	83	64	24	1	5120	0,250

### similar to DIN 71752 (sizes not considered in the norm)

DESIGNATION	CYLINDER Ø	d1	g	a1	a2	b1	b2	d2	d3	f	l1	l2	l3	r	static load Co.(daN)	weight ≈ (kg)
		H9	±0,5	h11	+0,30 -0,16	B13	Tol.	6H	±0,3	±0,2	±0,5	Tol.	±0,2			
G20X40 FG	80-100	20	40	40	40	20	20	M20x1,50	34	1	105	80	30	1,5	8000	0,550
G25X50 FG	125	25	50	50	50	25	25	M24x2,00	42	1	132	100	36	1,5	12500	1,100
G30X54 FG	125	30	54	55	55	30	30	M27x2,00	48	1	148	110	38	2	12500	1,460
G35X72 FG	160-200	35	72	70	70	35	35	M36x2,00	60	1	188	144	40	3	24500	3,270
G40X84 FG	250	40	84	85	85	40	40	M42x2,00	70	3	232	168	63,5	5	39000	5,300
G42X84 FG	250	42	84	85	85	42	42	M42x2,00	70	3	232	168	63,5	5	35500	5,300
G50X96 FG	320	50	96	96	96	50	50	M48x2,00	82	3	265	192	73	5	41000	7,900

For left-hand thread add "LH" (ex. G16x32 FG LH)  
Technical reading from page 44 to page 45

### MATERIAL

automatic steel 11SMnPb30 (1.0718)

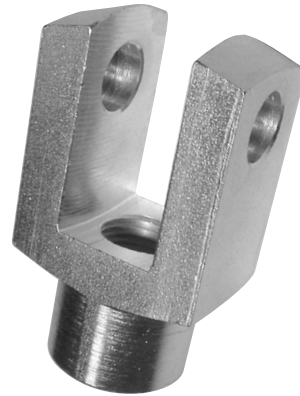
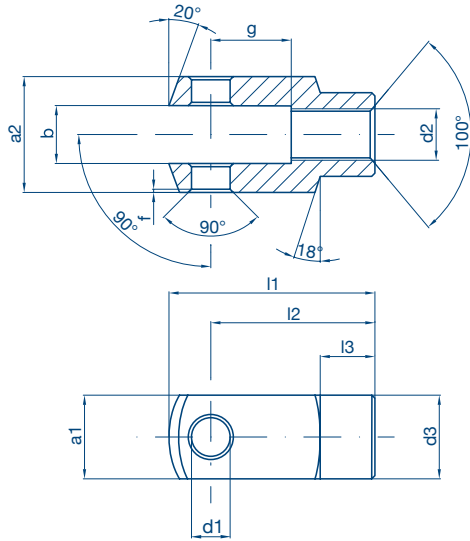
### Surface protection:

- Zinc plating according to EN ISO 4042, Fe/Zn 8c...
- Chromate treatment (passivation) example: type A please add 1A (G16x32 FG 1A)
- Surface treatment table at page 6
- Without any indication, the clevis will be supplied oiled and unplated

### Tolerances:

The dimensional tolerances shown in the table make reference to zinc plated products.

## Former CNOMO 06-07-14



Series  
**G/CN**

**CLEVISES**

Dimensions mm

DESIGNATION	CYLINDER Ø	d1	g	a1	a2	b	d2	d3	f	l1	l2	l3	static load Co.(daN)	weight ≈ (kg)
		H9	±0,5	h11	h11	H11	6H	±0,3	±0,2	±0,5	±0,4	±0,2		
G8x16 CN	32	8	16	22	22	11	M10x1,5	18	0,5	45	36	14	3080	0,080
G12x25 CN	40-50	12	25	26	36	18	M16x1,5	26	0,5	64	51	17	5040	0,210
G16x33 CN	63-80	16	33	34	45	22	M20x1,5	34	1	80	63	18,5	8280	0,440
G20x40 CN	100-125	20	40	42	63	30	M27x2,0	42	1	105	85	30	14520	0,910
G25x40 CN	160-200	25	40	50	80	40	M36x2,0	50	1	140	115	45	20000	1,800

For left-hand thread add "LH" (ex. G20x40 CN LH)  
Technical reading from page 44 to page 45

### MATERIAL

automatic steel 11SMnPb30 (1.0718)

### Surface protection:

- Zinc plating according to EN ISO 4042, Fe/Zn 8c...
- Chromate treatment (passivation) example: type A please add 1A (G16x33 CN 1A)
- Surface treatment table at page 6
- Without any indication, the clevis will be supplied oiled and unplated

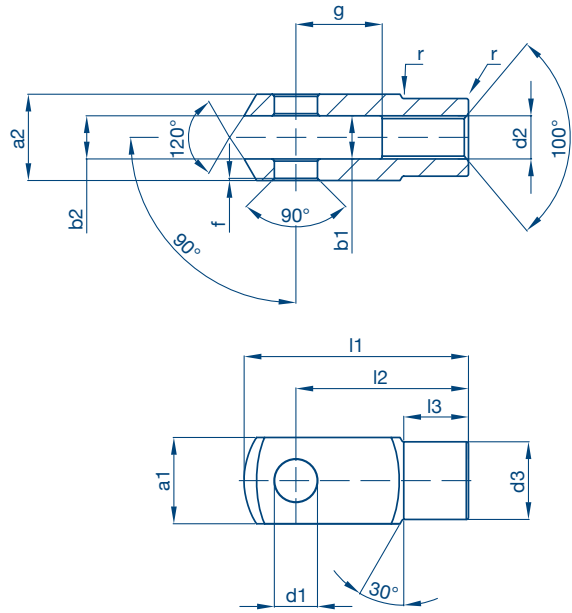
### Tolerances:

The dimensional tolerances shown in the table make reference to zinc plated products.

# DIN 71752

Series  
**G**  
**INOX**

**CLEVISES**  
**STAINLESS STEEL Version**



Dimensions mm

DESIGNATION	d1	g	a1	a2	b1	b2	d2	d3	f	l1	l2	l3	r	static load Co.(daN)	weight ≈ (kg)			
	H9	±0,5	h11	+0,30 -0,16	B13	tol.	6H	±0,3	±0,2	±0,5	tol.	±0,2						
G5x10 INOX	5	10	10	10	5	5	B13	M5x0,80	9	0,5	26	20	±0,30	7,5	0,5	500	0,009	
G5x20 INOX	5	20	10	10	5	5		M5x0,80	9	0,5	36	30		7,5	0,5	500	0,013	
G6x12 INOX	6	12	12	12	6	6		M6x1,00	10	0,5	31	24	±0,40	9	0,5	720	0,015	
G6x24 INOX	6	24	12	12	6	6		M6x1,00	10	0,5	43	36		9	0,5	720	0,022	
G8x16 INOX	8	16	16	16	8	8		M8x1,25	14	0,5	42	32	±0,40	12	0,5	1280	0,036	
G8x32 INOX	8	32	16	16	8	8		M8x1,25	14	0,5	58	48		12	0,5	1280	0,054	
G10x20 INOX	10	20	20	20	10	10		+0,70 +0,15	M10x1,50	18	0,5	52	40	±0,40	15	0,5	2000	0,074
G10x40 INOX	10	40	20	20	10	10			M10x1,50	18	0,5	72	60		15	0,5	2000	0,116
G12x24 INOX	12	24	24	24	12	12			M12x1,75	20	0,5	62	48	±0,40	18	0,5	2880	0,121
G12x48 INOX	12	48	24	24	12	12			M12x1,75	20	0,5	86	72		18	0,5	2880	0,175
G16x32 INOX	16	32	32	32	16	16	M16x2,00		26	1	83	64	±0,40	24	1	5120	0,282	
G16x64 INOX	16	64	32	32	16	16	M16x2,00		26	1	115	96		24	1	5120	0,411	

## Similar to DIN 71752 (sizes not considered in the norm)

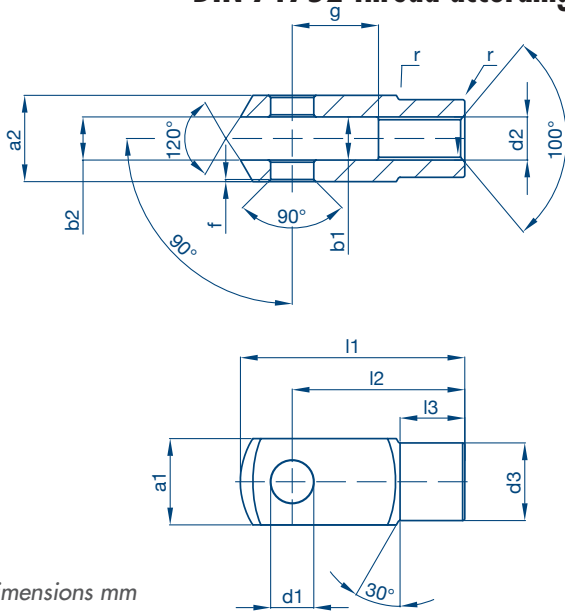
DESIGNATION	d1	g	a1	a2	b1	b2	d2	d3	f	l1	l2	l3	r	static load Co.(daN)	weight ≈ (kg)		
	H9	±0,5	h11	+0,30 -0,16	B13	tol.	6H	±0,3	±0,2	±0,5	tol.	±0,2					
G20x40 INOX	20	40	40	40	20	20	+0,70 +0,15	M20x2,50	34	1	105	80	±0,40	30	1,5	8000	0,550
G30x54 INOX	30	54	55	55	30	30		M30x3,50	48	1	148	110		38	2	12500	1,460
G35x72 INOX	35	72	70	70	35	35		M36x4,00	60	1	188	144		40	3	24500	3,270

For left-hand thread add "LH" (ex. G16x32 LH INOX)  
Technical reading from page 44 to page 45

### MATERIAL

stainless steel (1.4305 - AISI 303)

## DIN 71752 thread according to ISO 8140 CETOP for pneumatic cylinders



Series  
**G/FG**  
**INOX**

**CLEVISES**  
**STAINLESS STEEL Version**

Dimensions mm

DESIGNATION	CYLINDER Ø	d1	g	a1	a2	b1	b2	d2	d3	f	l1	l2	l3	r	static load Co.(daN)	weight ≈ (kg)			
		H9	±0,5	h11	0,3 -0,16	B13		6H	±0,3	±0,2	±0,5		Tol.	±0,2					
G4X8 INOX	8-10	4	8	8	8	4	4	M4x0,70	8	0,5	21	16	±0,3	6	320	0,005			
G6X12 INOX	12-16	6	12	12	12	6	6		M6x1,00	10	0,5	31		24			9	720	0,015
G8X16 INOX	20	8	16	16	16	8	8		M8x1,25	14	0,5	42		32			12	1280	0,036
G10X20 FG INOX	25-32	10	20	20	20	10	10	M10x1,25	18	0,5	52	40	±0,4	15	2000	0,070			
G12X24 FG INOX	40	12	24	24	24	12	12		M12x1,25	20	0,5	62		48			18	2880	0,121
G16X32 FG INOX	50-63	16	32	32	32	16	16		M16x1,50	26	1	83		64			24	5120	0,250

### Similar to DIN 71752 (measures not included in the standard)

DESIGNATION	CYLINDER Ø	d1	g	a1	a2	b1	b2	d2	d3	f	l1	l2	l3	r	static load Co.(daN)	weight ≈ (kg)			
		H9	±0,5	h11		B13	Tol.	6H	±0,3	±0,2	±0,5		±0,2						
G20X40 FG INOX	80-100	20	40	40	40	20	20	M20x1,50	34	1	105	80	±0,4	30	8000	0,550			
G30X54 FG INOX	125	30	54	55	55	30	30		M27x2,00	48	1	148		110			38	12500	1,460
G35X72 FG INOX	160-200	35	72	70	70	35	35		M36x2,00	60	1	188		144			40	24500	3,270

For left-hand thread add "LH" (ex. G16x32 FG LH INOX)  
Technical reading from page 44 to page 45

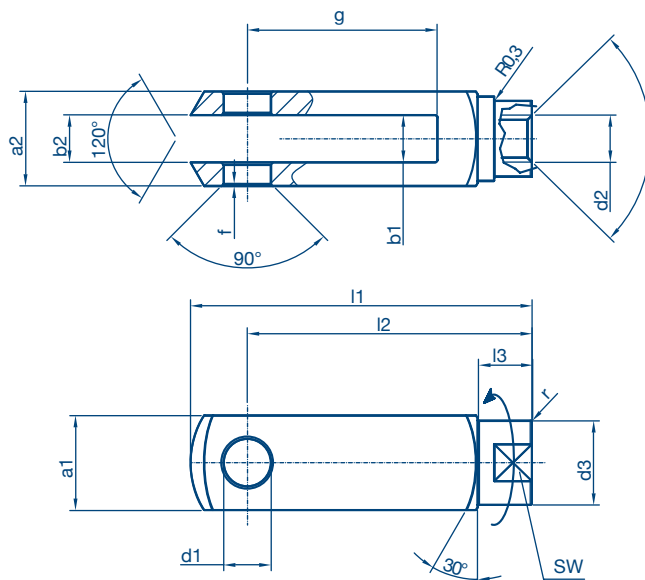
### MATERIAL

stainless steel (1.4305 - AISI 303)

## Rotating Clevises similar to DIN 71752

Series  
**GR**

**CLEVISES**



Dimensions mm

DESIGNATION	d1	g	a1	a2	b1	b2	d2	d3	f	l1	l2	l3	SW	static load Co.(daN)	weight ≈ (kg)	
	H9	±0,5	h11	+0,30 -0,16	B13	tol.	6H	±0,3	±0,2	±0,5	tol.	±0,2				
GR5x10	5	10	10	10	5	B13	M5x0,80	8,8	0,5	26	20	±0,30	4	7	80	0,014
GR5x20	5	20	10	10	5		M5x0,80	8,8	0,5	36	30		4	7	80	0,023
GR6x12	6	12	12	12	6		M6x1,00	10,2	0,5	31	24	5,6	9	240	0,015	
GR6x24	6	24	12	12	6		M6x1,00	10,2	0,5	43	36	5,6	9	240	0,040	
GR8x16	8	16	16	16	8		M8x1,25	14	0,5	42	32	8,2	12	340	0,036	
GR8x32	8	32	16	16	8		M8x1,25	14	0,5	58	48	8,2	12	340	0,102	
GR10x20	10	20	20	20	10	+0,70 +0,15	M10x1,50	17,8	0,5	52	40	±0,40	11,8	16	600	0,070
GR10x40	10	40	20	20	10		M10x1,50	17,8	0,5	72	60		11,8	16	600	0,186
GR12x24	12	24	24	24	12		M12x1,75	20	0,5	62	48	14	18	1400	0,121	
GR12x48	12	48	24	24	12		M12x1,75	20	0,5	86	72	14	18	1400	0,325	

Technical reading from page 44 to page 45

### MATERIAL

automatic steel 11SMnPb30 (1.0718)

### Surface protection:

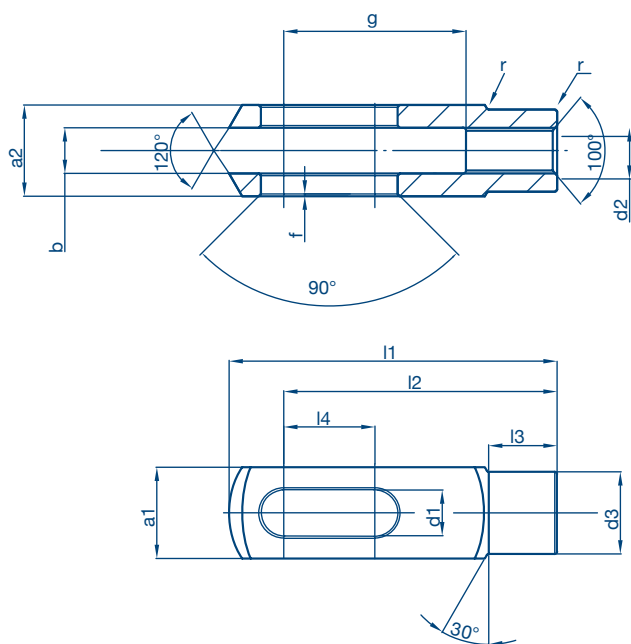
- Zinc plating according to EN ISO 4042, Fe/Zn 8c...
- Exemple of chromate treatment (passivation): type A please add 1A (G16x32 1A)
- Surface treatment table at page 6
- With no indications the clevis will be supplied oiled and unplated.

### Tolerances:

The dimensional tolerances shown in the table make reference to zinc plated products.



## Clevises with elongated hole similar to DIN 71752



Series  
**GS**

**CLEVISES**

Dimensions mm

DESIGNATION	d1	g	a1	a2	b	d2		d3	f	l1	l2	l3	l4	r	static load Co.(daN)	weight ≈ (kg)
	+0,20 0	±0,5	h11	+0,50 -0,16	+0,70 +0,15	regular thread 6H	fine pitch thread 6H	±0,3	±0,2	±0,5	±0,4	±0,2	±0,5			
GS6X24	6,1	24	12	12	6	M6x1,00		10	0,5	43	36	9	12	0,5	720	0,022
GS8X32	8,1	32	16	16	8	M8x1,25		14	0,5	58	48	12	16	0,5	1280	0,054
GS8X32 FG	8,1	32	16	16	8		M8x1	14	0,5	58	48	12	16	0,5	1280	0,054
GS10X40	10,1	40	20	20	10	M10x1,50		18	0,5	72	60	15	20	0,5	2000	0,116
GS10X40 FG	10,1	40	20	20	10		M10x1,25	18	0,5	72	60	15	20	0,5	2000	0,116
GS12X48	12,1	48	24	24	12	M12x1,75		20	0,5	86	72	18	24	0,5	2880	0,175
GS12X48 FG	12,1	48	24	24	12		M12x1,25	20	0,5	86	72	18	24	0,5	2880	0,175
GS14X56	14,1	56	27	27	14	M14x2,00		24	1	101	85	22,5	28	1	3380	0,258
GS14X56 FG	14,1	56	27	27	14		M14x1,5	24	1	101	85	22,5	28	1	3380	0,258
GS16X64	16,1	64	32	32	16	M16x2,00		26	1	115	96	24	32	1	5120	0,411
GS16X64 FG	16,1	64	32	32	16		M16x1,50	26	1	115	96	24	32	1	5120	0,411

For left-hand thread add "LH" (ex. GS16x64 LH)  
Technical reading from page 44 to page 45

### MATERIAL

automatic steel 11SMnPb30 (1.0718), on request stainless steel (1.4305 - AISI 303)

### Surface protection:

- Zinc plating according to EN ISO 4042, Fe/Zn 8c...
- Exemple of chromate treatment (passivation): type A please add 1A (G16x641A)
- Surface treatment table at page 6
- With no indications the clevis will be supplied oiled and unplated.

