



innovative
safety

**Lashing chain systems
and accessories**

History



pewag austria – An internationally renowned company from Styria, with production facilities in Graz, Kapfenberg and the Czech Republic can draw from a century of experience in the production of chains and chain components. Today, pewag's success is rooted in advanced, state-of-the-art, high-quality products that are exported to most countries throughout the world. The main focus of production is on chains for technical applications, tire protection chains and snow chains.

The management's philosophy is one of absolute quality; the management system that meets the requirements of ISO 9001 and 9002, is continuously improved and tailored to new challenges. Ongoing research and development of product and production technologies help to ensure our leading position on the world market.

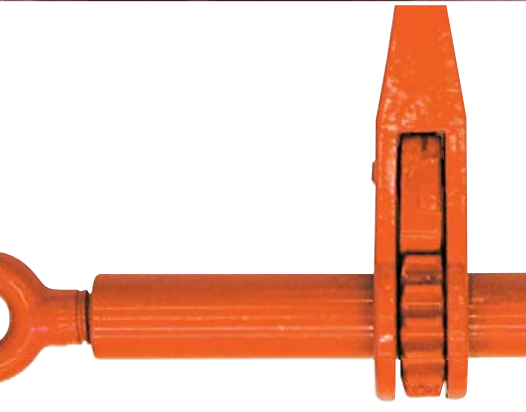
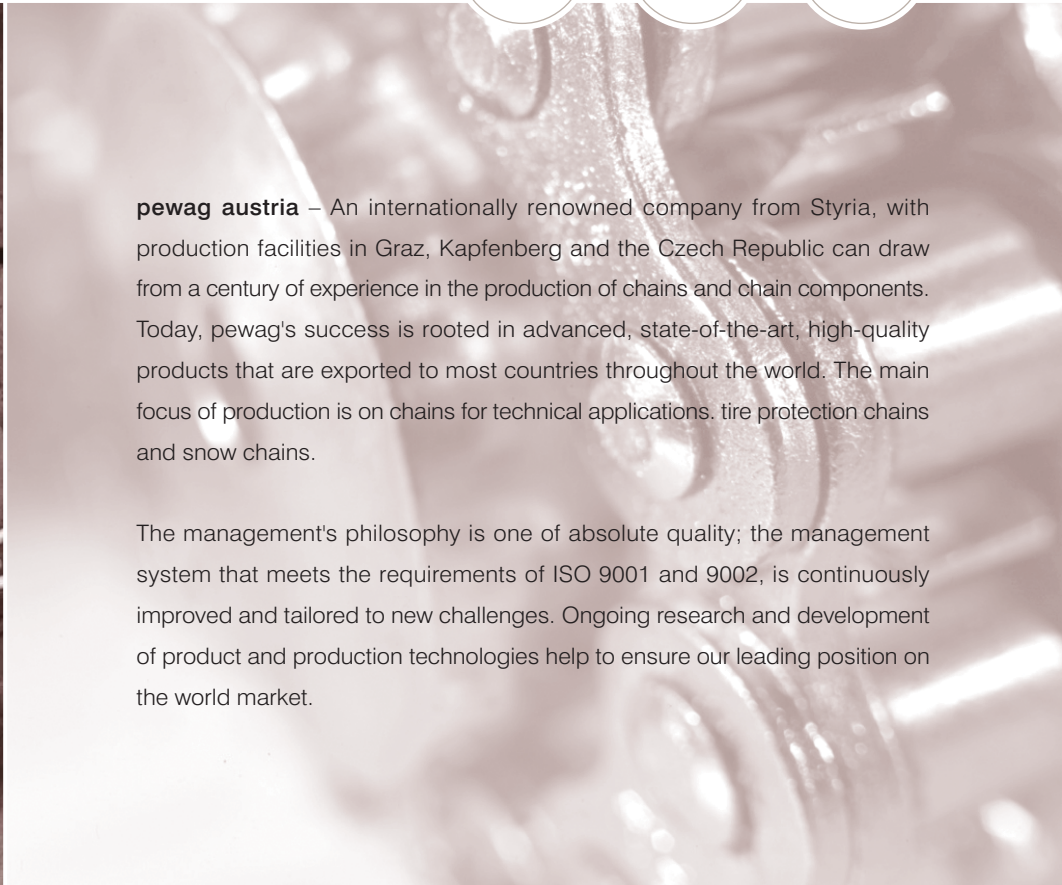


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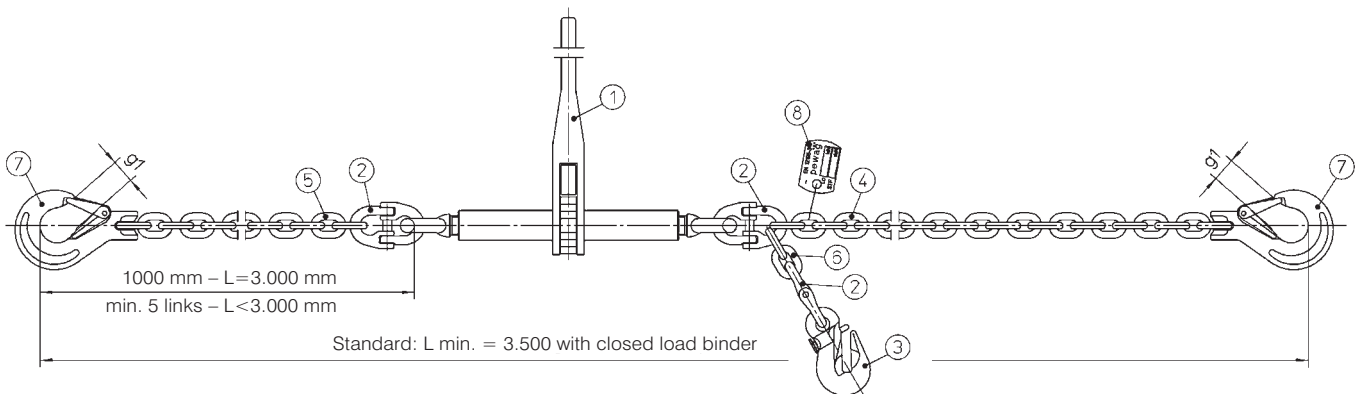
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Lashing chain systems in G10 quality

According EN 12195-3

ZRSW Lashing chain G10

- For load securing with 25% higher lashing capacity (LC) than conventional G8 lashing chains
- Kit system
- According EN 12195-3
- Standard length 3.500 mm
- Customised length available on short call
- Supplied with ID-tag according EN 12195-3 with G10 values



- 1 Load binder RSW
- 2 Connex connecting link CW
- 3 Grab hook with safety catch PSW
- 4-6 Chain WIN 400
- 7 Clevis sling hook KHSW
- 8 Identification tag