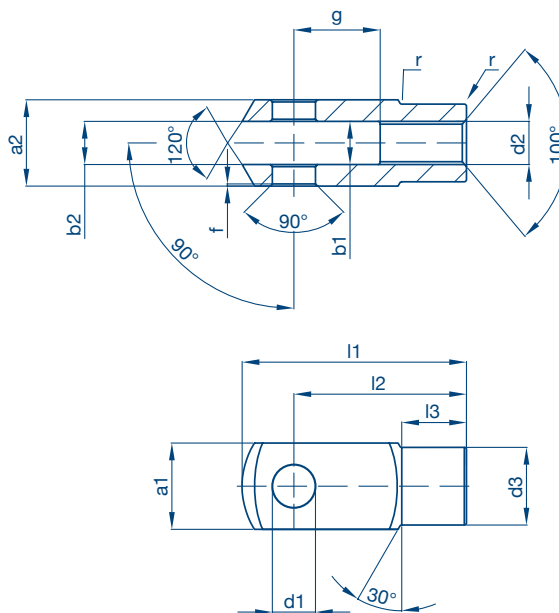
### Tolerances:

The dimensional tolerances shown in the table make reference to zinc plated products.

# DIN 71752

Series  
**GA**

**CLEVISES**  
ALUMINIUM Version



Dimensions mm

DESIGNATION	d1	g	a1	a2	b1	b2	d2	d3	f	l1	l2	l3	r	static load Co.(daN)	weight ≈ (kg)		
	H9	±0,5	h11	+0,30 -0,16	B13	Tol.		regular thread 6H	fine pitch thread 6H	±0,3	±0,2	±0,5	Tol.			±0,2	
GA4x8	4	8	8	8	4	4	M4x0,70		8	0,5	21	16		6	0,5	190	0,001
GA5x10	5	10	10	10	5	5	M5x0,80		9	0,5	26	20	±0,30	7,5	0,5	300	0,003
GA6x12	6	12	12	12	6	6	M6x1,00		10	0,5	31	24		9	0,5	430	0,005
GA8x16	8	16	16	16	8	8	M8x1,25		14	0,5	42	32		12	0,5	760	0,012
GA10x20	10	20	20	20	10	10	M10x1,50		18	0,5	52	40		15	0,5	1200	0,023
GA10x20 FG	10	20	20	20	10	10		M10x1,25	18	0,5	52	40		15	0,5	1200	0,023
GA12x24	12	24	24	24	12	12	M12x1,75		20	0,5	62	48	±0,40	18	0,5	1720	0,040
GA12x24 FG	12	24	24	24	12	12		M12x1,25	20	0,5	62	48		18	0,5	1720	0,040
GA16x32	16	32	32	32	16	16	M16x2,00		26	1	83	64		24	1	3070	0,085
GA16x32 FG	16	32	32	32	16	16		M16x1,5	26	1	83	64		24	1	3070	0,085

## similar to DIN 71752 (sizes not considered in the norm)

DESIGNATION	d1	g	a1	a2	b1	b2	d2	d3	f	l1	l2	l3	r	static load rad. Co.(daN)	weight ≈ (kg)		
	H9	±0,5	h11	+0,30 -0,16	B13	Tol.		regular thread 6H	fine pitch thread 6H	±0,3	±0,2	±0,5	Tol.			±0,2	
GA20x40	20	40	40	40	20	20	M20x2,50		34	1	105	80		30	1,5	4800	0,185
GA20x40 FG	20	40	40	40	20	20		M20x1,50	34	1	105	80	±0,40	30	1,5	4800	0,185

For left-hand thread add "LH" (ex. GA16x32 LH)  
Technical reading from page 44 to page 45

### MATERIAL

aluminium 2011 (11S)

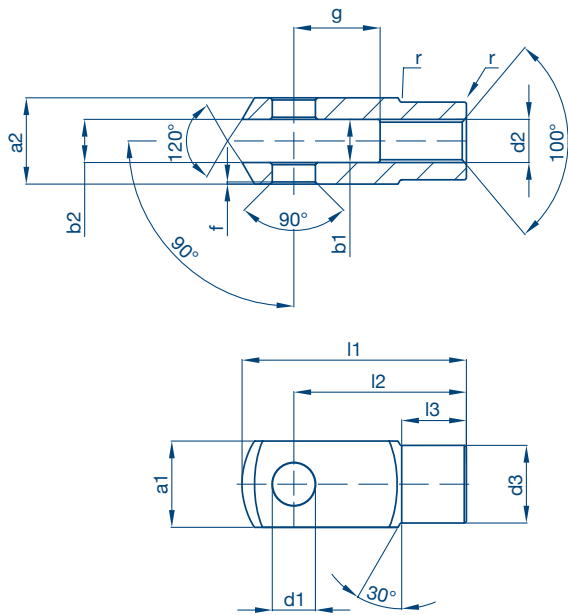
### Surface protection:

Silver colour anodizing.

Upon request:

- Gold Colour
- Black Colour

## DIN 71752 thread according to ISO 8140 CETOP for pneumatic cylinders



Series  
**GA/FG**

**CLEVISES**  
**ALUMINIUM Version**

Dimensions mm

DESIGNATION	CYLINDER Ø	d1	g	a1	a2	b1	b2	d2	d3	f	l1	l2	l3	r	static load Co.(daN)	weight ≈ (kg)									
		H9	±0,5	h11	+0,3 -0,16	B13	Tol.	6H	±0,3	±0,2	±0,5	Tol.	±0,2												
GA4X8	8-10	4	8	8	8	4	4	M4x0,70	8	0,5	21	16	6	0,5	190	0,001									
GA6x12	12-16	6	12	12	12	6	6										M6x1,00	10	0,5	31	24	9	0,5	430	0,005
GA8x16	20	8	16	16	16	8	8										M8x1,25	14	0,5	42	32	12	0,5	760	0,012
GA10x20 FG	25-32	10	20	20	20	10	10	M10x1,25	18	0,5	52	40	15	0,5	1200	0,023									
GA12x24 FG	40	12	24	24	24	12	12										M12x1,25	20	0,5	62	48	18	0,5	1720	0,040
GA16x32 FG	50-63	16	32	32	32	16	16										M16x1,50	26	1	83	64	24	1	3070	0,085

### similar to DIN 71752 (sizes not considered in the norm)

DESIGNATION	CYLINDER Ø	d1	g	a1	a2	b1	b2	d2	d3	f	l1	l2	l3	r	static load Co.(daN)	weight ≈ (kg)
		H9	±0,5	h11	+0,3 -0,16	B13	Tol.	6H	±0,3	±0,2	±0,5	Tol.	±0,2			
G20X40 FG	80-100	20	40	40	40	20	20	M20x1,50	34	1	105	80	30	1,5	4800	0,185

For left-hand thread add "LH" (ex. GA16x32 FG LH)  
Technical reading from page 44 to page 45

### MATERIAL

aluminium 2011 (11S)

### Surface protection:

Silver colour anodizing.

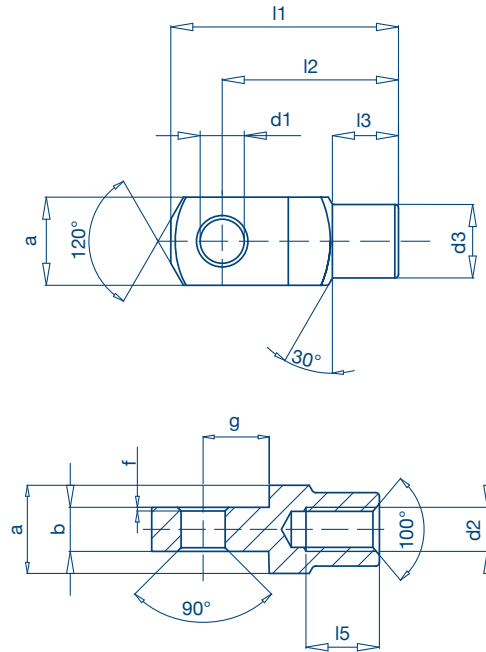
Upon request:

- Gold Colour
- Black Colour

Series  
**AG**

**MATING PIECE FOR CLEVISSES**

## Mating piece for clevises



Dimensions mm

DESIGNATION	d1	g	a	b	d2		d3	f	l1	l2	l3	l5	weight ~ (kg)
					Regular thread 6H	Fine pitch thread 6H							
	H9	±0,5	h11	0 -0,2			±0,3	±0,2	±0,5	±0,30	±0,2	min	
AG4	4	6	8	4	M4x0,70		8	0,5	21	16	6	6	0,006
AG5	5	7,5	10	5	M5x0,80		9	0,5	26	20	7,5	8	0,010
AG6	6	9	12	6	M6x1,00		10	0,5	31	24	9	11	0,017
AG8	8	12	16	8	M8x1,25		14	0,5	42	32	12	14	0,040
AG10	10	15	20	10	M10x1,50		18	0,5	52	40	15	18	0,080
AG10 FG	10	15	20	10		M10x1,25	18	0,5	52	40	15	18	0,080
AG12	12	18	24	12	M12x1,75		20	0,5	62	48	18	22	0,130
AG12 FG	12	18	24	12		M12x1,25	20	0,5	62	48	18	22	0,130
AG14	14	21	27	14	M14x2,00		24	1	72	56	22,5	25	0,210
AG14 FG	14	21	27	14		M14x1,50	24	1	72	56	22,5	25	0,210
AG16	16	24	32	16	M16x2,00		26	1	83	64	24	30	0,320
AG16 FG	16	24	32	16		M16x1,5	26	1	83	64	24	30	0,320
AG20	20	30	40	20	M20x2,5		34	1	105	80	30	38	0,660
AG20 FG	20	30	40	20		M20x1,5	34	1	105	80	30	38	0,660

For left-hand thread add "LH" (ex. AG16 LH)  
Technical reading from page 44 to page 45

### MATERIAL

automatic steel 11SMnPb30 (1.0718) upon request stainless steel (1.4305 - AISI 303)

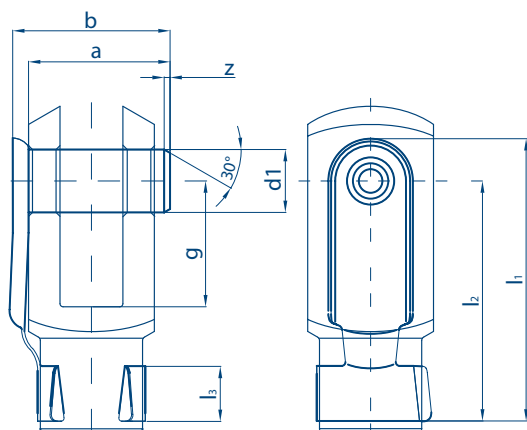
### Surface protection:

- Zinc plating according to EN ISO 4042, Fe/Zn 8c...
- Chromate treatment (passivation) example: type A please add 1A (AG16 1A)
- Surface treatment table at page 6
- Without any indication, the clevis will be supplied oiled and unplated

### Tolerances:

The dimensional tolerances shown in the table make reference to zinc plated products.

## Lockable pins for clevises series G, GFG e GA



Series  
**PM**

**CLEVIS ACCESSORIES**

Dimensions mm

DESIGNATION	d1 h11	g ±0,5	b	a ±0,2	l1 ≈	l2 ≈	l3 ≈	z	weight ≈ (kg)
PM4x8	4	8	11	9	19	15	4,5	0,5	0,002
PM5x10	5	10	13,5	12	23	19	4,5	0,5	0,003
PM5x20	5	20	13,5	12	33	29	4,5	0,5	0,003
PM6x12	6	12	16	14	28	23	6	0,75	0,005
PM6x24	6	24	16	14	40	35	6	0,75	0,005
PM8x16	8	16	22	19	37	31	8	1	0,011
PM8x32	8	32	22	19	53	47	8	1	0,012
PM10x20	10	20	26	23	46	39	10	1	0,019
PM10x40	10	40	26	23	66	59	10	1	0,020
PM12x24	12	24	32	28	55	46	12	1,25	0,032
PM12x48	12	48	32	28	79	71	12	1,25	0,034
PM14x28	14	28	34	31	62	52	14	1,5	0,047
PM14x56	14	56	34	31	92	82	14	1,5	0,051
PM16x32	16	32	41	36	72	62	14	1,5	0,067
PM16x64	16	64	40	36	103	92	16	1,5	0,075
PM20x40	20	40	49	44	88	72	16	1,5	0,130

### MATERIAL

**Pin:** automatic steel 11SMnPb30 (1.0718)

**Spring:** carbon steel C67 (1.1231) hardened and tempered

### Surface protection:

- Zinc plating according to standard EN ISO 4042, Fe/Zn 8c..., with dehydrogenation
- Chromate treatment (passivation) example: type A please add 1A (PM16x32 1A)
- Surface treatment table at page 6
- With no indications the lockable pin will be supplied oiled and unplated

### Tolerances:

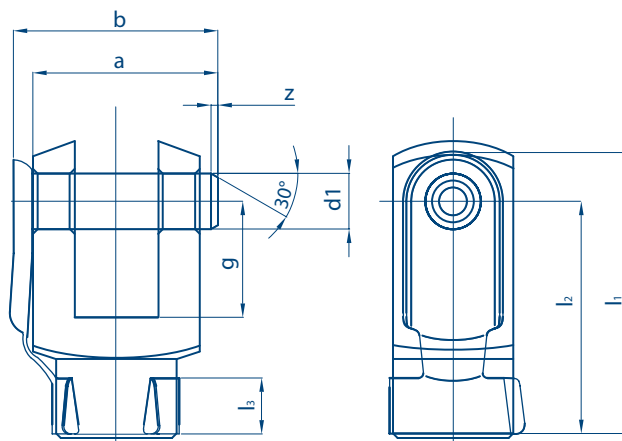
The dimensional tolerances shown in the table make reference to zinc plated products.



## Lockable pins for former CNOMO yokes series G/CN

Series  
**PMC**

CLEVIS ACCESSORIES



Dimensions mm

DESIGNATION	d1	g	b	a	l1	l2	l3	z	weight ≈ (kg)
PMC 8x16	h11	±0,5		±0,2	≈	≈	≈		
PMC 8x16	8	16	28	25	41	36	10	1	0,014
PMC 12x25	12	25	44	40	60	50	12	1,25	0,043
PMC 16x33	16	33	53	49	74	63	15	1,5	0,090
PMC 20x40	20	40	73	69	98	81	19	1,5	0,193

### MATERIAL

**Pin:** automatic steel 11SMnPb30 (1.0718)

**Spring:** carbon steel C67 (1.1231) hardened and tempered

### Surface protection:

- Zinc plating according to standard EN ISO 4042, Fe/Zn 8c..., with dehydrogenation
- Chromate treatment (passivation) example: type A please add 1A (PMC16x33 1A)
- Surface treatment table at page 6
- Without any indication, the lockable pin will be supplied oiled and unplated

### Tolerances:

The dimensional tolerances shown in the table make reference to zinc plated products.

DESIGNATION	d	D	k	z	z1	r	d2	l1	l	weight ≈ (kg)
	h11	h12	js14	≈	max		H14	+0,50 0	+0,50 0	
PD 4	4	6	1,0	0,5	0,8	0,3	1,0	10,0	12	0,001
PD 5	5	8	1,5	0,5	0,8	0,3	1,5	12,0	15	0,001
PD 6	6	9	1,5	0,5	1,0	0,5	1,6	15,0	18	0,004
PD 8	8	12	2,0	1,0	1,0	0,5	2,0	19,5	23	0,009
PD 10	10	14	2,0	1,0	1,5	0,5	3,2	24,5	29	0,017
PD 12	12	17	3,0	1,5	2,0	0,5	4,0	29,5	35	0,030
PD 14	14	19	3,0	1,5	2,5	1,0	4,0	32,5	40	0,048
PD 16	16	21	3,0	1,5	2,5	1,0	4,0	37,5	45	0,067
PD 18	18	23	3,0	1,5	2,5	1,0	5,0	43,5	50	0,108
PD 20	20	26	4,0	2,0	3,0	1,0	5,0	47,0	54	0,125
PD 25	25	32	5,0	2,0	3,0	1,0	6,0	59,0	67	0,260
PD 30	30	36	5,0	2,0	3,0	1,0	6,3	63,0	71	0,430
PD 35	35	44	6,0	2,0	4,0	2,0	8,0	80,0	90	0,740
PD 42	42	48	6,0	2,0	4,0	2,0	8,0	98,0	108	1,259
PD 50	50	58	7,0	2,0	6,0	2,0	10,0	111,0	123	2,021

DESIGNATION	d1 ≈	d2 ≈	s ≈	weight (kg x 100 pcs.)
PDR 4	4,3	7,5	0,8	0,019
PDR 5	5,3	9,5	1,0	0,038
PDR 6	6,4	11,0	1,6	0,079
PDR 8	8,4	15,0	1,6	0,152
PDR 10	10,5	18,0	1,6	0,211
PDR 12	13,0	20,0	2,0	0,285
PDR 14	15,0	24,0	2,0	0,433
PDR 16	17,0	27,0	2,0	0,542
PDR 20	21,0	33,0	2,5	0,998
PDR 25	25,0	39,0	4,0	2,209
PDR 30	31,0	56,0	4,0	5,361
PDR 35	37,0	66,0	5,0	9,203
PDR 42	42,0	78,0	7,0	18,635
PDR 50	50,0	92,0	8,0	29,401

DESIGNATION	l ≈	u max	e ≈	b max	a max
PDC4	10	1,0	2,5	1,5	0,9
PDC 5/6	10	2,0	3,3	2,0	1,3
PDC 8	15	2,0	4,0	2,3	1,8
PDC 10	20	2,0	5,0	3,0	2,7
PDC 12/16	30	3,0	7,2	4,1	3,7
PDC 18/20	40	3,0	8,2	4,7	4,7
PDC 25/30	40	3,0	10,2	5,7	5,7
PDC 35/42	60	3,0	13,5	7,7	7,7
PDC 50	70	4,0	17,0	9,7	9,7

## MATERIAL

**Pin:** automatic steel 11SMnPb30 (1.0718)

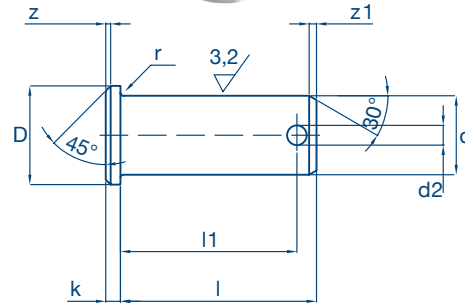
## Surface protection:

- Zinc plating according to standard EN ISO 4042, Fe/Zn 8c..., with dehydrogenation
- Example of chromate treatment (passivation): type A please add 1A (ex.:PD10 1A)
- Surface treatments table at page 6
- With no indications the pin will be supplied oiled and unplated

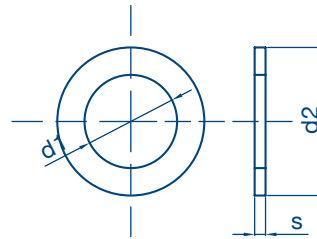
## Tolerances:

The dimensional tolerances shown in the table make reference to zinc plated products.

## Pins DIN 1434

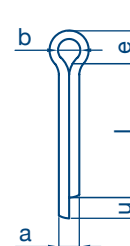


## Washers DIN 433 or equivalent



The values marked on the table are purely as an indication.

## Split pins DIN 94



Series

# PD

## CLEVIS ACCESSORIES

Series

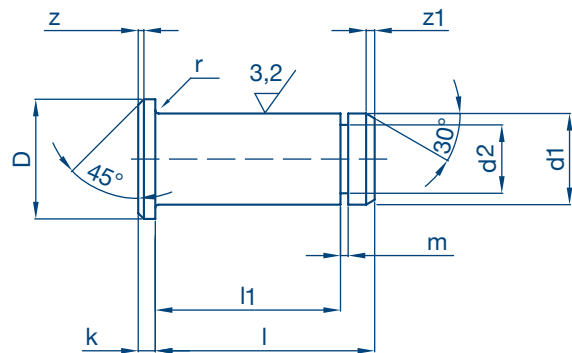
# PDR

Series

# PDC

chiavette unificate

## Pins for yokes G, G/FG series



Dimensions mm

DESIGNATION	d1	D	k	z	z1	r	d2	m	l1	l	weight ≈ (kg)
	h11	h12	js14	≈	≈		h11	+0,10 0	+0,30 0	+0,30 0	
PKS 4	4	6	1,0	0,5	0,5	0,3	3,2	0,64	8,5	10,5	0,002
PKS 5	5	8	1,5	0,5	0,5	0,5	4,0	0,74	10,5	13,0	0,003
PKS 6	6	9	1,5	0,5	0,8	0,5	5,0	0,74	12,5	15,5	0,004
PKS 8	8	12	2,0	1,0	1,0	0,5	6,0	0,94	16,5	20,0	0,009
PKS10	10	14	2,0	1,0	1,0	0,5	8,0	1,05	20,5	25,0	0,017
PKS12	12	17	3,0	1,5	1,3	0,5	9,0	1,15	24,5	30,0	0,030
PKS14	14	19	3,0	1,5	1,5	1,0	10,0	1,25	27,5	33,0	0,048
PKS16	16	20	3,0	1,5	1,5	1,0	12,0	1,35	32,5	38,5	0,067
PKS20	20	26	4,0	2,0	1,5	1,0	17,5	1,80	40,5	46,0	0,125
PKS25	25	32	5,0	2,0	1,5	1,0	18,0	1,80	50,5	57,0	0,260

Technical reading from page 44 to page 45

### MATERIAL

automatic steel 11SMnPb30 (1.0718)

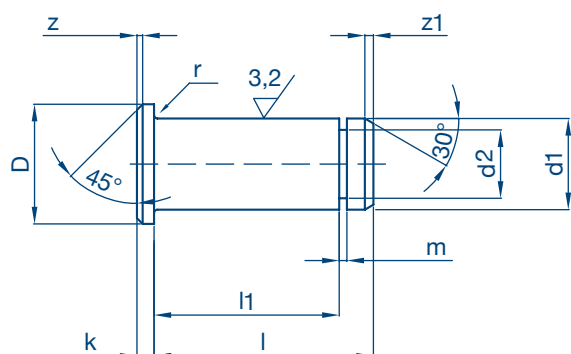
### Surface protection:

- Zinc plating according to standard EN ISO 4042, Fe/Zn 8c...
- Chromate treatment (passivation) example: type A please add 1A (es.:PKS10 1A)
- Surface treatment table at page 6
- without any indication, the lockable pin will be supplied oiled and unplated

### Tolerances:

The dimensional tolerances shown in the table make reference to zinc plated products.

## Pins in aluminium 11S for clevises series GA



Series  
**PKSAL**

**CLEVIS ACCESSORIES**  
**ALUMINIUM Version**

Dimensions mm

DESIGNATION	d1	D	k	z	z1	r	d2	m	l1	l	weight ≈ (kg)
	h11	h12	js14	≈	≈		h11	+0,10 0	+0,30 0	+0,30 0	
PKSAL 4	4	6	1,0	0,5	0,5	0,3	3,2	0,64	8,5	10,5	0,001
PKSAL 5	5	8	1,5	0,5	0,5	0,5	4,0	0,74	10,5	13,0	0,001
PKSAL 6	6	9	1,5	0,5	0,8	0,5	5,0	0,74	12,5	15,5	0,002
PKSAL 8	8	12	2,0	1,0	1,0	0,5	6,0	0,94	16,5	20,0	0,003
PKSAL10	10	14	2,0	1,0	1,0	0,5	8,0	1,05	20,5	25,0	0,006
PKSAL12	12	17	3,0	1,5	1,3	0,5	9,0	1,15	24,5	30,0	0,010
PKSAL16	16	20	3,0	1,5	1,5	1,0	12,0	1,35	32,5	38,5	0,023
PKSAL20	20	26	4,0	2,0	1,5	1,0	17,5	1,80	40,5	46,0	0,042

Technical reading from page 44 to page 45

### MATERIAL

aluminium 2011 (11S)

### Surface protection:

Silver colour anodizing.

Upon request:

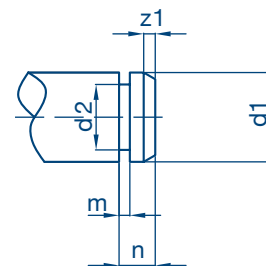
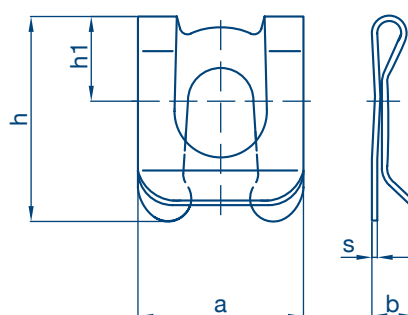
- Gold Colour
- Black Colour

## SL retainers for pins "PKS" and "PKSAL"

Series

# SL

CLEVIS ACCESSORIES



Dimensions mm

DESIGNATION	d1	a	h	h1	b	s	d2	m	n	z1	max axial load max x PKS [daN]	max axial load max x PKSAL [daN]	weight for 100 pcs [kg]
	h11	≈	≈	≈	≈		h11	+0,10 0	+0,30 0	≈			
SL 4	4	7	8,5	4,0	2,3	0,3	3,2	0,64	2,0	0,5	100	50	0,019
SL 5	5	9	10,7	5,0	3,3	0,4	4,0	0,74	2,5	0,5	130	65	0,034
SL 6	6	11	14,1	6,0	3,8	0,4	5,0	0,74	3,0	0,8	150	75	0,063
SL 8	8	14	17,5	8,0	4,0	0,5	6,0	0,94	3,5	1,0	360	180	0,109
SL10	10	18	22,1	10,0	5,0	0,5	8,0	1,05	4,5	1,0	640	320	0,211
SL12	12	22	26,0	12,0	5,0	0,5	9,0	1,15	5,0	1,3	960	480	0,280
SL14	14	25	30,0	13,5	6,0	0,6	10,0	1,25	5,5	1,5	1132	560	0,474
SL16	16	28	34,0	16,0	6,0	0,6	12,0	1,35	6,0	1,5	1350	670	0,563

### MATERIAL

Spring steel

### Surface protection:

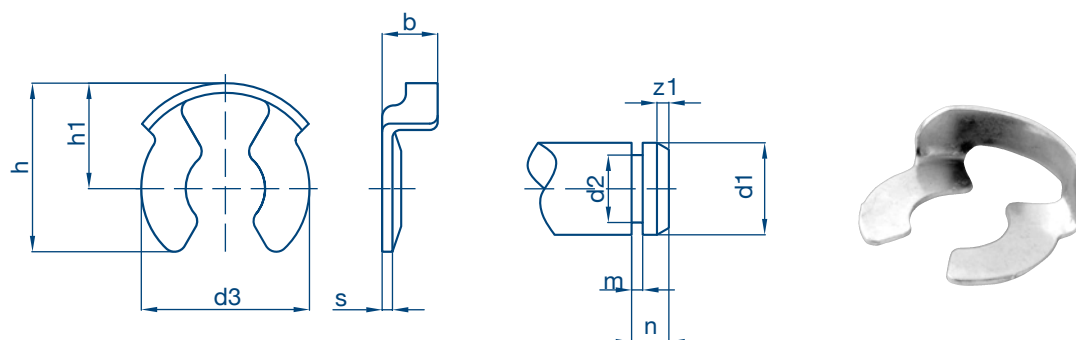
- Zinc plating according to standard EN ISO 4042, Fe/Zn 8c...
- Chromate treatment (passivation) example: type A please add 1A (ex.: SL12 1A)

### Tolerances:

The dimensional tolerances shown in the table are referred to zinc plated products.



## KL retainers for pins "PKS" and "PKSAL"



Series  
**KL**

**CLEVIS ACCESSORIES**

Dimensions mm

DESIGNATION	d1	d3	h	h1	b	s	d2	m	n	z1	max axial load max x PKS [daN]	max axial load max x PKSAL [daN]	weight for 100 pcs [kg]
	h11	≈	≈	≈	≈	h11	+0,10 0	+0,30 0	≈				
KL 4	4	6,5	7,0	4,3	2,7	0,4	3,2	0,64	2,0	0,5	150	50	0,0109
KL 5	5	7,5	8,7	5,2	2,8	0,5	4,0	0,74	2,5	0,5	300	65	0,0195
KL 6	6	10,4	11,5	6,8	3,5	0,5	5,0	0,74	3,0	0,8	485	75	0,0332
KL 8	8	11,5	12,1	7,2	4,1	0,5	6,0	0,94	3,5	1,0	550	180	0,0408
KL10	10	15,6	16,3	9,5	5,9	0,6	8,0	1,05	4,5	1,0	950	320	0,0899
KL12	12	16,7	18,0	10,5	6,1	0,6	9,0	1,15	5,0	1,3	1070	480	0,1102
KL14	14	19,0	20,0	11,5	6,5	0,7	10,0	1,25	5,5	1,5	1270	560	0,1578
KL16	16	22,7	23,5	13,8	7,8	0,8	12,0	1,35	6,0	1,5	1400	670	0,2282
KL20	20-25	34,5	34,0	20,0	9,0	1,0	16-18	1,80	8,0	1,5	1600	720	0,6171

### MATERIAL

Spring steel

### Surface protection:

- Zinc plating according to standard EN ISO 4042, Fe/Zn 8c...
- Exemple of chromate treatment (passivation): type A please add 1A (ex.: KL12 1A)

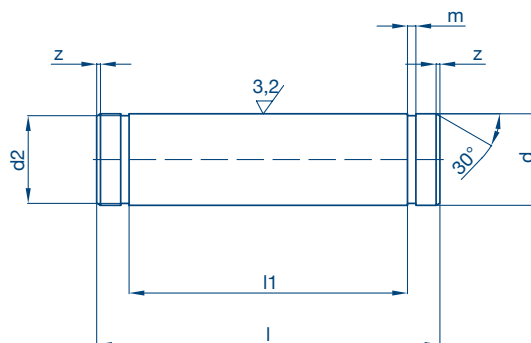
### Tolerances:

The dimensional tolerances shown in the table are referred to zinc plated products.

Series  
**PC**

CLEVIS ACCESSORIES

## Former CNOMO pins



Dimensions mm

DESIGNATION	d1 h11	l +0,40 0	d2 h11	l1 +0,20 0	z min	m H13	weight ≈ (kg)
PC 8	8	30	7,60	22	0,5	0,9	0,012
PC 12	12	45	11,50	36	0,5	1,1	0,039
PC 16	16	55	15,20	45	0,5	1,1	0,085
PC 20	20	75	19,00	63	1,0	1,3	0,185
PC 25	25	95	23,90	80	1,0	1,3	0,360

### MATERIAL

automatic steel 11SMnPb30 (1.0718)

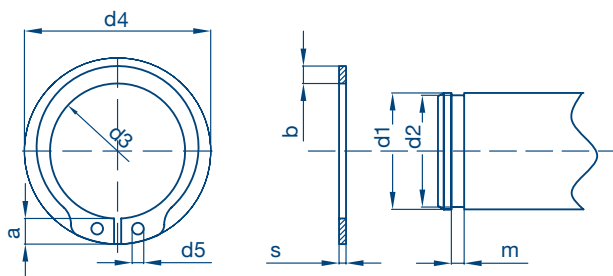
### Surface protection:

- Zinc plating according to standard EN ISO 4042, Fe/Zn 8c...
- Chromate treatment (passivation) example: type A please add 1A (es.: PC12 1A 1A)
- Surface treatment table at page 6
- Without any indication, the lockable pin will be supplied oiled and unplated

### Tolerances:

The dimensional tolerances shown in the table make reference to zinc plated products.

## Circlips DIN 471



Dimensions mm

DESIGNATION	s h11	d3 ≈	d4	d5 min	a max	b ≈
SE 8	0,8	7,4	14,7	1,2	3,2	1,5
SE12	1,0	11,0	19,0	1,7	3,3	1,8
SE16	1,0	14,7	23,8	1,7	3,7	2,2
SE20	1,2	18,5	28,4	2,0	4,0	2,6
SE25	1,2	23,2	34,2	2,0	4,4	3,0

### MATERIAL

carbon steel for springs Ck 75 (1.1248)

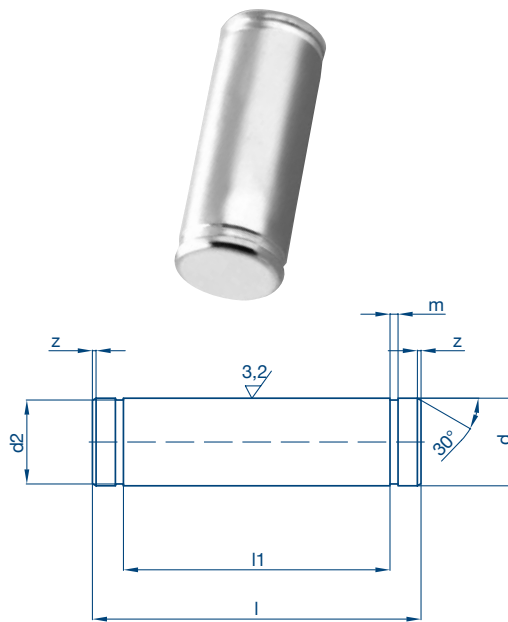
Supplied unplated

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## Pins ISO

Dimensions mm

DESIGNATION	d1	l	d2	l1	z	m	weight ≈ (kg)
	h11	+0,50 0	h11	+0,20 0	min	H13	
PI 6	6	17	5,7	12,5	0,5	0,8	0,005
PI 8	8	20	7,6	16,5	0,5	0,9	0,008
PI10	10	25	9,6	20,5	0,5	1,1	0,015
PI12	12	30	11,5	24,5	1	1,1	0,026
PI14	14	35	13,4	27,5	1	1,1	0,042
PI16	16	39	15,2	32,5	1	1,1	0,061
PI20	20	48	19	40,5	1	1,3	0,118
PI25	25	60	23,9	50,5	1	1,3	0,230
PI30	30	65	28,6	55,5	1	1,6	0,350
PI35	35	84	33,4	70,5	1	1,6	0,620
PI40	40	104,3	37,5	89,0	2	1,85	1,020
PI42	42	104,3	39,5	89,0	2	1,85	1,100
PI50	50	117,3	47	100	2	2,15	1,720



### MATERIAL

automatic steel 11SMnPb30 (1.0718)

### Surface protection:

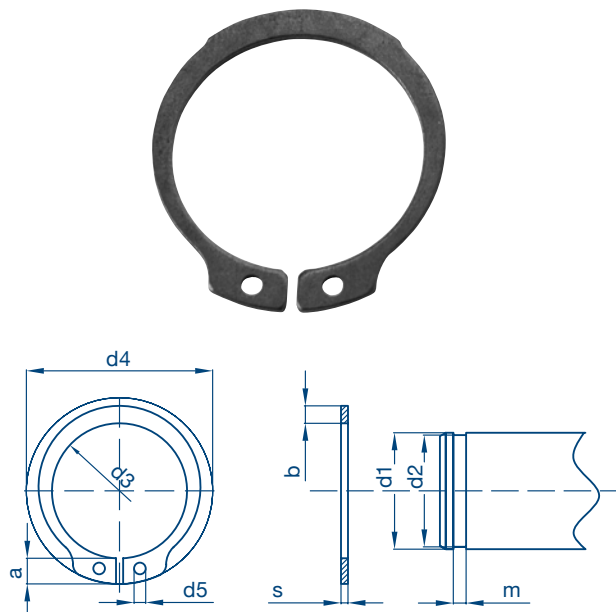
- Zinc plating according to standard EN ISO 4042, Fe/Zn 8c ...
- Exemple of chromate treatment (passivation): type A please add 1A (ex.: PI 12 1A)
- Surface treatments table at page 6
- With no indications the pin will be supplied oiled and unplated

### Tolerances:

The dimensional tolerances shown in the table make reference to zinc plated products.

Dimensions mm

DESIGNATION	s	d3	d4	d5	a	b
	h11	≈		min	max	≈
SE 6	0,7	5,6	11,7	1,15	2,7	1,3
SE 8	0,8	7,4	14,7	1,20	3,2	1,5
SE10	1,0	9,3	17,0	1,50	3,3	1,8
SE12	1,0	11	19,0	1,70	3,3	1,8
SE14	1,0	12,9	21,4	1,70	3,5	2,1
SE16	1,0	14,7	23,8	1,70	3,7	2,2
SE20	1,2	18,5	28,4	2,00	4,0	2,6
SE25	1,2	23,2	34,2	2,00	4,4	3,0
SE30	1,5	27,9	40,5	2,00	5,0	3,5
SE35	1,5	32,2	46,8	2,50	5,6	3,9
SE40	1,8	36,5	52,6	2,50	6,0	4,4
SE42	1,8	38,5	55,7	2,50	6,5	4,5
SE50	2,0	45,8	64,5	2,50	6,9	5,1



### MATERIAL

carbon steel for springs Ck 75 (1.1248)

Series

**PI**

**CLEVIS ACCESSORIES**

Series

**SE**

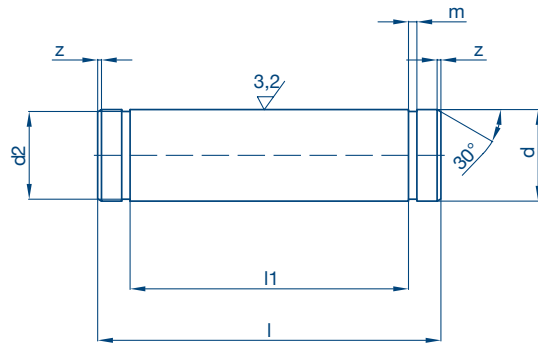
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Series  
**PI  
INOX**

**CLEVIS ACCESSORIES**  
**STAINLESS STEEL Version**

## ISO Pins



Dimensions mm

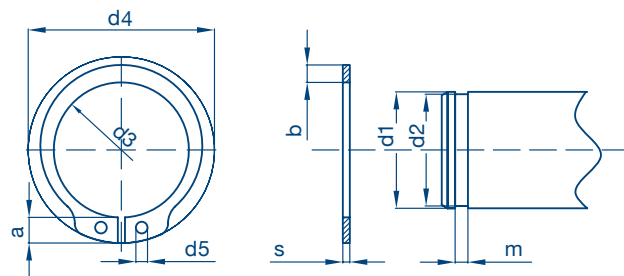
DESIGNATION	d1 h11	l +0,50 0	d2 h11	l1 +0,20 0	z min	m h13	weight ≈ (kg)
PI 5 INOX	5	15	4,8	10,5	0,5	0,7	0,003
PI 6 INOX	6	17	5,7	12,5	0,5	0,8	0,005
PI 8 INOX	8	20	7,6	16,5	0,5	0,9	0,008
PI 10 INOX	10	25	9,6	20,5	0,5	1,1	0,015
PI 12 INOX	12	30	11,5	24,5	1,0	1,1	0,026
PI 16 INOX	16	39	15,2	32,5	1,0	1,1	0,061
PI 20 INOX	20	48	19	40,5	1,0	1,3	0,118
PI 30 INOX	30	65	28,6	55,5	1,0	1,6	0,350
PI 35 INOX	35	84	33,4	70,5	1,0	1,6	0,620