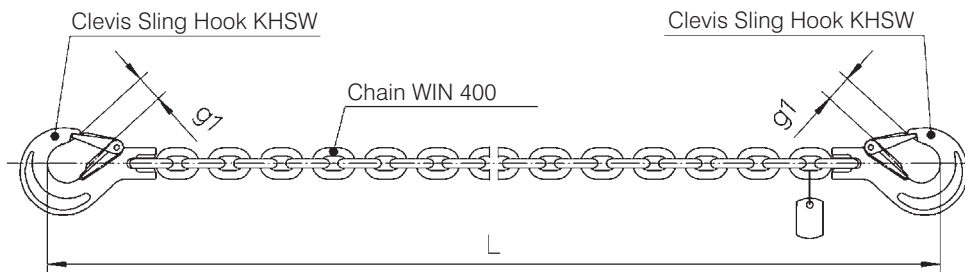
Type	LC Lashing capacity [kN]	Length RSW closed position [mm]	Length RSW open position [mm]	Tensioning Length [mm]	STF – standard tension force [daN]	Opening g1 [mm]	Weight kg/pc. approx.
ZRSW 7 400 / KHSW/KHSW 3500	38	365	540	175	-	26	8,4
ZRSW 8 400 / KHSW/KHSW 3500	50	360	505	145	-	26	9,7
ZRSW 10 400 / KHSW/KHSW 3500	80	370	515	145	3.150	31	14,5
ZRSW 13 400 / KHSW/KHSW 3500	134	613	913	300	4.800	39	26,1
ZRSW 16 400 / KHSW/KHSW 3500*	200	530	780	250	4.000	45	37,7

* Size 16 only with clevis turnbuckle KSSW 16 available

Please find further information regarding selection and dimensioning on page 13.

ZKW Lashing chain G10 as two part system

- Usable with separate loadbinder in G10 quality – Advantage: the load binder can be attached to the chain in any position
- For load securing with 25% higher lashing capacity (LC) than conventional G8 lashing chains
- Kit system
- According EN 12195-3
- Standard length 3.500 mm
- Customised length available on short call
- Supplied with ID-tag according EN 12195-3 with G10 values

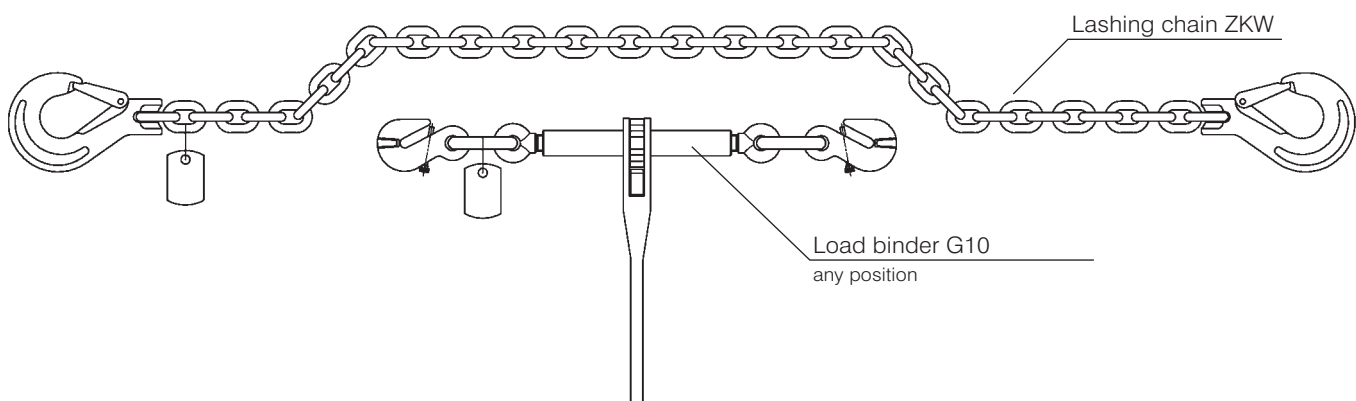


Type	LC Lashing capacity [kN]	L [mm]	g1 [mm]	Weight kg/pc. approx.
ZKW 7 400 I KHSW-KHSW 3500	38	3.500	26	5,17
ZKW 8 400 I KHSW-KHSW 3500	50	3.500	26	6,4
ZKW 10 400 I KHSW-KHSW 3500	80	3.500	31	10,27
ZKW 13 400 I KHSW-KHSW 3500	134	3.500	39	17,49

Please note: Identification tag only marked with G10 values when you order exactly according to column data.

Upon request we can supply the lashing chain system with G8 values. If it will be used with a G8 load binder. In this case please order type ZK from page 10.

Basic application principle of a two part Lashing chain system in G10

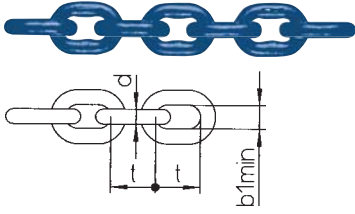


Please find further information regarding selection and dimensioning on page 13.

Round steel chains and accessories in G10 quality

- 25% higher lashing capacity (LC) than conventional G8 Lashing Chains.
- An easy and fast assembly of the lashing chains with the help of clevis parts or connex connecting links by a competent person is possible.

Chain Winner 400

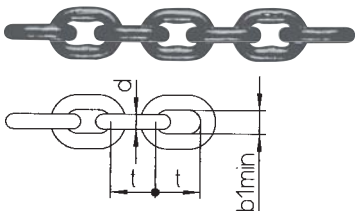


Code	Nominal diameter d	Standard delivery length [m]	Pitch t	Inside Width b1 min.	Outside Width b2 max.	Lashing capacity [kN]	Breaking force [kN]	Weight kg/m
WIN 7 400	7	50	21	9,5	25,2	38	77	1,2
WIN 8 400	8	50	24	10,9	28,8	50	100	1,57
WIN 10 400	10	50	30	13,5	36	80	157	2,46
WIN 13 400	13	50	39	17,5	46,8	134	266	4,18
WIN 16 400	16	25	48	21,5	57,6	200	402	6,28

Please find more detailed information about Winner 400 chains in our lifting catalogue.