## MATERIAL

stainless steel (1.4305 - AISI 303)

Series  
**SE  
INOX**

## Circlips DIN 471



Dimensions mm

DESIGNATION	s	d3	d4	d5	a	b
	h11	≈		min	max	≈
SE 5 INOX	0,6	4,7	10,3	1,0	2,5	1,1
SE 6 INOX	0,7	5,6	11,7	1,2	2,7	1,3
SE 8 INOX	0,8	7,4	14,7	1,2	3,2	1,5
SE 10 INOX	1,0	11,0	19,0	1,7	3,3	1,8
SE 12 INOX	1,0	11,0	19,0	1,7	3,3	1,8
SE 16 INOX	1,0	14,7	23,8	1,7	3,7	2,2
SE 20 INOX	1,2	18,5	28,4	2,0	4,0	2,6
SE 30 INOX	1,5	27,9	40,5	2,0	5,0	3,5
SE 35 INOX	1,5	32,2	46,8	2,5	5,6	3,9

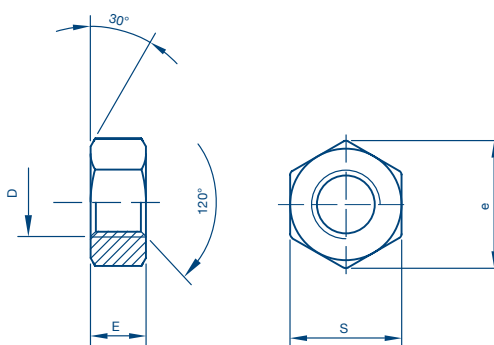
## MATERIAL

stainless steel AISI 420

## Hexagonal nuts UNI 5588 (DIN. 934) - UNI 5589 (DIN. 936)

Dimensions mm

D 6H	S	regular thread	fine pitch thread	E		e
				medium acc. UNI 5588	reduced version acc. UNI 5589	
M4	7	4x0,7	-	3,2	2	8,05
M5	8	5x0,8	-	4	2,5	9,20
M6	10	6x1	-	5	4	11,50
M7	11	7x1	-	5,5	4	12,65
M8	13	8x1,25	-	6,5	5	14,95
M10	17	10x1,50		8	6	19,55
M10x1,25	17		10x1,25	8	6	19,55
M12	19	12x1,75		10	7	21,85
M12x1,25	19		12x1,25	10	7	21,85
M14	22	14x2,00		11	8	25,30
M14x1,5	22		14x1,5	11	8	25,30
M16	24	16x2,00		13	8	27,60
M16x1,5	24		16x1,5	13	8	27,60
M18	27	18x2,50		15	9	31,05
M18x1,5	27		18x1,5	15	9	31,05
M20	30	20x2,50		16	9	34,50
M20x1,5	30		20x1,5	16	9	34,50
M22	32	22x2,50		18	10	36,80
M22x1,5	32		22x1,5	18	10	36,80
M24	36	24x3,00		19	10	41,40
M24x2	36		24x2	19	10	41,40
M27	41	27x3,00		22	12	47,15
M27x2	41		27x2	22	12	47,15
M30	46	30x3,50		24	12	52,90
M30x2	46		30x2	24	12	52,90
M33	50	33x3,50		26	14	57,50
M33x2	50		33x2	26	14	57,50
M36	55	36x4,00		29	14	63,25
M36x2	55		36x2	29	14	63,25
M39	60	39x4,00		39	16	69,00
M39x2	60		39x2	39	16	69,00
M42	65	42x4,50		42	16	74,75
M42x2	65		42x2	42	16	74,75
M45	70	45x4,50		45	18	80,50
M45x2	70		45x2	45	18	80,50
M48	75	48x5,00		48	18	86,25
M48x2	75		48x2	48	18	86,25
M52	80	52x5,00		52	20	92,00
M52x3	80		52x3	52	20	92,00
M56	85	56x5,50		56	22	97,75
M56x4	85		56x4	56	22	97,75



### MATERIAL

steel

6S resistance class

(according to UNI 3740 standard)

### Surface protection:

- Zinc plating according to standard EN ISO 4042, Fe/Zn 8c...
- Chromate treatment (passivation) example: type A please add 1A (ex.: M20 1A)
- Surface treatment table at page 6

HEXAGONAL  
NUTS

CLEVIS ACCESSORIES

chiavette unificate

## 1. PRODUCT DESCRIPTION

Ball joints are mechanical units for the connection of 2 parts which are perpendicular with respect to each other. They enable the transmission of alternating forces through angular and oscillating movements, at a moderate speed.

They are standard products which are produced according to the following standards:

### DIN 71802

Ball joints:

**a) Form C:** without safety clip S and therefore without its external slot and the two holes for the clip itself

**b) Form CS:** with safety clip S mounted in the slot and the two holes of the housing.

Available with or without nut (mounted or separated)

### DIN 71805

Ball Socket

**a) Form A:** without slot and holes for the safety clip and with the mounted snap ring R

**b) Form B:** with external slot and holes for the safety clip S and with the internal snap ring R

### DIN 71803

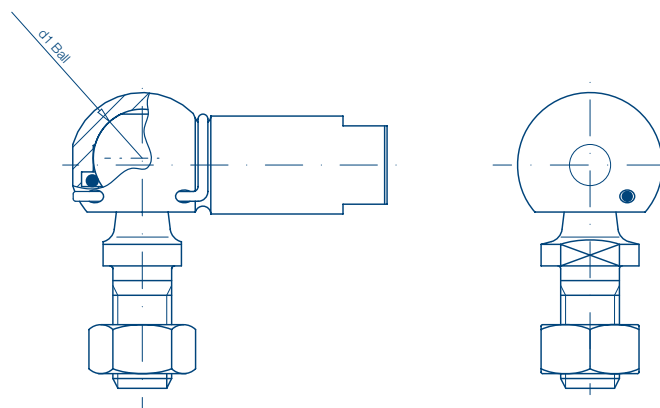
Ball Stud

**a) Form C:** with thread

**b) Form B:** without thread, to rivet

The ball sockets DIN 71805 produced and supplied by Chiavette Unificate have been improved by the spanner's execution. Upon request, they could be also supplied without spanner surface

All our products could be supplied with electrolytic coatings according to the standards stated at page 6 and/or unfinished.



## 2. TECHNICAL DATA

### MATERIALS

**Ball stud:** carbon steel with 60 daN/mm<sup>2</sup> resistance to tensile stress and inner ring hardened on the surface with hardness  $\geq 52$  HRC in alternative (1.4305 - AISI 303)

**Ball socket:** steel 11SMnPb30 with a 50 daN/mm<sup>2</sup> resistance to tensile stress (1.0718) in alternative (1.4305 - AISI 303)

**Springs:** steel for springs C98 UNI EN 10270-1 DH in alternative (1.4319 - AISI 302)

**Lubrication:** spherical coupling loaded during assembly with LITHIUM grease, NLGI 1 grade

**Nuts:** see table at page 67

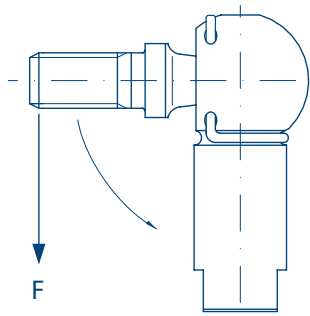
### Extraction and Insertion force BALL STUD - BALL SOCKET

The load values requested for the extraction and insertion of the ball stud from/to the ball socket's housing with the mounted "R" spring, with the joint free from grease, are indicated in the following table:

d1 (ball stud inner ring diameter)	8	10	13	16	19
Extraction force [daN] min	3	4	6	8	10
Insertion force [daN] max	20	25	32	35	40

### Sliding moment

In the male-female coupling (with grease), the male in a horizontal position falls with a force F applied to the extremity of the male thread (see diagram), according to the table below:



DESIGNATION	max. force (daN)
C 8 M5	0,4
CS 8 M5	0,4
C 10 M6	0,5
CS 10 M6	0,5
C 13 M8	0,6
CS 13 M8	0,6
C 16 M10 - M12	0,7
CS 16 M10 - M12	0,7
C 19 M14 - M16	0,8
CS 19 M14 - M16	0,8

### Permissible load and tightening torque

The maximum permissible load for the angular joint is given in the following table; it is also important to tighten the nut as indicated:

DESIGNATION	Permissible load [daN]		Nut tightening torque (daN·m)
	static	dynamic	
C 8 M5	50	20	0,35
CS 8 M5	50	20	0,35
C 10 M6	100	40	0,74
CS 10 M6	100	40	0,74
C 13 M8	200	80	1,80
CS 13 M8	200	80	1,80
C 16 M10	400	160	3,50
CS 16 M10	400	160	3,50
C 16 M12	400	160	4,20
CS 16 M12	400	160	4,20
C 19 M14	800	320	7,00
CS 19 M14	800	320	7,00
C 19 M16	800	320	8,00
CS 19 M16	800	320	8,00



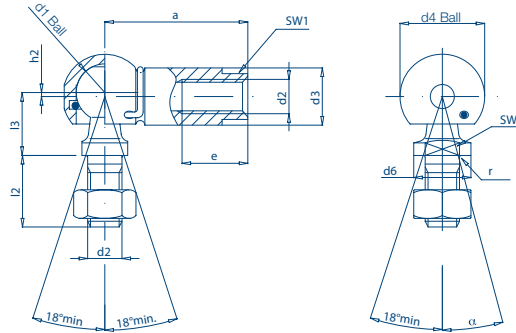
Form  
**CS**

BALL JOINTS

## DIN 71802 form CS



Dimensions mm



DESIGNATION	d1	d2 6g/6H**	a ±0,3	d3 ±0,5	d4 ±0,5	d6 h14	e min.	h2 ±0,5	l2 ±0,3	l3 ±0,3	r max.	*sw h14	*sw1 h14	α° ≈	weight ≈ (kg)
CS 8 M5	8	M5	22	8	12,8	8	10,2	0,65	10,2	9	0,3	7	7	10	0,015
CS10 M6	10	M6	25	10	14,8	10	11,5	0,7	12,5	11	0,3	8	8	15	0,025
CS13 M8	13	M8	30	13	19,3	13	14	1,15	16,5	13	0,5	11	11	15	0,053
CS16 M10	16	M10	35	16	24	16	15,5	1,15	20	16	0,5	13	13	15	0,104
CS16 M12	16	M12	35	16	24	16	15,5	1,15	20	16	0,5	13	-	15	0,150
CS19 M14x1,5	19	M14x1,5	45	22	30	19	21,5	0,5	28	20	0,8	16	-	15	0,221
CS19 M14x2	19	M14	45	22	30	19	21,5	0,5	28	20	0,8	16	-	15	0,221
CS19 M16	19	M16	45	22	30	19	21,5	0,5	28	20	0,8	16	-	15	0,221

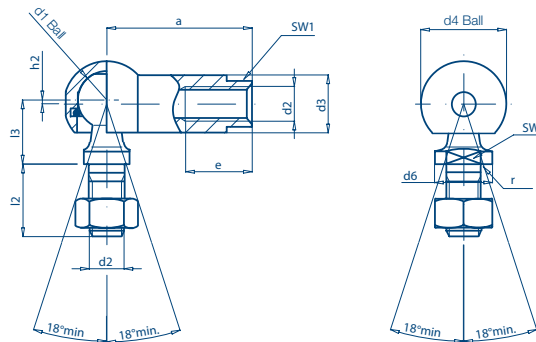
\*spanner flats  
\*\*tolerances d2: ball stud 6g-threaded hole 6H

Form  
**C**

## DIN 71802 form C



Dimensions mm



DESIGNATION	d1	d2 6g/6H**	a ±0,3	d3 ±0,5	d4 ±0,5	d6 h14	e min.	h2 ±0,5	l2 ±0,3	l3 ±0,3	r max.	*sw h14	*sw1 h14	weight ≈ (kg)
C 8 M5	8	M5	22	8	12,8	8	10,2	0,65	10,2	9	0,3	7	7	0,015
C10 M6	10	M6	25	10	14,8	10	11,5	0,7	12,5	11	0,3	8	8	0,025
C13 M8	13	M8	30	13	19,3	13	14	1,15	16,5	13	0,5	11	11	0,053
C16 M10	16	M10	35	16	24	16	15,5	1,15	20	16	0,5	13	13	0,104
C16 M12	16	M12	35	16	24	16	15,5	1,15	20	16	0,5	13	-	0,150
C19 M14x1,5	19	M14x1,5	45	22	30	19	21,5	0,5	28	20	0,8	16	-	0,221
C19 M14x2	19	M14	45	22	30	19	21,5	0,5	28	20	0,8	16	-	0,221
C19 M16	19	M16	45	22	30	19	21,5	0,5	28	20	0,8	16	-	0,221

\*spanner flats  
\*\*tolerances d2: ball stud 6g-threaded hole 6H

For left-hand thread add "LH" (ex. CS 16 M10 LH o C13 M8 LH)

Technical reading from page 68 to page 69

### MATERIALS

**Ball stud:** carbon steel with 60 daN/mm<sup>2</sup> resistance to tensile stress and inner ring hardened on the surface with a ≥ 52 HRC hardness

**Ball socket:** steel 11SMnPb30 with a 50 daN/mm<sup>2</sup> resistance to tensile stress (1.0718)

**Internal snap ring "R":** steel for springs C98 UNI EN 10270-1 DH

**Safety clip "S":** steel for springs C98 UNI EN 10270-1 DH

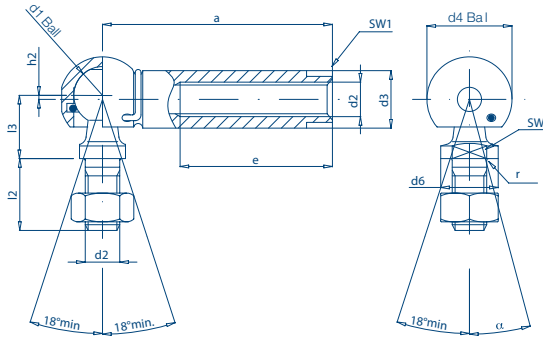
### Surface protection:

- Zinc plating according to EN ISO 4042, Fe/Zn 8c...
- Chromate treatment (passivation) example: type A please add 1A (ex.:CS 10 M6 1A)
- Surface treatment table at page 6

### Tolerances:

The dimensional tolerances shown in the table make reference to zinc plated products.

Similar to DIN 71802 form CS  
long version



Form  
**CSL**

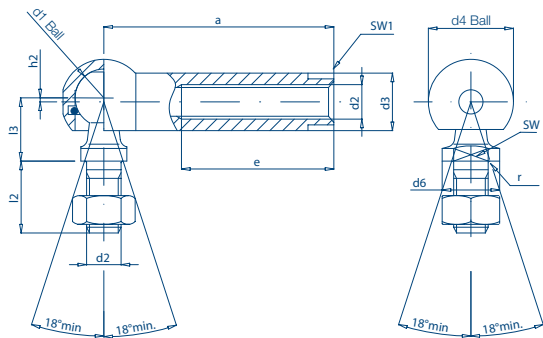
**BALL JOINTS**

Dimensions mm

DESIGNATION	d1	d2	a	d3	d4	d6	e	h2	l2	l3	r	*sw	*sw1	$\alpha^\circ$	weight ≈ (kg)
		6g/6H**	±0,3	±0,5	±0,5	h14	min.	±0,5	±0,3	±0,3	max.	h14	h14	≈	
CSL10 M6x40	10	M6	40	10	14,8	10	26,5	0,7	12,5	11	0,3	8	8	15	0,031
CSL13 M8x45	13	M8	45	13	19,3	13	29	1,15	16,5	13	0,5	11	11	15	0,063
CSL16 M10x45	16	M10	45	16	24	16	30,5	1,15	20	16	0,5	13	13	15	0,113

\*spanner flats  
\*\*tolerances d2: ball stud 6g-threaded hole 6H

Similar to DIN 71802 form C  
long version



Form  
**CL**

Dimensions mm

DESIGNATION	d1	d2	a	d3	d4	d6	e	h2	l2	l3	r	*sw	*sw1	$\alpha^\circ$	weight ≈ (kg)
		6g/6H**	±0,3	±0,5	±0,5	h14	min.	±0,5	±0,3	±0,3	max.	h14	h14	≈	
CL10 M6x40	10	M6	40	10	14,8	10	26,5	0,7	12,5	11	0,3	8	8	15	0,031
CL13 M8x45	13	M8	45	13	19,3	13	29	1,15	16,5	13	0,5	11	11	15	0,063
CL16 M10x45	16	M10	45	16	24	16	30,5	1,15	20	16	0,5	13	13	15	0,113

\*spanner flats  
\*\*tolerances d2: ball stud 6g-threaded hole 6H

For left-hand thread add "LH" (ex. CSL 16 M10x45 LH o CL13 M8x45 LH)  
Technical reading from page 68 to page 69

**MATERIALS**

**Ball stud:** carbon steel with traction resistance of 60 daN/mm<sup>2</sup> and a ball tempered on the surface with hardness ≥ 52 Hrc

**Ball socket:** 11SMnPb30 steel with tensile strength of 50 daN/mm<sup>2</sup> (1.0718)

**Internal snap ring "R":** spring steel C98 UNI EN 10270-1 DH

**Safety clip "S":** spring steel C98 UNI EN 10270-1 DH

**Surface protection:**

- Zinc plating according to EN ISO 4042, Fe/Zn 8c...
- Chromate treatment (passivation) example: type A please add 1A (ex.:CS 10 M6 1A)
- Surface treatment table at page 6

**Tolerances:**

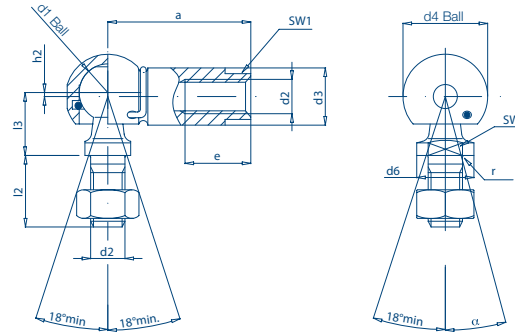
The dimensional tolerances shown in the table make reference to zinc plated products.