Winner 400 – meets the requirements of EN 818-2 with higher load capacity, and those of the 98/37/EC Machinery Directive

Chain Winner 200

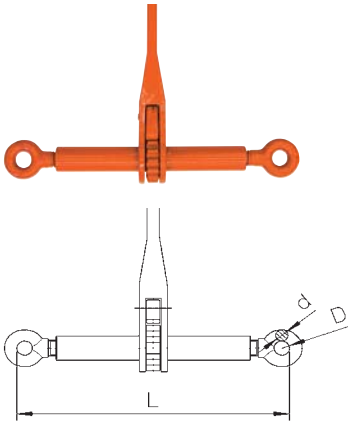


Code	Nominal diameter d	Standard delivery length [m]	Pitch t	Inside Width b1 min.	Outside Width b2 max.	Lashing capacity [kN]	Breaking force [kN]	Weight kg/m
WIN 7 200	7	300/50	21	9,5	25,2	38	77	1,2
WIN 8 200	8	250/50	24	10,9	28,8	50	100	1,57
WIN 10 200	10	150/50	30	13,5	36,0	80	157	2,46
WIN 13 200	13	80/50	39	17,5	46,8	134	266	4,18
WIN 16 200	16	50/25	48	21,5	57,6	200	402	6,28

Please find more detailed information about Winner 200 chains in our lifting catalogue.

Winner 200 – meets the requirements of ASTM A973/A973M-01 and of EN 818-2 but with higher load capacity (however admissible operating temperature of 200°C max.) and 98/37/EC Machinery Directive

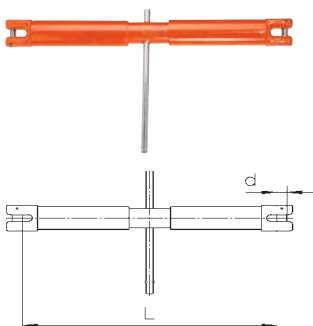
Load binder RSW for lashing chains



Type	LC Lashing capacity [kN]	STF – Standard tension force [daN]	Length RSW closed [mm]	Length RSW open [mm]	Tensioning Length [mm]	D [mm]	d [mm]	Weight kg/pc.
RSW 7	38	-	365	540	175	20	17	3,5
RSW 8	50	-	360	505	145	22	16	3,5
RSW 10	80	3.150	370	515	145	24	20	3,9
RSW 13*	134	4.800	613	913	300	31	22	9

* Loadbinder also usable for a 16 mm G8 chain. Please consider that for this application the correct lashing capacity LC = 160 kN.

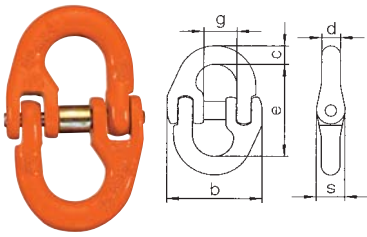
Clevis turnbuckle KSSW for lashing chains



Type	LC Lashing capacity [kN]	STF – Standard tension force [daN]	Length KSSW closed [mm]	Length KSSW open [mm]	Tensioning Length [mm]	d [mm]	Weight kg/pc.
KSSW 16	200	4.000	520	770	250	20	10

Please find further information regarding selection and dimensioning on page 13.

CW connex connecting link



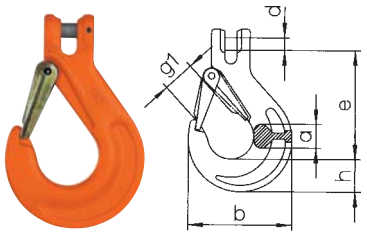
Load pin and bush CBH are also available separately.

Connecting link for:
Load binder – chain
Master link – chain
Chain – chain
Hook – chain

Type	LC Lashing capacity [kN]	e mm	c mm	s mm	d mm	b mm	g mm	Weight kg/pc.
CW 7	38	51	10	12,9	9	46,5	16,3	0,12
CW 8	50	61,5	11,5	15	10	53	18,35	0,18
CW 10	80	72	12,6	17,8	12,6	63	23	0,33
CW 13	134	88	19	22	16,7	79	27,6	0,7
CW 16	200	103	21	29	21	106	33	1,14

Assembly:

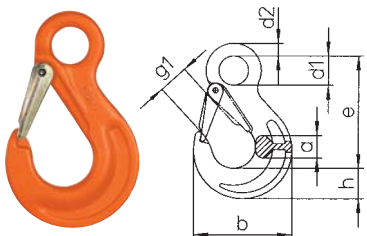
KHSW clevis sling hook



General purpose hook, can be used without transition link and without connecting link.
With forged safety catch.

Type	LC Lashing capacity [kN]	e mm	h mm	a mm	d mm	g1 mm	b mm	Weight kg/pc.
KHSW 7	38	95	28	19	9	26	90	0,6
KHSW 8	50	94,5	28	19	10	26	90	0,6
KHSW 10	80	109	34,5	25	12,5	31	108	1,1
KHSW 13	134	136	41	34	16	39	131	2
KHSW 16	200	155	49	37	20	45	153	3,48

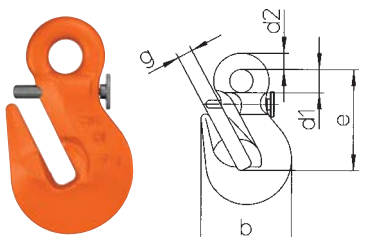
HSW eye sling hook



To be connected to the chain with connex connecting link CW. All hooks with forged safety catch.
Safety catch set also available as spare part.

Type	LC Lashing capacity [kN]	e mm	h mm	a mm	d1 mm	d2 mm	g1 mm	b mm	Weight kg/pc.
HSW 7-8	50	106	27	19	25	11	26	88	0,5
HSW 10	80	131	33	26	34	16	31	108,5	1,1
HSW 13	134	164	43,5	33	43	19	39	133,7	2
HSW 16	200	182,5	50	40	50	24,5	45	154,6	3,5

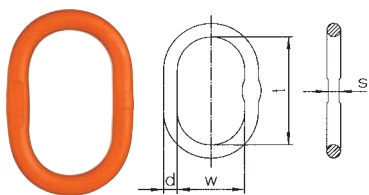
PSW grab hook with safety catch



Shortening hook, protects against accidental release of the chain.
Safety catch set also available as spare part.

Type	LC Lashing capacity [kN]	e mm	b mm	d1 mm	d2 mm	g mm	Weight kg/pc.
PSW 7-8	50	70,5	58	20	11,5	10,5	0,4
PSW 10	80	88	76	22	15	13	0,9
PSW 13	134	113	101	26	18	17	1,8
PSW 16	200	129	118	32	23	19	3,6

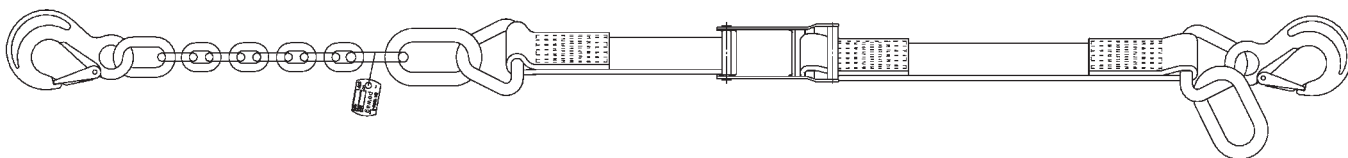
A8W master link



Type	for chain-Ø	LC Lashing capacity [kN]	d mm	t mm	w mm	s mm	Weight kg/pc.
A8W 13	7	46	13	110	60	10	0,34
A8W 16	8	70	16	110	60	14	0,53
A8W 18	10	100	18	135	75	14	0,86
A8W 22	13	152	23	160	90	17	1,6
A8W 26	16	200	27	180	100	20	2,46

Combination of lashing chain and lashing straps

Lashing chains can be combined with lashing straps. This combination unites the advantages of both. Easy shortening of the straps with a ratchet and use of the resistant chain in the loading region. For the chain-end attachment there are a large number of accessories available from the Winner programme.



Type	Winner Chain	LC Lashing capacity [kN]
ZG 60 Z	WIN 5	15
ZG 80 Z	WIN 5	20
ZG 100 Z	WIN 6	25
ZG 200 Z	WIN 8	50

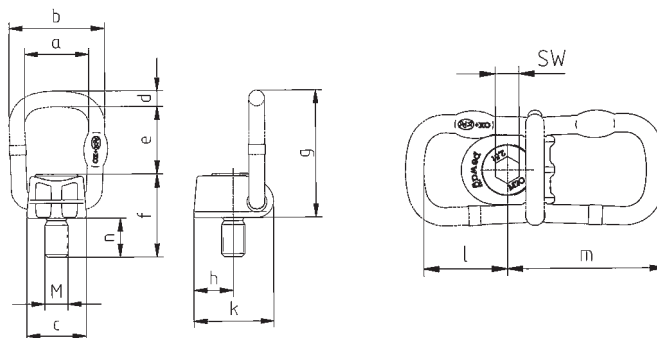
Data required for an inquiry:

- Length of chain and straps
- Required lashing capacity
- Type of attachment, hook, shackle, etc.
- Sketch if possible

PLAW profilift alpha



Lashing point rotates and foldable with special captive screw – metric thread and interchangeable clamping spring.



Type	LC Lashing capacity [kN]	M	n	a	b	c	d	e	f	g	h	k	l	m	SW	Weight kg/pc.	Tightening torque [Nm]
PLAW 0,63	12,6	10	33	54	81	50	13	57	70	107,5	33	67	60	113,5	17	0,93	40
PLAW 1,5	30	16	33	54	81	50	13	57	70	107,5	33	67	60	113,5	17	0,97	160
PLAW 2,5	50	20	33	54	81	50	13	57	70	107,5	33	67	60	113,5	17	1	300

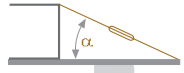
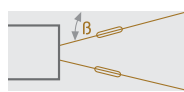
Please find further information regarding selection and dimensioning on page 13.

pewag G10 lashing table for the load restrained during road transport

Direct lashing

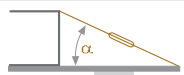
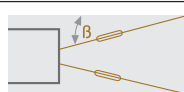
ZRSW 7 with RSW 7 load binder

marking of the load binder: pewag LC 40kN

Angle	Max. load [daN ~ kg]		Dynamic friction factor						
	α	β	0,01	0,1	0,2	0,3	0,4	0,5	0,6
Angle α side view 	15-35	21-30				13.350	17.800	24.450	37.650
		31-40	6.050	7.400	9.400	12.150	16.000	22.000	34.000
		41-50	5.100	6.300	8.100	10.600	13.750	19.000	29.450
		51-60	3.950	5.050	6.600	8.500	11.100	15.500	24.250
Angle β plan view 	36-50	21-30			8.950	11.950	16.350	23.800	38.600
		31-40	4.800	6.150	8.150	10.950	15.150	22.150	36.150
		41-50	4.000	5.300	7.150	9.750	13.650	20.150	33.150
		51-60		4.300	6.000	8.350	11.900	17.650	28.750

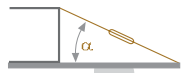
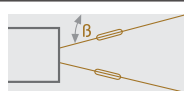
ZRSW 8 with RSW 8 load binder

marking of the load binder: pewag LC 63kN

Angle	Max. load [daN ~ kg]		Dynamic friction factor						
	α	β	0,01	0,1	0,2	0,3	0,4	0,5	0,6
Angle α side view 	15-35	21-30				17.600	23.450	32.150	49.550
		31-40	8.000	9.750	12.350	15.950	21.050	28.950	44.750
		41-50	6.700	8.300	10.650	13.950	18.100	25.000	38.800
		51-60	5.250	6.650	8.700	11.200	14.650	20.400	31.900
Angle β plan view 	36-50	21-30			11.800	15.700	21.550	31.300	50.800
		31-40	6.300	8.100	10.750	14.400	19.950	29.150	47.600
		41-50	5.300	6.950	9.400	12.850	17.950	26.500	43.600
		51-60		5.650	7.900	11.000	15.650	23.250	37.850

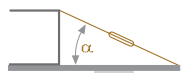
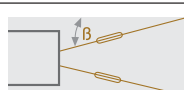
ZRSW 10 with RSW 10 load binder

marking of the load binder: pewag LC 100kN

Angle	Max. load [daN ~ kg]		Dynamic friction factor						
	α	β	0,01	0,1	0,2	0,3	0,4	0,5	0,6
Angle α side view 	15-35	21-30				28.200	37.550	51.500	79.300
		31-40	12.800	15.650	19.750	25.550	33.700	46.350	71.600
		41-50	10.750	13.300	17.100	22.350	28.950	40.000	62.050
		51-60	8.400	10.650	13.950	17.900	23.450	32.650	51.050
Angle β plan view 	36-50	21-30			18.900	25.150	34.500	50.100	81.300
		31-40	10.100	13.000	17.200	23.100	31.950	46.650	76.150
		41-50	8.500	11.150	15.100	20.550	28.750	42.450	69.800
		51-60		9.050	12.650	17.600	25.100	37.200	60.550

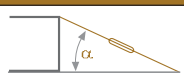
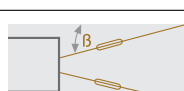
ZRSW 13 with RSW 13 load binder

marking of the load binder: pewag LC 160kN

Angle	Max. load [daN ~ kg]		Dynamic friction factor						
	α	β	0,01	0,1	0,2	0,3	0,4	0,5	0,6
Angle α side view 	15-35	21-30				47.200	62.900	86.250	132.900
		31-40	21.450	26.200	33.150	42.850	56.500	77.650	119.950
		41-50	18.050	22.350	28.600	37.400	48.500	67.000	104.000
		51-60	14.050	17.850	23.400	30.000	39.250	54.700	85.500
Angle β plan view 	36-50	21-30			31.700	42.150	57.800	83.900	136.150
		31-40	16.950	21.750	28.800	38.700	53.500	78.200	127.550
		41-50	14.250	18.750	25.250	34.450	48.200	71.100	116.900
		51-60		15.200	21.150	29.500	42.050	62.350	101.450