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Form  
**CS**  
INOX

**BALL JOINTS**  
**STAINLESS STEEL Version**

## DIN 71802 form CS



Dimensions mm

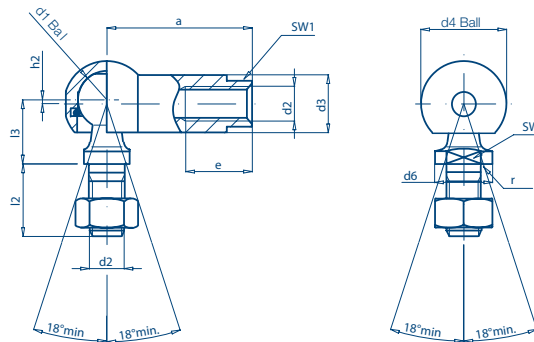
DESIGNATION	d1	d2 6g/6H**	a ±0,3	d3 ±0,5	d4 ±0,5	d6 h14	e min.	h2 ±0,5	l2 ±0,3	l3 ±0,3	r max.	*sw h14	*sw1 h14	α° ≈	weight ≈ (kg)
CS 8 M5 INOX	8	M5	22	8	12,8	8	10,2	0,65	10,2	9	0,3	7	7	10	0,015
CS10 M6 INOX	10	M6	25	10	14,8	10	11,5	0,7	12,5	11	0,3	8	8	15	0,025
CS13 M8 INOX	13	M8	30	13	19,3	13	14	1,15	16,5	13	0,5	11	11	15	0,053
CS16 M10 INOX	16	M10	35	16	24	16	15,5	1,15	20	16	0,5	13	13	15	0,104
CS16 M12 INOX	16	M12	35	16	24	16	15,5	1,15	20	16	0,5	13	-	15	0,150
CS19 M14x1,5 INOX	19	M14x1,5	45	22	30	19	21,5	0,5	28	20	0,8	16	-	15	0,221
CS19 M14x2 INOX	19	M14	45	22	30	19	21,5	0,5	28	20	0,8	16	-	15	0,221
CS19 M16 INOX	19	M16	45	22	30	19	21,5	0,5	28	20	0,8	16	-	15	0,221

\*spanner flats  
\*\*tolerances d2: ball stud 6g-threaded hole 6H

Form  
**C**  
INOX

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## DIN 71802 form C



Dimensions mm

DESIGNATION	d1	d2 6g/6H**	a ±0,3	d3 ±0,5	d4 ±0,5	d6 h14	e min.	h2 ±0,5	l2 ±0,3	l3 ±0,3	r max.	*sw h14	*sw1 h14	weight ≈ (kg)
C 8 M5 INOX	8	M5	22	8	12,8	8	10,2	0,65	10,2	9	0,3	7	7	0,015
C10 M6 INOX	10	M6	25	10	14,8	10	11,5	0,7	12,5	11	0,3	8	8	0,025
C13 M8 INOX	13	M8	30	13	19,3	13	14	1,15	16,5	13	0,5	11	11	0,053
C16 M10 INOX	16	M10	35	16	24	16	15,5	1,15	20	16	0,5	13	13	0,104
C16 M12 INOX	16	M12	35	16	24	16	15,5	1,15	20	16	0,5	13	-	0,150
C19 M14x1,5 INOX	19	M14x1,5	45	22	30	19	21,5	0,5	28	20	0,8	16	-	0,221
C19 M14x2 INOX	19	M14	45	22	30	19	21,5	0,5	28	20	0,8	16	-	0,221
C19 M16 INOX	19	M16	45	22	30	19	21,5	0,5	28	20	0,8	16	-	0,221

\*spanner flats  
\*\*tolerances d2: ball stud 6g-threaded hole 6H

For left-hand thread add "LH" (ex. CS 16 M10 INOX LH)  
Technical reading from page 68 to page 69

### MATERIAL

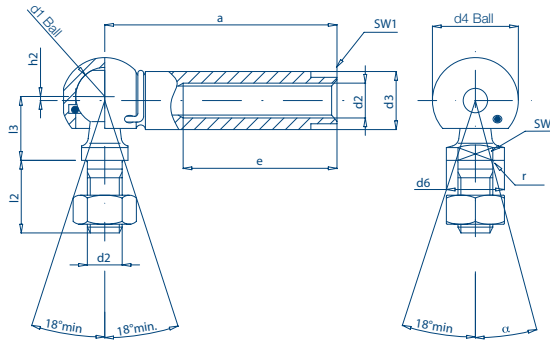
**Ball stud:** stainless steel (1.4305 - AISI 303)

**Ball socket:** stainless steel (1.4305 - AISI 303)

**Internal snap ring "R":** stainless steel (1.4319 - AISI 302)

**Safety spring "S":** (1.4319 - AISI 302)

## Similar to DIN 71802 form CS - long version



Form  
**CSL  
INOX**

Dimensions mm

DESIGNATION	d1	d2	a	d3	d4	d6	e	h2	l2	l3	r	*sw	*sw1	α°	weight (kg)
		6g/6H**	±0,3	±0,5	±0,5	h14	min.	±0,5	±0,3	±0,3	max	h14	h14	≈	≈
CSL10 M6x40 INOX	10	M6	40	10	14,8	10	26,5	0,7	12,5	11	0,3	8	8	15	0,031
CSL13 M8x45 INOX	13	M8	45	13	19,3	13	29	1,15	16,5	13	0,5	11	11	15	0,063
CSL16 M10x45 INOX	16	M10	45	16	24	16	30,5	1,15	20	16	0,5	13	13	15	0,113

For left-hand thread add "LH" (ex. CSL 16 M10x45 INOX LH)  
Technical reading from page 68 to page 69

### MATERIAL

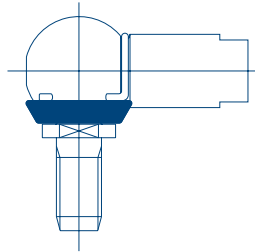
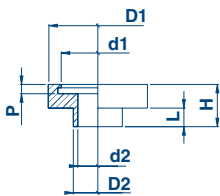
**Ball stud:** stainless steel (1.4305 - AISI 303)

**Ball socket:** stainless steel (1.4305 - AISI 303)

**Internal snap ring "R":** stainless steel (1.4319 - AISI 302)

**Safety spring "S":** stainless steel (1.4319 - AISI 302)

## Neoprene sealing cup for ball joints



DESIGNATION	Ø	D1	d1	D2	d2	H	L	P
NEOPRENE SEALING CUP	8	11,5	9	5,4	4	4,5	1,5	1,5
NEOPRENE SEALING CUP	10	13	10,5	6,9	5,5	6,5	3,5	1,5
NEOPRENE SEALING CUP	13	17	14	8,6	7	7,5	3,5	2
NEOPRENE SEALING CUP	16	21	17,5	10,5	9	8,5	4,5	2
NEOPRENE SEALING CUP	19	25	20	14,5	13	10	6	2

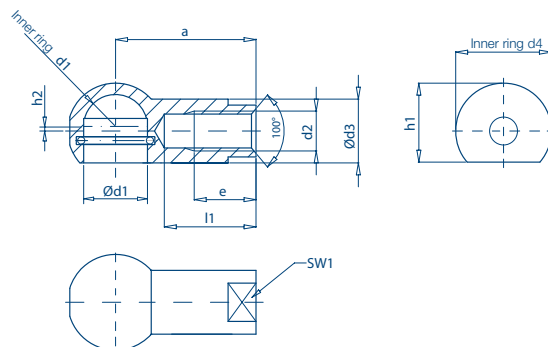
**BALL JOINTS**  
**STAINLESS STEEL Version**

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Form  
**A**

BALL JOINTS

## Ball socket DIN 71805 form "A" with internal snap ring



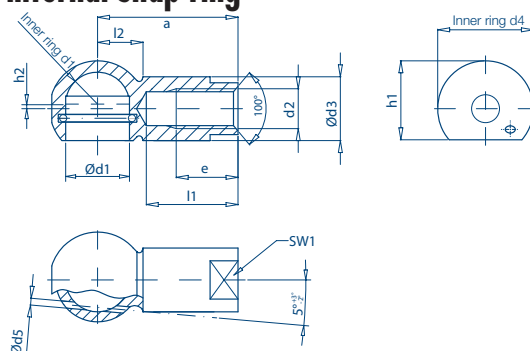
Dimensions mm

DESIGNATION	d1 H9	d2 6H	a ±0,3	d3 ±0,5	d4 ±0,5	e min	l1 max.	h1 ±0,4	h2 ±0,5	*sw1 h14	weight (kg) ≈
A8 M5	8	M5	22	8	12,8	10,2	15	10,8	0,65	7	0,009
A10 M6	10	M6	25	10	14,8	11,5	17	12,3	0,7	8	0,014
A13 M8	13	M8	30	13	19,3	14	20	15,8	1,15	11	0,029
A16 M10	16	M10	35	16	24	15,5	22	20,0	1,15	13	0,057
A16 M12	16	M12	35	16	24	15,5	22	20,0	1,15	-	0,057
A19 M14x1,5	19	M14x1,5	45	22	30	21,5	28	25,0	0,5	-	0,125
A19 M14	19	M14	45	22	30	21,5	28	25,0	0,5	-	0,125
A19 M16	19	M16	45	22	30	21,5	28	25,0	0,5	-	0,125

\* spanner flats

Form  
**B**

## Ball socket DIN 71805 form "B" with internal snap ring



Dimensions mm

DESIGNATION	d1 H9	d2 6H	a ±0,3	d3 ±0,5	d4 ±0,5	d5 ±0,15	e min	l1 max.	h1 ±0,4	h2 ±0,5	l2 ±0,3	*sw1 h14	weight (kg) ≈
B8 M5	8	M5	22	8	12,8	1,3	10,2	15	10,8	0,65	6,3	7	0,009
B10 M6	10	M6	25	10	14,8	1,3	11,5	17	12,3	0,7	7	8	0,014
B13 M8	13	M8	30	13	19,3	1,6	14	20	15,8	1,15	9,1	11	0,029
B16 M10	16	M10	35	16	24	1,8	15,5	22	20,0	1,15	11,4	13	0,057
B16 M12	16	M12	35	16	24	1,8	15,5	22	20,0	1,15	11,4	-	0,057
B19 M14x1,5	19	M14x1,5	45	22	30	1,9	21,5	28	25,0	0,5	12,5	-	0,125
B19 M14	19	M14	45	22	30	1,9	21,5	28	25,0	0,5	12,5	-	0,125
B19 M16	19	M16	45	22	30	1,9	21,5	28	25,0	0,5	12,5	-	0,125

\* spanner flats

For left-hand thread add "LH" (ex. A 16 M10 LH)  
Technical reading from page 68 to page 69

### MATERIAL

**Ball socket:** steel 11SMnPb30 with a 50 daN/mm<sup>2</sup> resistance to tensile stress (1.0718)

**Internal snap ring "R":** steel for springs C98 UNI EN 10270-1 DH

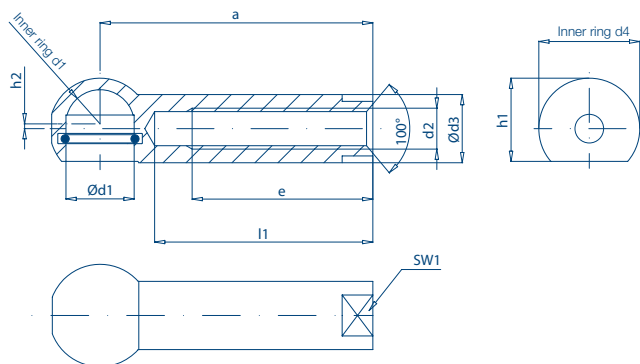
### Surface protection:

- Zinc plating according to EN ISO 4042, Fe/Zn 8c...
- Exemple of chromate treatment (passivation): type A add 1A (ex.: B 10 M6 1A)
- Surface treatments table at page 6

### Tolerances:

The dimensional tolerances in the table make reference to zinc plated products.

## Ball socket similar to DIN 71805 form "A" - long version with internal snap ring



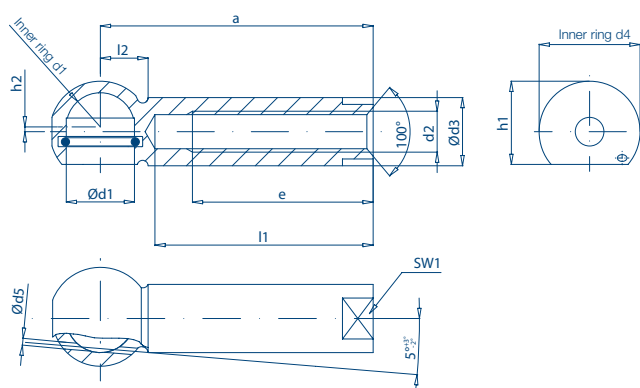
Form  
**AL**

**BALL JOINTS**

Dimensions mm

DESIGNATION	d1 H9	d2 6H	a ±0,3	d3 ±0,5	d4 ±0,5	e min	l1 max.	h1 ±0,4	h2 ±0,5	*sw1 h14	weight (kg) ≈
AL10 M6	10	M6	40	10	14,8	26,5	32	12,3	0,7	8	0,015
AL13 M8	13	M8	45	13	19,3	29	34	15,8	1,15	11	0,039
AL16 M10	16	M10	45	16	24	30,5	35,5	20,0	1,15	13	0,067

\*spanner flats



Form  
**BL**

Dimensions mm

DESIGNATION	d1 H9	d2 6H	a ±0,3	d3 ±0,5	d4 ±0,5	d5 ±0,15	e min	l1 max.	h1 ±0,4	h2 ±0,5	l2 ±0,3	*sw1 h14	weight (kg) ≈
BL10 M6	10	M6	40	10	14,8	1,3	26,5	32	12,3	0,7	7	8	0,015
BL13 M8	13	M8	45	13	19,3	1,6	29	34	15,8	1,15	9,1	11	0,039
BL16 M10	16	M10	45	16	24	1,8	30,5	35,5	20,0	1,15	11,4	13	0,067

\*spanner flats

For left-hand thread add "LH" (ex. AL 16 M10 LH)  
Technical reading from page 68 to page 69

### MATERIAL

**Socket:** 11SMnPb30 steel with tensile strength of 50 daN/mm<sup>2</sup> (1.0718)

**Internal snap ring "R":** spring steel C98 UNI EN 10270-1 DH

### Surface protection:

- Zinc plating according to EN ISO 4042, Fe/Zn 8c...
- Chromate treatment (passivation) example: type A please add 1A (ex.: BL10 M6 1A)
- Surface treatment table at page 6

### Tolerances:

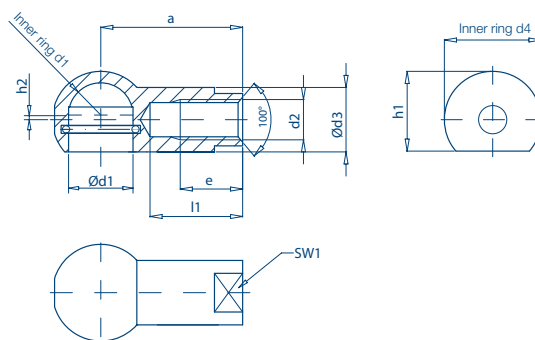
The dimensional tolerances in the table make reference to zinc plated products.

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## Ball socket DIN 71805 form "A" with internal snap ring

Form  
**A**  
INOX

**BALL JOINTS**  
**STAINLESS STEEL Version**



Dimensions mm

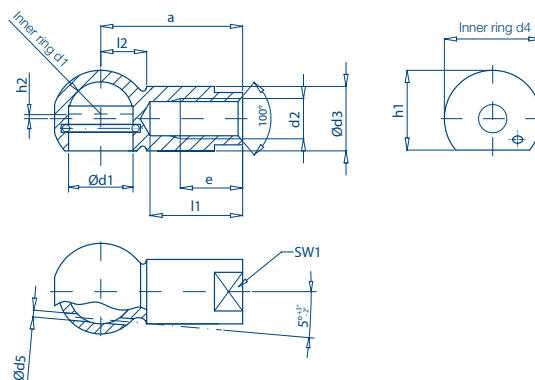
DESIGNATION	d1 H9	d2 6H	a ±0,3	d3 ±0,5	d4 ±0,5	e min	l1 max.	h1 ±0,4	h2 ±0,5	*sw1 h14	weight (kg) ≈
A8 M5 INOX	8	M5	22	8	12,8	10,2	15	10,8	0,65	7	0,009
A10 M6 INOX	10	M6	25	10	14,8	11,5	17	12,3	0,7	8	0,014
A13 M8 INOX	13	M8	30	13	19,3	14	20	15,8	1,15	11	0,029
A16 M10 INOX	16	M10	35	16	24	15,5	22	20,0	1,15	13	0,057
A16 M12 INOX	16	M12	35	16	24	15,5	22	20,0	1,15	-	0,057
A19 M14x1,5 INOX	19	M14x1,5	45	22	30	21,5	28	25,0	0,5	-	0,125
A19 M14 INOX	19	M14	45	22	30	21,5	28	25,0	0,5	-	0,125
A19 M16 INOX	19	M16	45	22	30	21,5	28	25,0	0,5	-	0,125

\* spanner flats

## Ball socket DIN 71805 form "B" with internal snap ring

Form  
**B**  
INOX

**chiavette unificate**



Dimensions mm

DESIGNATION	d1 H9	d2 6H	a ±0,3	d3 ±0,5	d4 ±0,5	d5 ±0,15	e min	l1 max.	h1 ±0,4	h2 ±0,5	l2 ±0,3	*sw1 h14	weight (kg) ≈
B8 M5 INOX	8	M5	22	8	12,8	1,3	10,2	15	10,8	0,65	6,3	7	0,009
B10 M6 INOX	10	M6	25	10	14,8	1,3	11,5	17	12,3	0,7	7	8	0,014
B13 M8 INOX	13	M8	30	13	19,3	1,6	14	20	15,8	1,15	9,1	11	0,029
B16 M10 INOX	16	M10	35	16	24	1,8	15,5	22	20,0	1,15	11,4	13	0,057
B16 M12 INOX	16	M12	35	16	24	1,8	15,5	22	20,0	1,15	11,4	-	0,057
B19 M14x1,5 INOX	19	M14x1,5	45	22	30	1,9	21,5	28	25,0	0,5	12,5	-	0,125
B19 M14 INOX	19	M14	45	22	30	1,9	21,5	28	25,0	0,5	12,5	-	0,125
B19 M16 INOX	19	M16	45	22	30	1,9	21,5	28	25,0	0,5	12,5	-	0,125

\* spanner flats

For left-hand thread add "LH" (ex. A 16 M10 INOX LH)  
Technical reading from page 68 to page 69

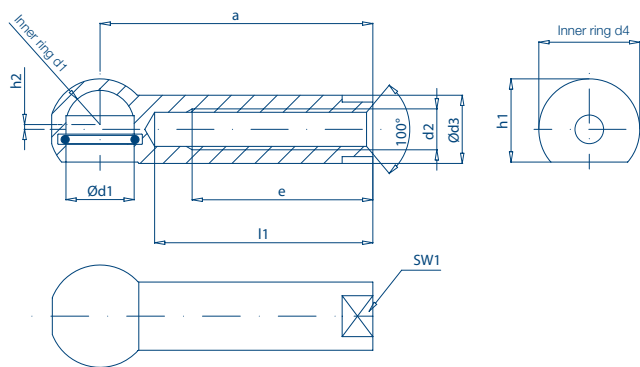
### MATERIAL

**Socket:** stainless steel (1.4305 - AISI 303)

**Internal snap ring "R":** stainless steel (1.4319 - AISI 302)



## Ball socket similar to DIN 71805 form "A" long version with internal snap ring



Form  
**AL  
INOX**

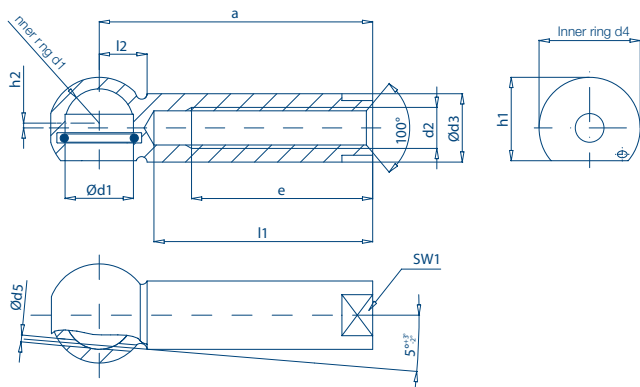
**BALL JOINTS**  
**STAINLESS STEEL Version**

Dimensions mm

DESIGNATION	d1	d2	a	d3	d4	e	l1	h1	h2	*sw1	weight
	H9	6H	±0,3	±0,5	±0,5	min	max.	±0,4	±0,5	h14	(kg) ≈
AL10 M6 INOX	10	M6	40	10	14,8	26,5	32	12,3	0,7	8	0,015
AL13 M8 INOX	13	M8	45	13	19,3	29	34	15,8	1,15	11	0,039
AL16 M10 INOX	16	M10	45	16	24	30,5	35,5	20,0	1,15	13	0,067

\*spanner flats

## Ball socket similar to DIN 71805 form "B" long version with internal snap ring



Form  
**BL  
INOX**

Dimensions mm

DESIGNATION	d1	d2	a	d3	d4	d5	e	l1	h1	h2	l2	*sw1	weight
	H9	6H	±0,3	±0,5	±0,5	±0,15	min	max.	±0,4	±0,5	±0,3	h14	(kg) ≈
BL10 M6 INOX	10	M6	40	10	14,8	1,3	26,5	32	12,3	0,7	7	8	0,015
BL13 M8 INOX	13	M8	45	13	19,3	1,6	29	34	15,8	1,15	9,1	11	0,039
BL16 M10 INOX	16	M10	45	16	24	1,8	30,5	35,5	20,0	1,15	11,4	13	0,067

\*spanner flats

For left-hand thread add "LH" (ex. AL 16 M10 INOX LH)  
Technical reading from page 68 to page 69

### MATERIAL

**Socket:** stainless steel (1.4305 - AISI 303)

**Internal snap ring "R":** stainless steel (1.4319 - AISI 302)

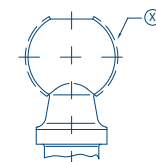
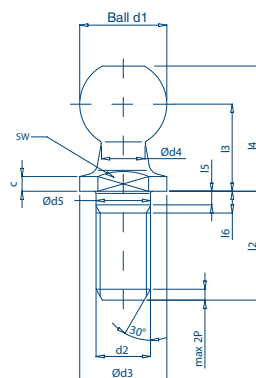
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## Ball stud DIN 71803 form C



Dimensions mm



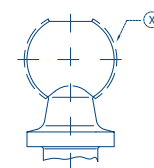
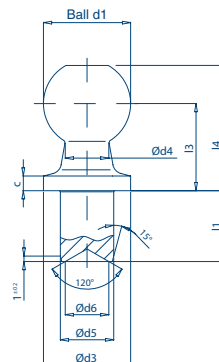
X= INDUCTION-HARDENED SURFACE

DESIGNATION	d1	c	d2	d3	d4	d5	l2	l3	l4	l5	l6	*sw	weight (kg) ≈
	h9	+0,4 0	6g	h14	±0,2	h11	±0,3	±0,3	±0,3	min.	max	h14	
C8 M5	8	2	M5	8	4	5	10,2	9	12,5	1,2	4	7	0,005
C10 M6	10	2,2	M6	10	5	6	12,5	11	15,5	1,2	4	8	0,009
C13 M8	13	2,4	M8	13	6,5	8	16,5	13	18,5	1,5	5,3	11	0,018
C16 M10	16	2,7	M10	16	8	10	20	16	23	2,5	7,3	13	0,035
C16 M12	16	2,7	M12	16	8	10	20	16	23	2,5	7,3	13	0,035
C19 M14x1,5	19	3	M14x1,5	19	10	14	28	20	28,5	5,0	10,8	16	0,071
C19 M14	19	3	M14	19	10	14	28	20	28,5	5,0	10,8	16	0,071
C19 M16	19	3	M16	19	10	14	28	20	28,5	5,0	10,8	16	0,071

## Ball stud DIN 71803 form B



Dimensions mm



X= INDUCTION-HARDENED SURFACE

DESIGNATION	d1	l1	c	d3	d4	d5	d6	l3	l4	weight (kg) ≈
	h9	±0,2	+0,4 0	h14	±0,2	h11	0 -0,4	±0,3	±0,3	
B8x4,0	8	4	2	8	4	5	3	9	12,5	0,0038
B8x7,5	8	7,5	2	8	4	5	3	9	12,5	0,0043
B10x4,5	10	4,5	2,2	10	5	6	4	11	15,5	0,0071
B10x8,0	10	8	2,2	10	5	6	4	11	15,5	0,0078
B13x5,0	13	5	2,4	13	6,5	8	6	13	18,5	0,0142
B13x10	13	10	2,4	13	6,5	8	6	13	18,5	0,0160
B16x6,0	16	6	2,7	16	8	10	8	16	23	0,0235
B16x13	16	13	2,7	16	8	10	8	16	23	0,0296
B19x12	19	12	3	19	10	14	10	20	28,5	0,0562
B19x18	19	18	3	19	10	14	10	20	28,5	0,0637

Technical reading from page 68 to page 69

### MATERIAL

**Ball stud:** carbon steel with a 60 daN/mm<sup>2</sup> resistance to tensile stress and inner ring hardened on the surface with a ≥ 52 HRC hardness

### Surface protection:

- Zinc plating according to EN ISO 4042, Fe/Zn 8c...
- Exemple of chromate treatment (passivation): type A please add 1A (ex.: C8 M5 1A)
- Surface treatment table at page 6

### Tolerances:

The dimensional tolerances in the table make reference to zinc plated products.

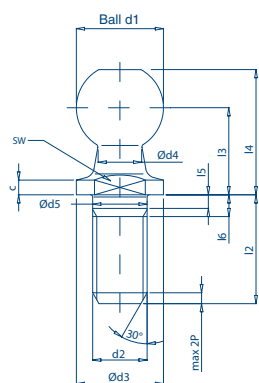
Form  
C

BALL JOINTS

Form  
B

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## Ball stud DIN 71803 form C



Form  
**C**  
**INOX**

Dimensions mm

DESIGNATION	d1	c	d2	d3	d4	d5	l2	l3	l4	l5	l6	*sw	weight (kg) ≈
	h9	+0,4 0	6g	h14	±0,2	h11	±0,3	±0,3	±0,3	±0,3	max	h14	
C8 M5 INOX	8	2	M5	8	4	5	10,2	9	12,5	1,2	4	7	0,005
C10 M6 INOX	10	2,2	M6	10	5	6	12,5	11	15,5	1,2	4	8	0,009
C13 M8 INOX	13	2,4	M8	13	6,5	8	16,5	13	18,5	1,5	5,3	11	0,018
C16 M10 INOX	16	2,7	M10	16	8	10	20	16	23	2,5	7,3	13	0,035
C16 M12 INOX	16	2,7	M12	16	8	10	20	16	23	2,5	7,3	13	0,035
C19 M14x1,5 INOX	19	3	M14x1,5	19	10	14	28	20	28,5	5,0	10,8	16	0,071
C19 M14 INOX	19	3	M14	19	10	14	28	20	28,5	5,0	10,8	16	0,071
C19 M16 INOX	19	3	M16	19	10	14	28	20	28,5	5,0	10,8	16	0,071

\*spanner flats

Technical reading from page 68 to page 69

**BALL JOINTS**  
**STAINLESS STEEL Version**

### MATERIAL

**Ball stud:** stainless steel (1.4305 - AISI 303)

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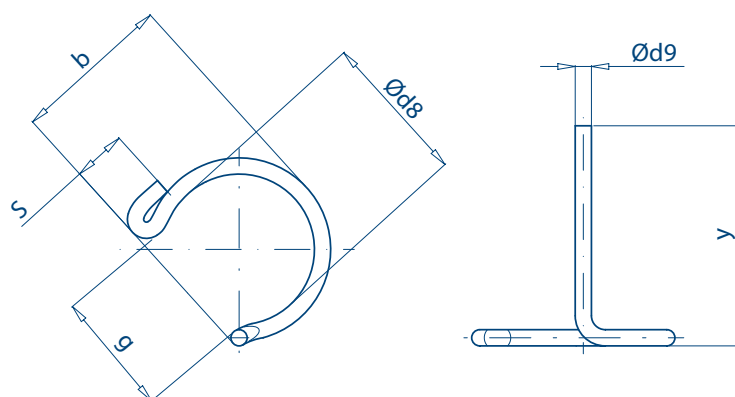


## Safety clip "S" for ball joints DIN 71805 form CS

Series

**S**

**BALL JOINTS**



Dimensions mm

DESIGNATION	d8		d9	b ±0,3	g ±0,3	y		S max	weight (kg) 1000 pcs
		Tol.					Tol.		
S8	7	± 0,2	1	8,5	5	12	± 0,3	3,5	0,21
S10	8,7	± 0,2	1	9,5	7,7	12,5	± 0,3	4,2	0,24
S13	11	± 0,2	1,2	12,5	8	15,7	± 0,3	5	0,46
S16	13	± 0,2	1,4	14	11	19	± 0,3	5	0,77
S19	20	± 0,3	1,5	19	16,9	24,4	± 0,4	6	1,10

Technical reading from page 68 to page 69

### MATERIAL

steel for springs C98 UNI EN 10270-1 DH in alternative (1.4319 - AISI 302)

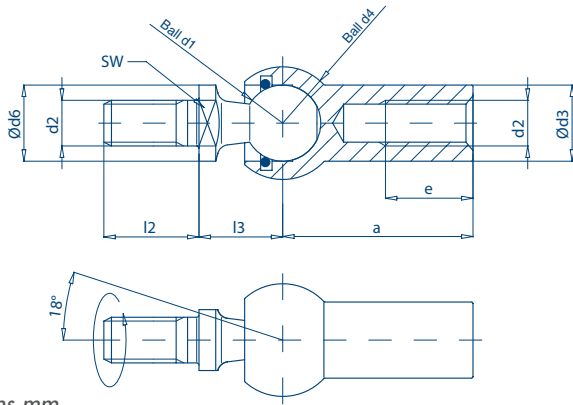
### Surface protection:

- Zinc plating according to EN ISO 4042, Fe/Zn 8c...
- Example of chromate treatment (passivation): type A please add 1A (ex.: S 10 1A)
- Surface treatment table at page 6

### Tolerances:

The dimensional tolerances in the table are referred to zinc plated products.

## Axial joints similar to DIN 71802



Series  
**AXA**

\*\*tolerances d2: ball stud 6g - f-threaded hole 6H

Dimensions mm

DESIGNATION	d1	d2	a	d3	d4	d6	e	l2	l3	*sw	weight (kg)
	h9	6g/6H**	±0,3	±0,5	±0,5	h14	min.	±0,3	±0,3	h14	~
AXA 8 M5	8	M5	22	8	12,8	8	10,2	10,2	9	7	0,015
AXA10 M6	10	M6	25	10	14,8	10	11,5	12,5	11	8	0,025
AXA13 M8	13	M8	30	13	19,3	13	14	16,5	13	11	0,053
AXA16 M10	16	M10	35	16	24	16	15,5	20	16	13	0,104
AXA16 M12	16	M12	35	16	24	16	15,5	20	16	13	0,150
AXA19 M14x1,5	19	M14x1,5	45	22	30	19	21,5	28	20	16	0,221
AXA19 M14x2	19	M14	45	22	30	19	21,5	28	20	16	0,221
AXA19 M16	19	M16	45	22	30	19	21,5	28	20	16	0,221

For left-hand thread add "LH" (ex. AXA16 M10 LH)  
Technical reading from page 68 to page 69

### MATERIAL

**Ball stud:** carbon steel with tensile strength of 60 daN/mm<sup>2</sup> and a ball tempered on the surface with hardness  $\geq 52$  HRC stainless steel AISI 303 (1.4305) on request

**Ball socket:** steel 11SMnPb30 with tensile strength of 50 daN/mm<sup>2</sup> (1.0718) stainless steel (1.4305 - AISI 303) upon request

**Internal snap ring "R":** steel for springs C98 UNI EN 10270-1 DH stainless steel (1.4319 - AISI 302) upon request

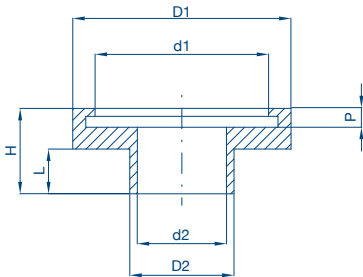
### Surface protection:

- Zinc plating according to EN ISO 4042, Fe/Zn 8c...
- Chromate treatment (passivation) example: type A please add 1A (ex.: AXA 10 M6 1A)
- Surface treatment table at page 6

### Tolerances:

The dimensional tolerances in the table make reference to zinc plated products.

## Neoprene sealing cup for axial joints "AXA" similar to DIN 71802



DESIGNATION	Ø	D1	d1	D2	d2	H	L	P
NEOPRENE SEALING CUP	8	11,5	9	5,4	4	4,5	1,5	1,5
NEOPRENE SEALING CUP	10	13	10,5	6,9	5,5	6,5	3,5	1,5
NEOPRENE SEALING CUP	13	17	14	8,6	7	7,5	3,5	2
NEOPRENE SEALING CUP	16	21	17,5	10,5	9	8,5	4,5	2
NEOPRENE SEALING CUP	19	25	20	14,5	13	10	6	2

AXIAL JOINTS AND SEALING CUPS

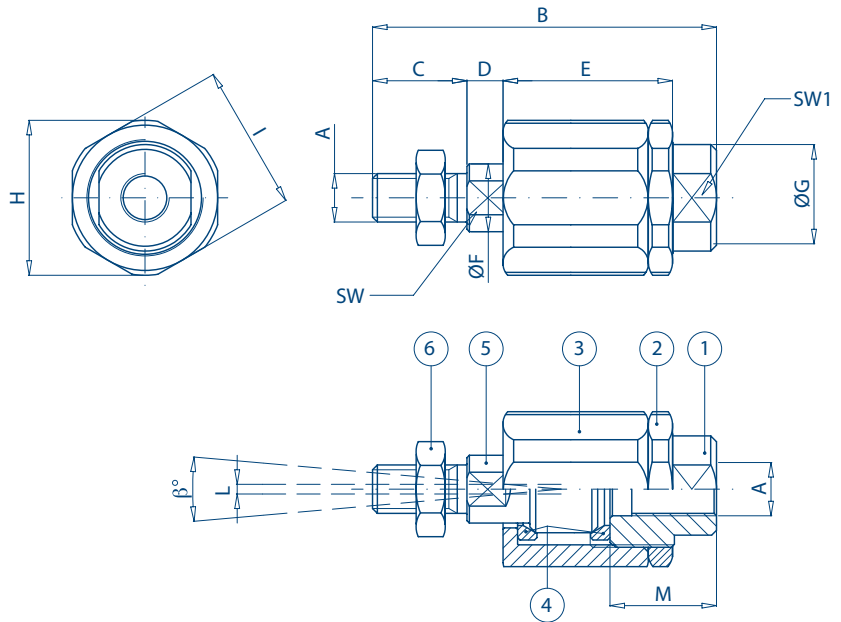
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Series  
**GB**

**SELF-ALIGNING JOINTS**

## Self-aligning joints

Characteristics: the self-aligning joint enables the compensation of angular bendings and radial shiftings



Dimensions mm

DESIGNATION	CYLINDER Ø	A	B	C	D	E	ØF	ØG	ØH	I	L	M	SW*	β°	SW1*	static load (daN)	weight (kg) (daN)
		6g-6H**															
GB6	12-16	M6x1	35	11	2,5	17,5	6	8,5	14,5	13	1	12,5	5	6°	7	120	0,025
GB8	25-30	M8x1,25	57	21	5	26	8	12,5	19	17	2	16	7	8°	11	250	0,060
GB10x1,25	32	M10x1,25	71,5	20	7,5	35	14	22	32	30	2	22	12	8°	19	500	0,220
GB10	32	M10x1,5	71,5	20	7,5	35	14	22	32	30	2	22	12	8°	19	500	0,220
GB12x1,25	40	M12x1,25	75,5	24	7,5	35	14	22	32	30	2	22	12	8°	19	500	0,230
GB12	40	M12x1,75	75,5	24	7,5	35	14	22	32	30	2	22	12	9°	20	500	0,230
GB16x1,5	50-63	M16x1,5	104	32	10	53	22	32	45	41	2	30	20	6°	27	1000	0,660
GB20x1,5	80-100	M20x1,5	119	40	10	53	22	32	45	41	2	37	20	6°	27	1000	0,700
GB27x2	125	M27x2	147	54	10	60	32	57	70	65	2	48	24	8°	54	3000	2,060
GB36x2	125	M36x2	190	72	15,5	77	39	57	75	70	2	68	32	8°	54	4000	3,110

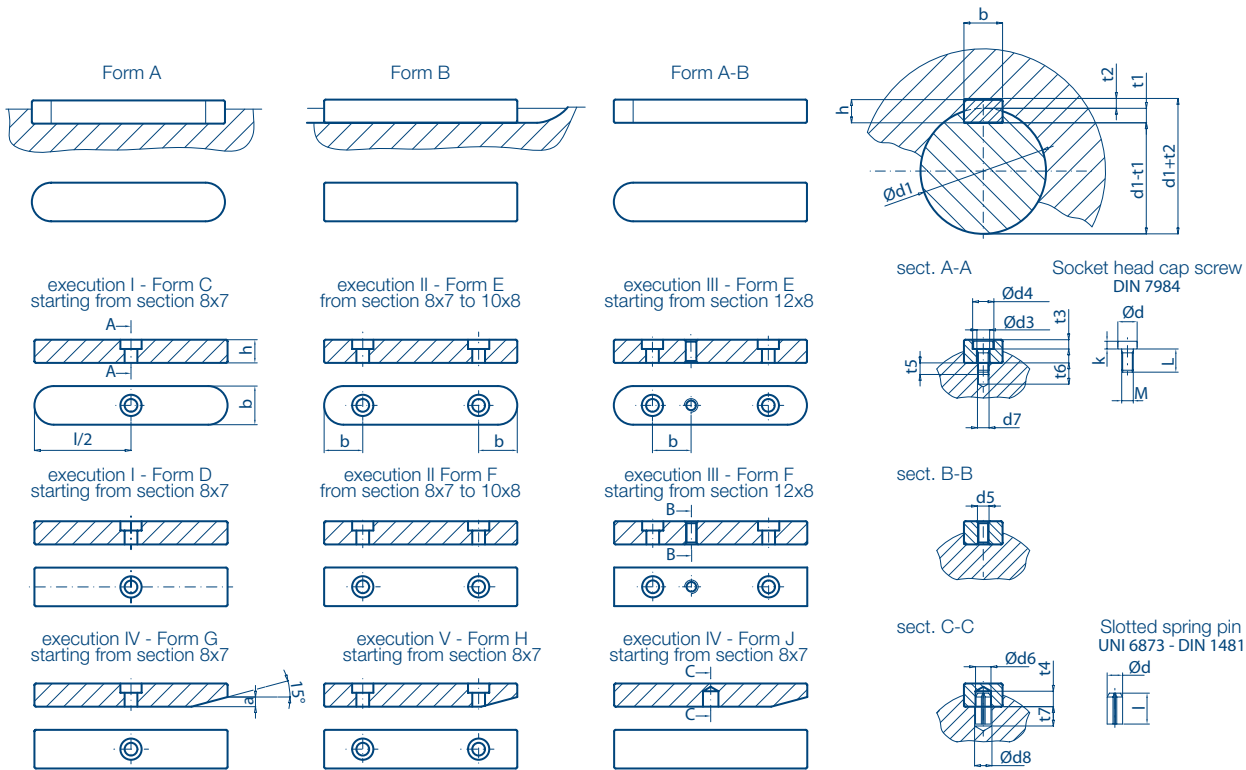
\*\*tolerances A: ball stud 6g - threaded hole 6H  
\*spanner flats