ZKSW 16 with KSSW 16 clevis turn buckle

marking of the clevis turn buckle: 16-8W

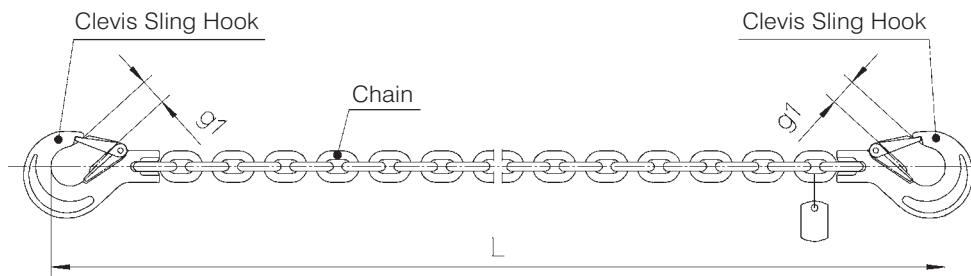
Angle	Max. load [daN ~ kg]		Dynamic friction factor						
	α	β	0,01	0,1	0,2	0,3	0,4	0,5	0,6
Angle α side view 	15-35	21-30				70.500	93.850	128.750	198.350
		31-40	32.050	39.100	49.450	63.950	84.300	115.900	179.000
		41-50	26.950	33.350	42.750	55.850	72.400	100.000	155.200
		51-60	21.000	26.650	34.950	44.800	58.600	81.600	127.650
Angle β plan view 	36-50	21-30			47.300	62.900	86.300	125.250	203.250
		31-40	25.300	32.500	43.000	57.750	79.850	116.700	190.400
		41-50	21.300	27.950	37.750	51.400	71.950	106.150	174.500
		51-60		22.700	31.600	44.050	62.750	93.100	151.400

Lashing chain systems in G8 quality

According EN 12195-3

Lashing chain ZK G8 as two part system

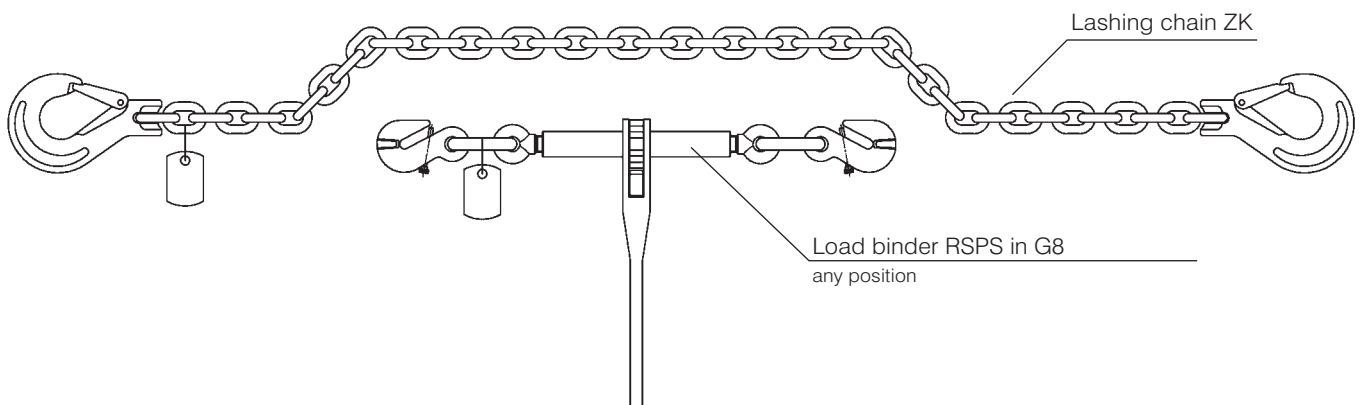
- Usable with separate loadbinder in G8 quality
- Advantage: the load binder can be assembled in any position
- Kit system
- According EN 12195-3
- Standard length 3.500 mm
- Customised length available on short call
- Supplied with ID-tag according EN 12195-3 with G8 values



Type	LC Lashing capacity [kN]	L [mm]	g1 [mm]	Weight kg/pc.
ZK 8 KHS-KHS 3500	40	3.500	26	6,4
ZK 10 KHS-KHS 3500	63	3.500	31	10,27
ZK 13 KHS-KHS 3500	100	3.500	39	17,49

Please consider: Identification tag only marked with G8 values when you order exactly according to the column data.

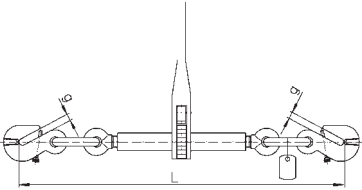
Basic application principle of a two part Lashing system in G8



Please find further information regarding selection and dimensioning on page 13.

RSP-S load binder for lashing chains

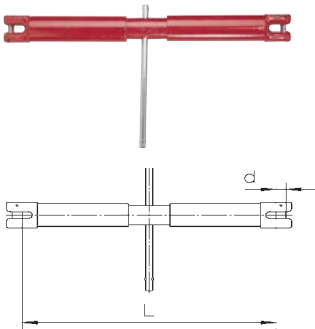
- Usable with Lashing chain ZK G8 in a two part system
- Advantage: the load binder can be assembled in any position
- Supplied with ID-tag according to EN 12195-3 with G8 values



Type	LC Lashing capacity [kN]	STF – Standard tension force [daN]	Length RSP-S closed [mm]	Length RSP-S open [mm]	Tensioning Length [mm]	Opening g [mm]	Weight kg/pc.
RSPS 8	40	-	585	760	175	12,5	4
RSPS 10	63	2.700	635	780	145	15	4,2
RSPS 13	100	3.150	685	830	145	20	8,7
RS 16*	160	4.800	613	913	300	-	9

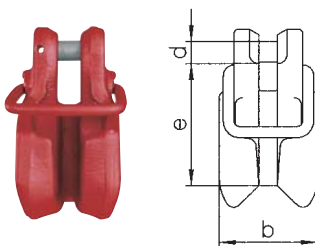
* only available without hooks and transition links

KSS clevis turnbuckle for lashing chains



Type	LC Lashing capacity [kN]	Tensioning Length	L min.	L max.	d mm	Weight kg/pc.
KSS 7	30	90	230	320	8	2,9
KSS 8	40	120	330	450	10	3,2
KSS 10	63	215	455	670	12	3,9
KSS 13	100	280	515	795	16	6,5

KVS clevis connector



Type	LC Lashing capacity [kN]	e mm	b mm	d mm	Weight kg/pc.
KVS 7	30	58	44	9	0,50
KVS 8	40	58	44	10	0,50
KVS 10	63	70	55	12,5	0,80
KVS 13	100	90	70	16	1,53



Warning instruction:

- Only load inside chain
- Only using with safety device
- Make sure that the chain fits properly

■ Marking and documentation

Lashing chain systems in compliance with EN 12195-3 will be supplied with:


- Identification-tag
- Manufacturers certificate
- Verification document
- Information for use

Marking:



- Manufacturer
- Traceability no.
- Warning
- Lashing capacity (LC) in kN – for direct lashing method
- EN-standard
- Dimension of the lashing chain system
- Quality grade from pewag
- Standard tension force (STF) in daN – for frictional lashing method
- Chain dimension

Manufacturers certificate:



manufacturer certification

Customer Muster Max	Specifications according to EN 12195-3
	Certificate No.:
	Comm. No.:
Order-No.:	Sling No.:

Technical specifications of the chain sling:

Norm-Designation:

Additional information:

Individual parts	Nominal diameter d [mm]	Quality

Pieces	Length [m]	Lashing capacity [kN]	Standard tension force [daN]
	3,5		

Result of test	Kapfenberg, the	Quality department	This certificate was generated by computer and is valid without a signature.
WITHOUT ANY OBJECTION	25.04.2006	I.A. Ing. Kurt Gaber (acceptance representative)	

This test certificate must be kept for ten years resp. during the entire service life.

Verification document / Information for use:

verification document / file for lashing systems

Lashing systems must be inspected on a regular basis – at least once a year – by a competent person. Load tests with visual inspections are recommended every 2 years. You have to keep records for both inspections and keep them filed during service. In addition visual inspections according to the operating conditions and circumstances are recommended. Records are not necessary.

date	comments	signature
	inspection before use	

manual for pewag lashing systems

pewag lashing systems are developed only for securing loads during transportation. The classification of the lashing capacity is valid for normal transportation. In case of dangerous conditions (e.g. securing of dangerous goods like liquid metals, acidic substances or nuclear materials) the competent persons needs to estimate the risk of danger and adapt the permissible lashing capacity.

It is not allowed to change the delivery condition – e.g. through bending, burnishing, cutting off parts, affixing drillings etc. Do not heat up the lashing systems above the determined temperatures or expose them to chemical mediums or its vapours.

pewag lashing systems must be stored in a cleaned and dried shape and also protected against corrosion, e.g. slightly oiled.

pewag lashing systems must be tested for visible damage or incorrect abrasion. In case of doubt and damage don't use the lashing system and have it checked by a competent person – e.g.:

- notches, grooves, cracks, breakage of parts
- missing or illegible marking on the tags, missing securing
- deformation of components (e.g. drifting of the mouth of the hook), twisted or distorted links
- immoderate corrosion, discolouring through heat, signs of belated welding
- immobility of connecting links or other malfunction:
 - major wear
 - improper repair (e.g. knots or chains combined with screws)

Service on pewag systems only by a competent person and with records.

Number of lashing systems calculated after EN 12195-1 – use of at least 2 lashing systems.

On selection of lashing system consider necessary lashing, the load that needs to be secured as the permissible lashing capacity and transportation (utilises, lashing points...)

Before lashing, plan the lashing and the opening of the lashing system. During a long trip consider possible partial removals.

Only use lashing chains up to the permissible lashing capacity according to the ID-tag.

Don't put the lashing systems over edges without necessary precautions (edge protection, intermediate layers and/or reduction of the lashing capacity up to 50 %).

Maximum temperature of use without reduction 200 °C.

The connecting links of the lashing system (hooks, rings) must be moveable in the lashing point and adjustable in the tensile direction. Bending stress on the accessories and loading the tip of the hook are impermissible. Hooks must be loaded at the bottom.

The maximum hand force of 50 daN for tightening the tensioner should only be applied manually. Use of mechanical utilities i.e. rods or levers is forbidden.

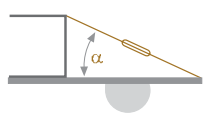
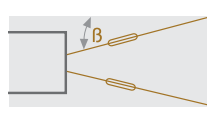
During transportation check the tension of the lashing system.

Before opening the lashing system make sure that the load is safe also without securing and the people who unload are not in danger through goods that are coming off or toppling down.

pewag direct lashing table

- This table will enable you to calculate the maximum loading and select the correct lashing assembly to suit a given load. Please note that additional securing devices have not been taken into account in these calculations.
- Each lashing assembly has its own table.
- The calculations for the table are in accordance with EN 12195-1 and take into account the maximum forces generated by acceleration, braking and change of direction.

This table shows the maximum loading when using 4 lashing chain assemblies ZRSW 8.

Angle α side view	Max. Load [daN ~ kg]		Dynamic friction factor						
	α	β	0,01	0,1	0,2	0,3	0,4	0,5	0,6
	15-35	21-30				17.600	23.450	32.150	49.550
		31-40	8.000	9.750	12.350	15.950	21.050	28.950	44.750
		41-50	6.700	8.300	10.650	13.950	18.100	25.000	38.800
		51-60	5.250	6.650	8.700	11.200	14.650	20.400	31.900
	36-50	21-30			11.800	15.700	21.550	31.300	50.800
		31-40	6.300	8.100	10.750	14.400	19.950	29.150	47.600
		41-50	5.300	6.950	9.400	12.850	17.950	26.500	43.600
		51-60		5.650	7.900	11.000	15.650	23.250	37.850

α vertical angle between lashing and loading area of a load carrier

β longitudinal angle between lashing and longitudinal axis (x-axis) of a load carrier in the plane of the loading area.



How to use the pewag lashing table

First method:

- Determine the dynamic friction factor – please look on page 14.
- Please verify with help of the table if the loading weight with the chosen lashing system at the determined friction factor can be secured. If not please choose a different Lashing system or increase the friction.
- Please verify if the Lashing equipment with the specified angles can be attached. All those angles are possible where the tabular value “Maximum loading” is higher than the real Load.

Example: Lashing = ZRSW 8; Load = steel part; 10 tons; loading area = steel

The dynamic friction factor is 0,2. As shown in the table more combinations of angles with this dynamic friction factor can secure the load of 10 tons with help of a ZRSW 8. Please check now if the Lashing chain can be attached with the recommended angles. Attention: As shown in the table the ZRSW cannot secure the load if the dynamic friction factor is lower. Please make sure that the load and the loading area is clean on the contact surface. Soil can reduce the friction.

Second method:

- Determine the dynamic friction factor – please look on page 14.
- Determine the possible angles for securing the load on the carrier.
- Check with help of the table if with the determined dynamic friction factor and angles the load can be secured safely. If not please choose a stronger lashing system.