POS.	DESIGNATION	MATERIALS	HEAT TREATMENT	SURFACE PROTECTION
1	Cover	11SMnPb30 (1.0718) with R ≥ 50 daN/mm <sup>2</sup>		zinc plating according to the standard EN ISO 4042, Fe/Zn 8c 1A
2	Ring nut	11SMnPb30 (1.0718) with R ≥ 50 daN/mm <sup>2</sup>		zinc plating according to the standard EN ISO 4042, Fe/Zn 8c 1A
3	Body	11SMnPb30 (1.0718) R ≥ 50 daN/mm <sup>2</sup>		zinc plating according to the standard EN ISO 4042, Fe/Zn 8c 1A
4	Housing	39NiCrMo3 (1.6511) hardened and tempered R 100÷120 daN/mm <sup>2</sup>	Nitriding HV 0,1 > 600	
5	Pin	39NiCrMo3 (1.6511) hardened and tempered R 100÷120 daN/mm <sup>2</sup>	Nitriding HV 0,1 > 600	blackened
6	Nut	Nut UNI 5589-6S see page 67		zinc plating according to the standard EN ISO 4042, Fe/Zn 8c 1A

# PRODUCT DESCRIPTION AND TECH. DATA

## Feather keys according to DIN 6885- UNI 6604 (former ISO 773)

Feather keys are normally used to transmit the torque from the shaft to the hub



Nomenclature according to the standard:			DESCRIPTION
UNI 6604	UNI 6605	DIN 6885	
Form A		Form A	rounded ends
Form B		Form B	flat ends
	Execution I	Form C	From section 8x7 form A supplied with hole for retaining screw
		Form D	From section 8x7 form B supplied with hole for retaining screw
	Execution II	Form E	From section 8x7 to 10x8 form A supplied with 2 holes for retaining screws
		Form F	From section 8x7 to 10x8 form B supplied with 2 holes for retaining screws
	Execution III	Form E	From section 12x8 form A supplied with 2 holes for retaining screws and 1 threaded hole for the extracting screw
		Form F	From section 12x8 form B supplied with 2 holes for retaining screws and 1 threaded hole for the extracting screw
	Execution IV	Form G	From section 8x7 form B supplied with hole for retaining screw and chamfer
	Execution V	Form H	From section 8x7 form B supplied with 2 holes for retaining screw and chamfer
	Execution VI	Form J	From section 8x7 form B supplied with chamfer and hole for 1 spring dewel sleeve
Form A/B: not included in the standard			if needed the forms A and B can be combined, so that 1 end will be flat and the other one will be rounded

### MATERIAL

C45 (1.1191) steel with  $R_{\geq 59} \text{ daN/mm}^2$  cold formed according to EN ISO 683-1 : 2018  
 stainless steel (1.4401 - AISI 316) with  $R_{\geq 59} \text{ daN/mm}^2$  - cold formed 39NiCrMo3 (1.6511) available upon request up to size 20x12 mm and 18NiCrMo5 (1.5919) up to size 12x8 mm.

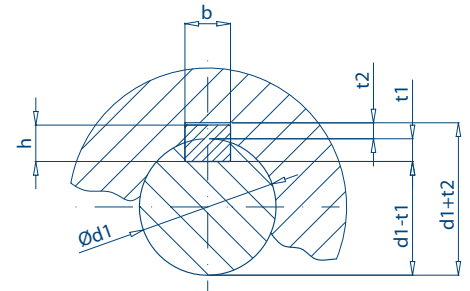
The relationship between the diameter of the shaft and the section of the key indicated in the dimensional tables refers to normal uses

The use of keys with smaller sections is possible if their resistance is sufficient for the force to be transmitted

The use of keys with larger sections is not recommended.



# Tolerances Table for feather keys and keyways



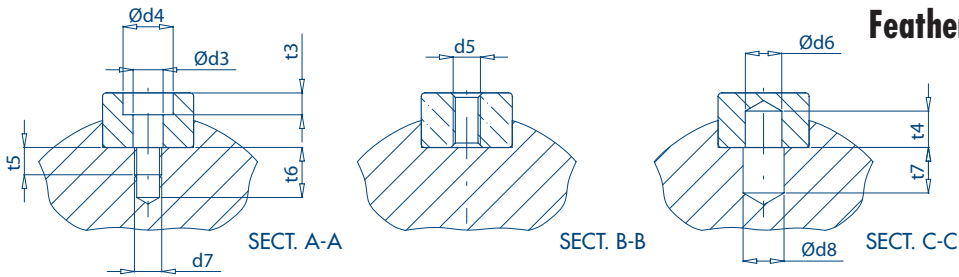
Dimensions mm

FEATHER KEYS

Range		Feather key Section			keyway											
Shaft diameter d		Nominal Dimensions b x h		Tolerances on b <sup>h9</sup> h*		Nominal Dimensions b		Width					Depth			
								Tolerances on b					Shaft		Hub	
								For shaft			For hub		t1		t2	
d		b x h		b <sup>h9</sup>	h*	b	H9	N9	P9	D10	Js9	P9	Nom.	Tol.	Nom.	Tol.
from up to	6	2 x 2	0	0	2	+0,025	0	-0,006	+0,060	±0,012	-0,006	1,2	1,8	1	+0,1	0
from up to	8	3 x 3	-0,025	-0,025	3	0	-0,004	-0,031	+0,020		-0,031	1,8		1,4		
from up to	10	4 x 4	0	0	4	+0,030	0	-0,012	+0,078	±0,015	-0,012	2,5		1,8		
from up to	12	5 x 5			5							3	2,3			
from up to	17	6 x 4	0	-0,030	6	0	-0,030	-0,042	+0,030	±0,015	-0,042	2,5	+0,1	1,8	+0,1	0
from up to	22	6 x 5			6							3		2,3		
		6 x 6			6							3,5		3,5		
from up to	22	8 x 5	0	-0,036	8	+0,036	0	-0,015	+0,098	±0,018	-0,015	3	+0,2	2,3	+0,2	0
from up to	30	8 x 6			8							3,5		2,8		
		8 x 7			8							4		3,3		
		8 x 8			8							5		3,3		
from up to	30	10 x 8	0	-0,090	10	0	-0,036	-0,051	+0,040	±0,018	-0,051	5	+0,2	3,3	+0,2	0
from up to	38	10 x 10			10							6		4,3		
from up to	38	12 x 8	0	-0,090	12	+0,043	0	-0,018	+0,120	±0,021	-0,018	5	+0,2	3,3	+0,2	0
from up to	44	12 x 12			12							7,5		4,9		
from up to	44	14 x 9	0	-0,043	14	0	-0,043	-0,061	+0,050	±0,021	-0,061	5,5	+0,2	3,8	+0,2	0
from up to	50	14 x 14			14							9		5,4		
from up to	58	16 x 10	0	-0,090	16	0	-0,090	-0,061	+0,050	±0,021	-0,061	6	+0,2	4,3	+0,2	0
from up to	60	18 x 11			18							7		4,4		
from up to	65	20 x 12	0	-0,052	20	+0,052	0	-0,022	+0,149	±0,026	-0,022	7,5	+0,2	4,9	+0,2	0
from up to	75	22 x 14			22							9		5,4		
from up to	75	25 x 14	0	-0,110	25	0	-0,052	-0,074	+0,065	±0,026	-0,074	9	+0,2	5,4	+0,2	0
from up to	85	28 x 16			28							10		6,4		
from up to	95	32 x 18	0	-0,062	32	0,062	0	-0,026	+0,180	±0,031	-0,026	11	+0,3	7,4	+0,3	0
from up to	110	36 x 20			36							12		8,4		
from up to	130	40 x 22	0	-0,130	40	0	-0,062	-0,088	+0,080	±0,031	-0,088	13	+0,3	9,4	+0,3	0
from up to	150	45 x 25			45							15		10,4		
from up to	170	50 x 28			50							17		11,4		
from up to	200	56 x 32	0	-0,074	56	+0,074	0	-0,032	+0,220	±0,037	-0,032	20	+0,3	12,4	+0,3	0
from up to	230	63 x 32			63							20		12,4		
from up to	260	70 x 36	0	-0,160	70	0	-0,074	-0,106	+0,100	±0,037	-0,106	22	+0,3	14,4	+0,3	0
from up to	290	80 x 40			80							25		15,4		
from up to	330	90 x 45	0	-0,087	90	+0,087	0	-0,037	+0,260	±0,043	-0,037	28	+0,3	17,4	+0,3	0
from up to	380	100 x 50			100							31		19,5		

\* the deviation values are referred to the tolerances h9 for square sections and h11 for rectangular sections

## Feather keys executions



Feather key Section		Sect. A-A							Sect. B-B	Sect. C-C				Slotted spring pin	
Nominal Dimensions	Minimum length of application	a*	Ød3	Ød4	d7	t3	t5	t6	d5	Ød6	Ød8	t4	t7	Socket head cap screw	diameter
b x h	L									H12				Thread	
2 x 2															
3 x 3															
4 x 4															
5 x 5															
6 x 4															
6 x 5															
6 x 6															
8 x 5															
8 x 6															
sizes in which is not possible to apply C - D - E - F - G - H - J forms															
8 x 7	40	3	3,4	6	M3	2,4	4	7	M3	4	4,5	4	5	4 x 8	M3 x 8
8 x 8															
10 x 8	50	3	3,4	6	M3	2,4	5	8	M3	4	4,5	4	5	4 x 8	M3 x 10
10 x 10															
12 x 8	56	3	4,5	8	M4	3,2	6	10	M4	5	5,5	5	7	5 x 10	M4 x 10
12 x 12															
14 x 9	63	3,5	5,5	10	M5	4,1	6	10	M5	6	6,5	6	8	6 x 12	M5 x 10
14 x 14															
16 x 10	70	4	5,5	10	M5	4,1	6	10	M5	6	6,5	6	8	6 x 12	M5 x 10
18 x 11	80	4,5	6,6	11	M6	4,8	6	11	M6	8	9	7	11	8 x 16	M6 x 12
20 x 12	90	5	6,6	11	M6	4,8	6	11	M6	8	9	8	10	8 x 16	M6 x 12
22 x 14	100	5,5	6,6	11	M6	4,8	8	13	M6	8	9	8	10	8 x 16	M6 x 12
25 x 14	100	5,5	9	14	M8	6	9	15	M8	10	11	10	12	10 x 20	M8 x 16
28 x 16	110	6,5	11	18	M10	7,3	9	16	M10	12	13	10	18	12 x 24	M10 x 16
32 x 18	110	7	11	18	M10	7,3	10	17	M10	12	13	12	16	12 x 24	M10 x 20
36 x 20	125	8	14	20	M12	8,3	12	20	M12	16	17	14	20	16 x 30	M12 x 25
40 x 22	125	9	14	20	M12	8,3	12	20	M12	16	17	16	18	16 x 30	M12 x 25
45 x 25	125	10	14	20	M12	8,3	15	22	M12	16	17	16	18	16 x 30	M12 x 30
50 x 28	140	11	14	20	M12	8,3	12	19	M12	16	17	16	18	16 x 32	M12 x 30
56 x 32	160	13	14	20	M12	8,3	13	20	M12	16	17	16	18	16 x 32	M12 x 35
63 x 32	180	13	14	20	M12	8,3	13	20	M12	16	17	16	18	16 x 32	M12 x 35
70 x 36	200	14	18	26	M16	11,5	17	24	M16	20	21	20	24	20 x 40	M16 x 40
80 x 40	220	16	18	26	M16	11,5	18	25	M16	20	21	20	24	20 x 40	M16 x 45
90 x 45	250	18	22	33	M20	13,5	20	28	M20	25	26	25	30	25 x 50	M20 x 50
100 x 50	280	20	22	33	M20	13,5	20	28	M20	25	26	25	30	25 x 50	M20 x 50

\* execution Form G-H-J

## Feather keys standard lengths DIN 6885-UNI 6604 (former ISO 773)



FEATHER KEYS

bxh (mm)	length L (mm)															
	feather keys length tolerance: up to 28 mm from 0 to -0,20 mm, over 28 up to 80 mm from 0 to -0,30 mm, over 80 mm from 0 to -0,50 mm															
	keyway tolerance: up to 28 mm from +0,20 to 0 mm, over 28 up to 80 mm from +0,30 to 0, over 80 mm from +0,50 to 0 mm															
3x3	8	10	12	14	15	16	18	20	22	25	28	30	32	35	36	40
Kg/100 pcs	0,05	0,07	0,08	0,09	0,11	0,11	0,12	0,14	0,15	0,17	0,19	0,21	0,22	0,24	0,25	0,28
4x4	8	10	12	14	15	16	18	20	22	25	28	30	32	35	36	40
Kg/100 pcs	0,09	0,12	0,14	0,17	0,18	0,19	0,22	0,24	0,27	0,30	0,34	0,37	0,39	0,43	0,44	0,49
5x5	8	10	12	14	15	16	18	20	22	25	28	30	32	35	36	40
Kg/100 pcs	0,14	0,17	0,21	0,25	0,27	0,29	0,33	0,37	0,41	0,47	0,53	0,57	0,61	0,66	0,69	0,76
6x4	10	12	14	15	16	18	20	22	25	28	30	32	35	36	40	45
Kg/100 pcs	0,17	0,20	0,24	0,26	0,28	0,31	0,35	0,38	0,43	0,49	0,52	0,56	0,61	0,62	0,69	0,78
6x5	10	12	14	15	16	18	20	22	25	28	30	32	35	36	40	45
Kg/100 pcs	0,21	0,26	0,30	0,33	0,35	0,39	0,43	0,48	0,54	0,61	0,65	0,69	0,76	0,78	0,87	0,98
6x6	10	12	14	15	16	18	20	22	25	28	30	32	35	36	40	45
Kg/100 pcs	0,26	0,31	0,36	0,39	0,42	0,47	0,52	0,59	0,67	0,76	0,80	0,	0,96	0,98	1,09	1,23
8x5	12	14	15	16	18	20	22	25	28	30	32	35	36	40	45	50
Kg/100 pcs	0,34	0,40	0,43	0,46	0,51	0,57	0,63	0,71	0,80	0,85	0,91	1,00	1,03	1,14	1,28	1,42
8x6	12	14	15	16	18	20	22	25	28	30	32	35	36	40	45	50
Kg/100 pcs	0,41	0,48	0,51	0,55	0,62	0,68	0,75	0,85	0,96	1,03	1,09	1,20	1,23	1,37	1,54	1,71
8x7	12	14	15	16	18	20	22	25	28	30	32	35	36	40	45	50
Kg/100 pcs	0,48	0,56	0,60	0,64	0,72	0,81	0,89	1,03	1,16	1,24	1,34	1,45	1,51	1,69	1,91	2,13
8x8	15	16	18	20	22	25	28	30	32	35	36	40	45	50	55	56
Kg/100 pcs	0,68	0,72	0,81	0,91	1,00	1,13	1,27	1,36	1,45	1,58	1,63	1,81	2,04	2,26	2,49	2,53
10x8	15	16	18	20	22	25	28	30	32	35	36	40	45	50	55	56
Kg/100 pcs	0,85	0,91	1,02	1,13	1,25	1,44	1,63	1,76	1,88	2,07	2,13	2,38	2,70	3,01	3,32	3,39
10x10	15	20	22	25	28	30	32	35	36	40	45	50	55	56	60	63
Kg/100 pcs	1,06	1,41	1,56	1,77	1,98	2,12	2,26	2,47	2,55	2,83	3,18	3,53	3,89	3,96	4,24	4,45
12x8	15	20	22	25	28	30	32	35	36	40	45	50	55	56	60	63
Kg/100 pcs	1,03	1,37	1,51	1,71	1,92	2,08	2,22	2,45	2,52	2,82	3,20	3,58	3,95	4,03	4,34	4,56
12x12	20	22	25	28	30	32	35	36	40	45	50	55	56	60	63	65
Kg/100 pcs	2,05	2,26	2,57	2,87	3,08	3,28	3,59	3,69	4,10	4,62	5,13	5,64	5,75	6,16	6,46	6,67
14x9	20	22	25	28	30	32	35	36	40	45	50	55	56	60	63	65
Kg/100 pcs	1,81	1,99	2,27	2,54	2,72	2,90	3,17	3,26	3,66	4,15	4,65	5,06	5,24	5,62	5,93	6,15
14x14	30	35	40	45	50	55	56	60	63	65	70	80	85	90	100	110
Kg/100 pcs	4,23	4,93	5,64	6,34	7,05	7,75	7,90	8,46	8,88	9,16	9,87	11,28	11,98	12,69	14,10	15,51
16x10	30	35*	40	45	50	55	56	60	63	65	70	80	85	90	100	110
Kg/100 pcs	3,43	4,00	4,57	5,22	5,85	6,43	6,60	7,07	7,77	8,37	9,57	10,27	10,87	12,17	13,37	13,80
18x11	30	40	45	50	55	56	60	63	65	70	75	80	90	100	110	120
Kg/100 pcs	4,30	5,74	6,45	7,17	7,88	8,10	8,65	9,19	9,56	10,30	11,06	11,80	13,40	14,90	16,50	17,80
20x12	40	45	50	55	56	60	63	70	80	90	100	110	120	125	130	140
Kg/100 pcs	6,80	7,65	8,50	9,62	9,79	10,30	11,09	12,39	14,29	16,19	17,99	19,89	21,50	22,69	23,20	25,59
22x14	50	55	60	63	70	80	90	100	110	120	125	130	140	150*	160	180
Kg/100 pcs	10,83	11,92	13,00	14,06	15,76	18,16	20,86	23,06	25,46	27,60	29,06	30,00	32,66	34,50	37,56	42,36
24x14	60	63	70	80	90	100	110	120	125	130	140	150	160	180	200	220
Kg/100 pcs	14,40	15,10	17,00	19,50	22,50	24,80	27,40	30,00	31,50	32,80	35,20	38,00	40,50	48,00	51,00	55,00
25x14	60	63	70	80	90	100	110	120	125	130	140	150	160	180	200	220
Kg/100 pcs	13,90	15,60	17,70	20,50	23,20	26,00	28,70	31,00	32,80	34,00	37,00	39,30	42,50	48,00	53,50	58,90
28x16	55	60	70	80	90	100	110	120	125	130	140	145	150	160	180	200
Kg/100 pcs	17,40	19,00	22,20	26,00	29,60	33,10	36,60	39,50	41,90	43,50	47,10	50,30	54,20	61,20	68,20	75,30
32x18	65	70	80	90	100	110	120	125	130	140	150	160	170	180	200	220
Kg/100 pcs	27,20	29,20	33,40	37,60	42,10	47,60	49,50	53,40	55,50	60,20	64,00	69,20	73,90	78,30	87,30	96,40
36x20	80	90	100	110	120	125	130	140	150	160	170	180	200	220	250	280
Kg/100 pcs	41,30	46,50	52,10	57,80	63,00	68,50	74,70	79,80	86,00	92,20	97,60	108,60	119,60	136,60	153,60	164,50
40x22	70	90	100	110	120	125	130	140	150	160	180	200	220	240	250	280
Kg/100 pcs	43,79	56,30	62,80	70,10	76,30	80,40	83,00	90,80	96,60	105,10	118,10	132,10	146,10	160,40	167,10	187,10
45x25	100	110	120	125	130	140	150	160	180	200	220	240	245	250	260	280
Kg/100 pcs	80,00	88,00	96,50	101,50	105,00	115,50	122,00	132,50	150,50	168,50	185,50	202,30	206,60	212,50	219,20	238,50
50x28																
56x 32																
63x 32																
70x 36																
80x 40																
90x 45																
100x 50																

available upon request

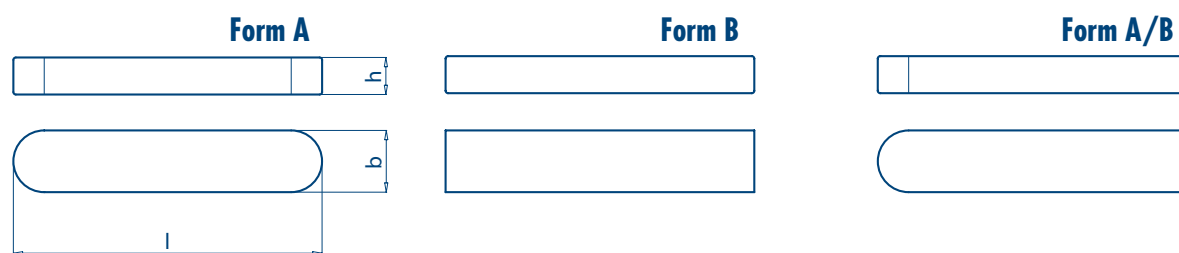
**Note:** the weight is referred to Form A (mass volume 7,85 kg/mm<sup>3</sup>)  
 Sizes in inches upon request Technical reading from page 83 to page 85