Example: Lashing = ZRSW 8, Load = steel part, 10 tons, loading area = steel, two lashing points with possible angles, Lashing point 1 alpha = 31°, beta = 56°, Lashing point 2: alpha = 21°, beta = 31°.

The dynamic friction factor is 0,2. At the angles from Lashing point 1 the maximum loading weight is 8.700 daN. This lashing point is not allowed to be used with a ZRSW 8. At lashing point 2 the max. loading weight is 12.350 daN. This lashing point can be used. Attention: Please make sure that the Lashing point capacity is high enough!

Friction factors

According annex of EN 12195-1

Dynamic friction factors of some usual goods

Combination of materials in the contact surface	Friction factor μ_D
Sawn wood	
Sawn wood against fabric base laminate/plywood	0,35
Sawn wood against grooved aluminium	0,3
Sawn wood against steel sheets	0,3
Sawn wood against crimped foils	0,2
Crimped foils	
Crimped foils against fabric base laminate/plywood	0,3
Crimped foils against grooved aluminium	0,3
Crimped foils against steel sheets	0,3
Crimped foils against crimped foils	0,3
Cardboard boxes	
Cardboard box against cardboard box	0,35
Cardboard box against wood pallet	0,35
Large bags	
Large bags against wood pallet	0,3
Steel and metal sheets	
Oiled metal sheets against oiled metal sheets	0,1
Flat steel bars against sawn wood	0,35
Unpainted rough steel sheets against sawn wood	0,35
Painted rough steel sheets against sawn wood	0,35
Unpainted rough steel sheets against unpainted rough steel sheets	0,3
Painted rough steel sheets against painted rough steel sheets	0,2
Painted steel barrel against painted steel barrel	0,15
Concrete	
Wall on wall without intermediate layer (concrete/concrete)	0,5
Finished part with wooden intermediate layer on wood (concrete/wood/wood)	0,4
Ceiling on ceiling without intermediate layer (concrete/lattice girder)	0,6
Steel frame with wooden intermediate layer (steel/wood)	0,4
Ceiling on steel frame with wooden intermediate layer (concrete/wood/steel)	0,45
Paletts	
Resin bonded plywood, smooth – Europallet (wood)	0,2
Resin bonded plywood, smooth – box pallet (steel)	0,25
Resin bonded plywood, smooth – plastic pallet (PP)	0,2
Resin bonded plywood, smooth – wooden pressboard pallets	0,15
Resin bonded plywood, sleeve structure – Europallet (wood)	0,25
Resin bonded plywood, sleeve structure – box pallet (steel)	0,25
Resin bonded plywood, sleeve structure – plastic pallet (PP)	0,25
Resin bonded plywood, sleeve structure – wooden pressboard pallets	0,2
Aluminium beams in the load-carrying platform (punched bars) – Europallet (wood)	0,25
Aluminium beams in the load-carrying platform (punched bars) – box pallet (steel)	0,35
Aluminium beams in the load-carrying platform (punched bars) – plastic pallet (PP)	0,25
Aluminium beams in the load-carrying platform (punched bars) – wooden pressboard pallets	0,2

- Friction factor according EN 12195-1
- Values are valid for clean surfaces and optimal conditions
- Please consider that soiling, ice and moisture reduce the friction factor. Please also consider that this can happen during the transport depending on the season.
- Please choose only such values that you can rely on. In case of doubt take the lower value. This is for your own safety.

Information for use, storage and maintenance of pewag lashing chain systems

1. General

pewag lashing chain systems have been developed for securing loads during transport. Lashing chain systems should be used only by trained personnel. If properly used, pewag lashing chain systems have a long service life and offer a high level of safety. Personal injury and damage to property could result from improper use. It is therefore highly important that you read and understand this user information and act in a responsible and forward-thinking manner when using lashing equipment.

We offer tools in accordance with the selection and proper usage of the lashing chain systems. Sufficient experience about load securing and use of lashing equipment is necessary.

pewag offers chains and accessories for self assembly of lashing chain systems. Please ensure that the specifier has sufficient experience regarding the selection and assembling of the individual parts. Only competent persons in accordance to EN 12195-1 and 2 are allowed to assemble and use pewag lashing chain systems.

2. Limitation on use

When assembling or repairing pewag lashing chain systems use only pewag supplied original parts (e.g. bolts, safety pins, screws, etc.).

Single parts and complete lashing chain systems must not be modified – e.g. bending, grinding, separating individual parts, drilling, etc.. Avoid heating of the chains to more than 400°C (Winner 400) or 200°C (Winner 200). Do not remove any safety components, such as latches, safety pins, safety catches, etc.

Do not apply any surface coatings to pewag lashing chain systems, i.e. do not subject them to hot galvanising or electrogalvanising. Dipping or removing the coating with chemicals is also dangerous and must be approved by pewag. If required please contact our technical department who will be pleased to provide information.

3. Storage

pewag lashing chain systems should be stored in a clean and dried condition and protected from corrosion, e.g. lightly lubricated.

4. Inspection and tests

Before using any lashing equipment for the first time, it should be ensured that:

- the lashing chain system corresponds exactly to the order;
- the inspection certificate or certificate of conformity has been supplied
- Marking and lashing capacity stated on the ID-tag of the lashing chain system correspond to the information given on the manufacturers certificate
- A file card for the lashing chain system exists (e.g. see back of manufacturer certification)
- Instructions for the proper use of lashing chain system have been supplied, read and understood by personnel

Before use:

- Check lashing chain systems before use for visible damage or signs of wear. In case of doubt or damage do not use the lashing chains and have them inspected by a competent person.

Periodic thorough examinations:

Examination by a competent person according to national regulations, at least every 12 months. Depending on use this period can be shorter; e.g. frequent and rough usage.

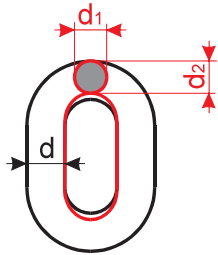
As per EN 818 we recommend subjecting the lashing chain system every two years to a load test with the max. permissible lashing capacity, followed by a visual inspection, or another type of crack detection test (fluxing).

After unusual events, that could cause impairment to the lashing chain. It must be checked by a competent person (e.g. after exposure to uncontrolled heat, emergency braking).