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## Feather keys standard lengths DIN 6885-UNI 6604 (ex ISO 773)



**FEATHER KEYS  
STAINLESS STEEL Version**

bxh (mm)	Length L (mm)																					
	feather keys length tolerance: up to 28 mm from 0 to -0,20 mm, over 28 up to 80 mm from 0 to -0,30 mm, over 80 mm from 0 to -0,50 mm																					
	keyway tolerance: up to 28 mm from +0,20 to 0 mm, over 28 up to 80 mm from +0,30 to 0, over 80 mm from +0,50 to 0 mm																					
3x3	8	10	12	14	15	16	18	20	22	25	28	30	32	35	36	40	45	50				
Kg/100 pcs	0,052	0,066	0,080	0,094	0,107	0,109	0,123	0,137	0,151	0,173	0,194	0,214	0,222	0,243	0,249	0,277	0,312	0,344				
4x4	10	12	14	15	16	18	20	22	25	28	30	32	35	36	40	45	50					
Kg/100 pcs	0,115	0,140	0,165	0,183	0,190	0,215	0,240	0,265	0,303	0,341	0,365	0,391	0,428	0,441	0,491	0,554	0,616					
5x5	10	12	14	15	16	18	20	22	25	28	30	32	35	36	40	45	50	55	60			
Kg/100 pcs	0,174	0,214	0,254	0,272	0,293	0,332	0,371	0,411	0,470	0,529	0,567	0,607	0,656	0,685	0,764	0,862	0,960	1,057	1,156			
6x6	10	12	14	15	16	18	20	22	25	28	30	32	35	36	40	45	50	55	60	70	80	85
Kg/100 pcs	0,255	0,307	0,358	0,390	0,416	0,473	0,520	0,586	0,671	0,755	0,801	0,868	0,959	0,984	1,094	1,234	1,374	1,516	1,654	1,944	2,221	2,360
8x7	15	20	22	25	28	30	32	35	36	40	45	50	55	60	70	80	90	100	110	140	160	
Kg/100 pcs	0,598	0,805	0,892	1,025	1,155	1,244	1,335	1,453	1,505	1,685	1,905	2,125	2,342	2,566	3,005	3,445	3,956	4,316	5,179	6,592	6,906	
10x8	20	22	25	28	30	32	35	36	40	45	50	55	56	60	65	70	80	90	100	110	120	
Kg/100 pcs	1,131	1,245	1,435	1,625	1,757	1,875	2,065	2,125	2,375	2,695	3,005	3,324	3,385	3,642	3,960	4,265	4,885	5,515	6,145	6,775	7,390	
12x8	25	28	30	32	35	36	40	45	50	55	60	65	70	80	90	100	110	130	140	150		
Kg/100 pcs	1,710	1,916	2,077	2,216	2,446	2,516	2,816	3,196	3,576	3,954	4,339	4,723	5,086	5,836	6,586	7,346	8,096	9,565	10,406	11,149		
14x9	35	36	40	45	50	55	60	70	80	90	100	110	120	130	140	150						
Kg/100 pcs	3,172	3,263	3,663	4,153	4,653	5,057	5,615	6,623	7,613	8,603	9,593	10,600	11,566	12,496	13,503	14,384						
16x10	40	45	50	55	60	70	80	90	100	110	120	130	140	150								
Kg/100 pcs	4,570	5,220	5,850	6,430	7,070	9,570	10,270	12,170	13,370	13,800	15,270	17,170	18,200	19,410								
18x11	50	55	60	70	80	90	100	110	120	130	140	150										
Kg/100 pcs	7,170	7,880	8,650	10,300	11,800	13,400	14,900	16,500	17,800	19,500	21,200	22,400										
20x12	50	60	70	80	90	100	110	120	130	140	150											
Kg/100 pcs	8,500	10,300	12,390	14,290	16,190	17,990	19,890	21,500	23,200	25,590	26,900											

**Note:** the weight is referred to Form A (mass volume 7,85 kg/mm<sup>3</sup>)

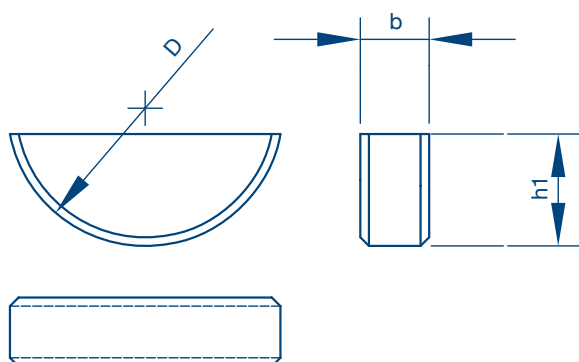
Sizes in inches upon request

Technical reading from page 83 to page 85

### MATERIAL

Stainless steel (1.4401 - AISI 316) with R<sub>z</sub> 59 daN/mm<sup>2</sup>

## Dimensional tolerances for woodruff keys according to ISO 3912-DIN 6888- UNI 6606 standards



Dimensions mm

Shaft diameter d				standard keys b x h x D or equivalent form	key								
torque transmission		for positioning			Base b		height h <sub>1</sub>		Diameter D		chamfer/radius		
≥	≤	≥	≤		nom.	tol. h <sub>9</sub>	nom.	Tol. h <sub>11</sub>	nom.	tol. h <sub>12</sub>	min.	max.	
3	4	3	4	1,0x1,4x 4	1,0	0 -0,025	1,4	0 -0,060	4	0 -0,120	0,16	0,25	
4	5	4	6	1,5x2,6x7	1,5		2,6		7	0 -0,150			
5	6	6	8	2x2,6x7	2,0		3,7	0 -0,075	10				0 -0,180
6	7	8	10	2x3,7x10	2,5				5,0	13			
7	8	10	12	2,5x3,7x10	3,0		6,5	16					
8	10	12	15	3x5x13	4,0	0 -0,030	7,5	0 -0,090	19	0 -0,210	0,25	0,40	
10	12	15	18	3x6,5x16					6,5				16
12	14	18	20	4x6,5x16					7,5				19
14	16	20	22	4x7,5x19	5,0		6,5	16					
16	18	22	25	5x6,5x16			7,5	19					
18	20	25	28	5x7,5x19	6,0	9,0	22						
20	22	28	32	5x9,0x22		10,0	25						
22	25	32	36	6x9,0x22	8,0	11,0	0 -0,110	28	0 -0,210	0,4	0,6		
25	28	36	40	6x10x25				10,0				25	
28	32	40	-	8x11x28	10,0	13,0	0 -0,036	32	0 -0,210	0,4	0,6		
32	38	-	-	10x13x32				10,0				13,0	32

For no standard dimension keys, the referred tolerances remain the same

### MATERIAL

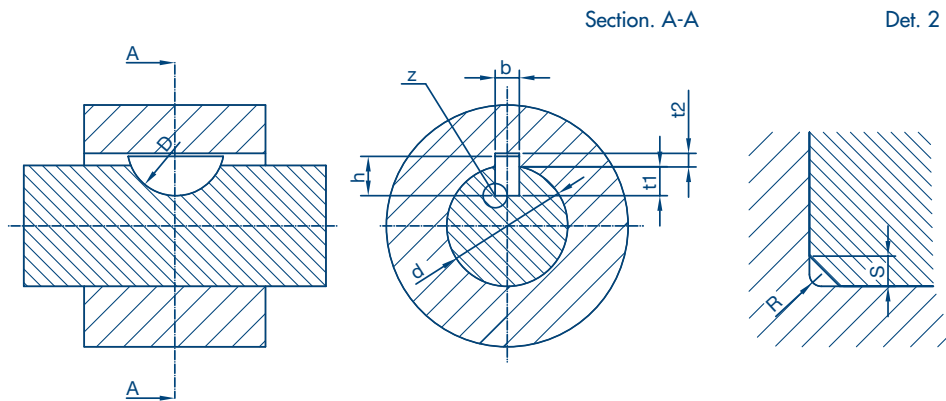
steel C45 (1.1191) with  $R_z \geq 59 \text{ daN/mm}^2$  cold drawn EN ISO 683-1 : 2018 norm

The relation between the shaft diameter and the key section, indicated in the dimensional tables, is referred to the standard use

It is possible to use smaller keys sections, if their resistance is enough for the torque to be transmitted

The use of keys with bigger sections is not recommended

# Dimensional tolerances of the keyway for the woodruff keys according to ISO 3912 DIN 6888 UNI 6606



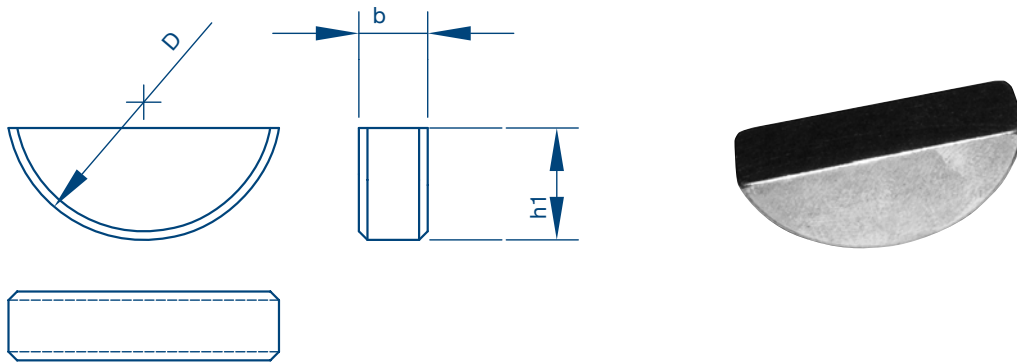
Dimensions mm

Shaft diameter d				standard keys b x h x D or equivalent	nom.	keyway								
transmiss. torque		For positioning				Base b			Depth				Radius R	
≥	≤	≥	≤			type of coupling			shaft		hub		max.	min.
						normal fit		close fit	t1		t2			
						shaft	hub	shaft/hub	nom.	tol.	nom.	tol.		
				Tol. N9	Tol. Js9	Tol. P9								
3	4	3	4	1,0x1,4x 4	1,0	-0,004 -0,029	±0,012	-0,006 -0,031	1	+0,1 0	0,6	0,16	0,08	
4	5	4	6	1,5x2,6x7	1,5				2		0,8			
5	6	6	8	2x2,6x7	2,0				1,8		1			
6	7	8	10	2x3,7x10					2,9		1,2			
7	8	10	12	2,5x3,7x10	2,5				2,7		1,2			
8	10	12	15	3x5x13	3,0				3,8		1,4			
10	12	15	18	3x6,5x16					5,3		1,4			+0,1 0
12	14	18	20	4x6,5x16	4,0	5	+0,2 0	1,8	0,25	0,16				
14	16	20	22	4x7,5x19		6		2,3						
16	18	22	25	5x6,5x16		5,0		4,5			2,3			
18	20	25	28	5x7,5x19				5,5			2,3			
20	22	28	32	5x9,0x22	6,0	7	+0,3 0	2,8	0,40	0,25				
22	25	32	36	6x9,0x22		6,5		2,8						
25	28	36	40	6x10x25		7,5		2,8						
28	32	40	-	8x11x28	8,0	0 -0,036	±0,018	-0,015 -0,051	8	+0,2 0	3,3	0,40	0,25	
32	38	-	-	10x13x32	10,0				8		3,3			

For no standard dimension keys, the tolerances remain the same



## WOODRUFF KEYS ISO 3912 - UNI 6606 - DIN 6888

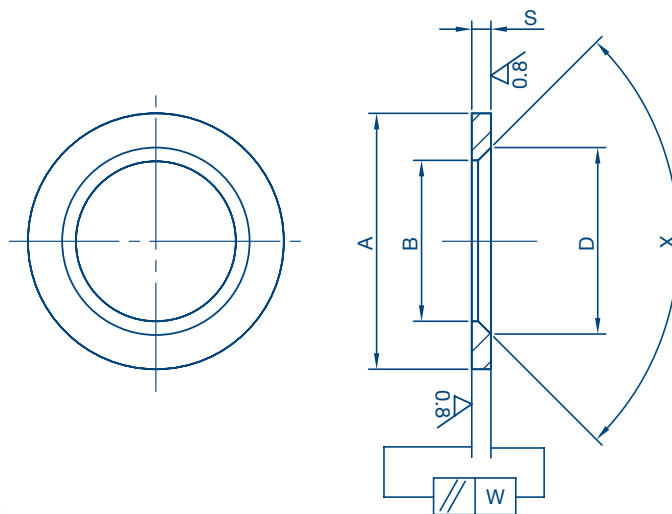


DESIGNATION	b	h1	L	D	weight
	h9	h11		h12	[kg/100 pcs]
KEY 1,5X2,6	1,5	2,6	6,76	7	0,012
KEY 2X2,6	2,0	2,6	6,76	7	0,017
KEY 2X3,7	2,0	3,7	9,66	10	0,034
KEY 2,5X3,7	2,5	3,7	9,66	10	0,047
KEY 3X3,7	3,0	3,7	9,66	10	0,060
KEY 2X5	2,0	5,0	12,65	13	0,070
KEY 3X5	3,0	5,0	12,65	13	0,108
KEY 4X5	4,0	5,0	12,65	13	0,141
KEY 3X6,5	3,0	6,5	15,72	16	0,171
KEY 4X6,5	4,0	6,5	15,72	16	0,231
KEY 5X6,5	5,0	6,5	15,72	16	0,290
KEY 3X7,5	3,0	7,5	18,57	19	0,234
KEY 4X7,5	4,0	7,5	18,57	19	0,308
KEY 5X7,5	5,0	7,5	18,57	19	0,397
KEY 4X9	4,0	9,0	21,63	22	0,442
KEY 5X9	5,0	9,0	21,63	22	0,556
KEY 6X9	6,0	9,0	21,63	22	0,556
KEY 5X10	5,0	10,0	24,49	25	0,704
KEY 6X10	6,0	10,0	24,49	25	0,837
KEY 6X11	6,0	11,0	27,35	28	1,390
KEY 8X11	8,0	11,0	27,35	28	1,850
KEY 6X13	6,0	13,0	31,42	32	1,400
KEY 8X13	8,0	13,0	31,42	32	1,420
KEY 8X15	8,0	15,0	37,15	38	2,500
KEY 8X16	8,0	16,0	43,08	45	3,100
KEY 10X16	10,0	16,0	43,08	45	4,120

**Note:** mass volume 7,85 kg/mm<sup>3</sup>

Technical reading from page 89 to page 90

## Shims



### MATERIAL

Hardening and tempering steel or casehardening steel

### THICKNESS

from 0,8 mm to 5,00 mm

### MACHINING

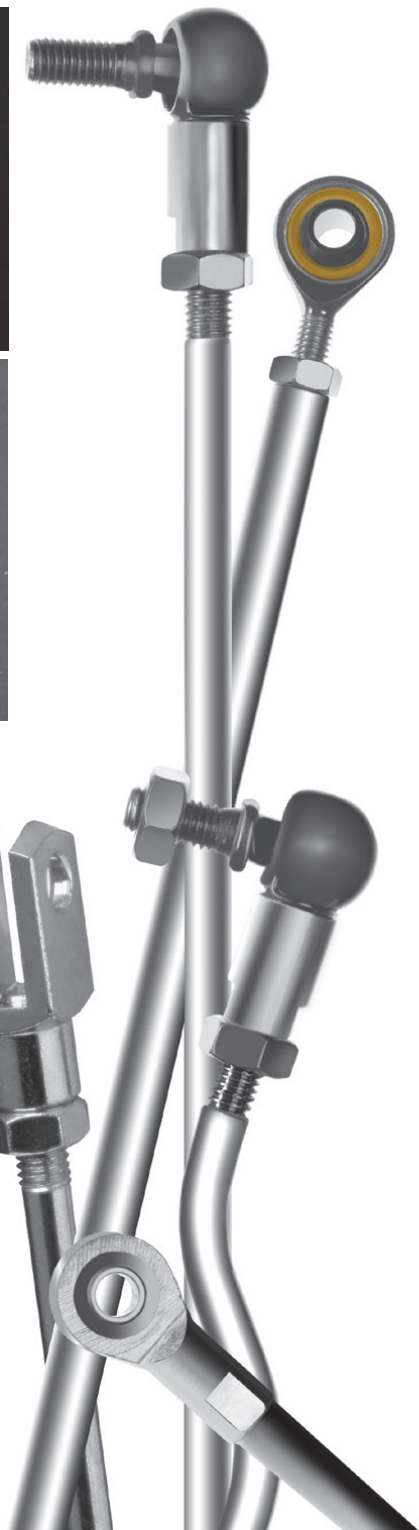
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Thickness tolerances up to  $\pm 0,01$ mm

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40069 Zola Predosa - Bologna - Italy - via Giacomo Brodolini, 6/8/10

Tel. +39 051 75.87.67 - Fax +39 051 75.47.80



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