Information for use, storage and maintenance of pewag lashing chain systems

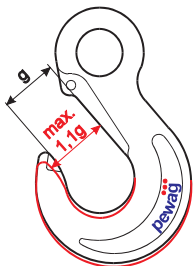
4.1. Elimination criteria following visual inspection

- Broken parts
- Missing or illegible marking of the ID tag of the lashing chain system
- Deformation of accessories or the chain itself
- Elongation of the chain. The chain must be discarded if $t > 1,05 t_n$ according to the catalogue
- Wear is determined as the mean value of two measurements of diameters d_1 and d_2 carried out at right angle (see picture). The chain must be discarded if:



$$\frac{d_1 + d_2}{2} \leq 0,9 d \quad \text{according to the catalogue.}$$

- Cuts, notches, grooves, surface cracks, excessive corrosion, discoloration due to heat, signs of subsequent welding, bent or twisted links or other flaws.
- Missing or damaged safety device (safety catches if fitted) as well as signs of widening or twisting of hooks, i.e. noticeable enlargement of the opening or other forms of deformation. The enlargement of the opening must not exceed 10 % of the nominal value.



Maximum approved dimensional change:

designation	dimension	admissible deviation
chain	d m	-10%
	t	+5%
links	d	-15%
	t	+10%
hooks*	e	+5%
	d2 and h	-10%
	g	+10%
CW	e	+5%
	c	-10%
Clevis and Connex-pin	d	-10%

* HSW, PSW, KHSW, KVS

4.2 Repair

pewag lashing chain systems should only be repaired by qualified personnel.

4.3 Documentation

Records of inspections, and in particular the results, as well as details of repairs carried out must be kept on file (verification document) during the entire service life of the lashing chain system.

Information for use, storage and maintenance ■ of pewag lashing chain systems

5. Correct use of lashing chain systems

5.1. Restrictions of use due to hazardous or dangerous conditions.

5.1.1. Edge load

The maximum lashing capacity of pewag lashing chain systems was defined on the assumption that the lashing chains are pulled under straight loading., i.e. that they do not run over edges. In the case of edge loading, load protection should be used to avoid damage. If lashing chain systems are to be used without sufficient edge protection the maximum permissible lashing capacity should be reduced, particularly when the danger of breakage is evident. Please consider the relevant reduction load factors from the table below. The lashing capacity is reduced when the maximum permissible load from the pewag lashing table is multiplied with the load reduction factors.

5.1.2. Impact

If the lashing is implemented according to the EN 12195-1 it is not necessary to consider occasional impact loads. These impacts will be counterbalanced because of the shock absorber system of the vehicle and the elasticity of the lashing chain system.

5.1.3. Temperature

pewag lashing chain systems must not be used outside the stated temperature range. In the event of temperatures outside this range, do not use the lashing chain system, and remove it from service. The load reduction factors of the lashing capacity (LC) at high temperatures mentioned in the table are valid as long as the lashing chain system itself has this temperature. After cooling down to room temperature it is no longer necessary to apply the load reduction factors.

5.1.4. Acids, caustics and chemicals




Do not subject pewag lashing chain systems to acid or caustic solutions or use in acid or caustic atmospheres.

5.1.5. Endangering conditons

The classification of the maximum permissible lashing capacity is valid for normal conditions. In case of potentially hazardous conditions (e.g. restraining of dangerous goods like liquid metals, acidic substances or nuclear materials) a competent person needs to estimate the risk of danger and adapt the permissible lashing capacity.

5.1.6. Use of pewag lashing chain systems for other than the intended purposes

Use pewag lashing chain systems only for the intended purpose of securing the load during transport. Please contact our technical customer service department if you use the pewag lashing chain system in any other way.

Temperature	-40° – 200°C	über 200° – 300°C	über 300° – 400°C
Load factor Winner 200	1	not permissible	not permissible
Load factor Winner 400	1	0,9	0,75
Edge loading Lashing chains	 R = larger than 2x chain ø	 R = larger than chain ø	 R = chain ø or smaller
Load factor	1	0,7	0,5

■ Information for use, storage and maintenance of pewag lashing chain systems

5.2. General information

5.2.1. Lashing points

Choose lashing points so that the angles of the lashing chain system are in the range of our lashing table and that the lashing chain systems are symmetrical with the driving direction. Use only lashing points with adequate strength. Deviation should only be considered after consulting our technical customer service.

5.2.2. Selection

Consider the lashing method required and the load that needs to be secured when selecting the lashing chain systems. Size, form and weight of the load as well as the intended usage category (friction lashing, direct lashing, ...) and the transport environment (additional utilities, lashing points, ...) determine proper selection.

Lashing chain systems should be used because of the high lashing capacity and the low elongation. We recommend to use the direct lashing method especially for the securing of heavy loads with the least possible lashing systems.

The number of the lashing systems should be calculated according to the EN standard 12195-1. In accordance with the standard pewag has integrated the commonly used lashing methods in an easy to use lashing table. Please look for more detailed info on page 9.

Use at least two pairs of lashing chain systems for stability for the direct lashing method.

The chosen lashing chain systems must be strong and long enough for the intended purpose.

In case of doubt safety is a priority rather than overloading the lashing chain system. The connecting parts (hooks, links) of the lashing chain systems must be moveable in the lashing point and adjustable in the tensile direction. Bending stress on the accessories and tip loading of the hooks are not permissible. Hooks must be loaded at the bottom.

Please use either lashing chain systems or lashing straps for the load securing because of the different performance and elongation of different lashing equipment under load (e.g. lashing chains and lashing straps made of synthetic fibre). If required please contact our technical customer service department.

5.2.3. Use

Always consider proper lashing practice. Before lashing, plan the lashing and the release/opening of the lashing system. During a long trip consider possible partial unloading.

Pay attention to overhead lines during loading and unloading. Remove lifting equipment before lashing. The maximum hand force of 50 daN for tightening the tensioning device should only be applied manually. Use of mechanical utilities ie. Rods or levers is forbidden. Consider sufficient edge protection. During check transport the tension of the lashing chain system repeatedly. Before opening the lashing chain system make sure that the load is safe also without securing and the people who unload are not in danger through goods that fall off or topple down. If necessary assemble the lifting equipment for a possible further transport on the load to avoid a goods falling off or toppling down. Release the lashing chain systems as appropriate so that the load is free standing. Avoid the risk of the lashing chain getting caught during unloading.

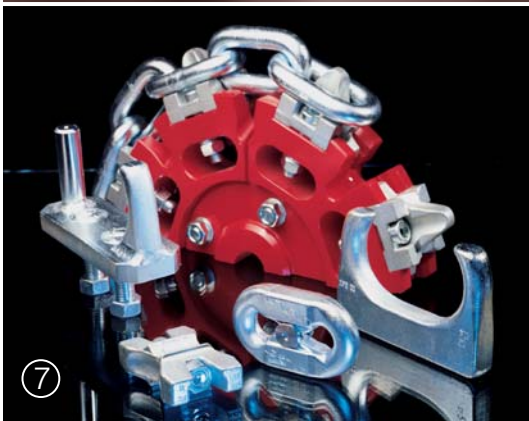
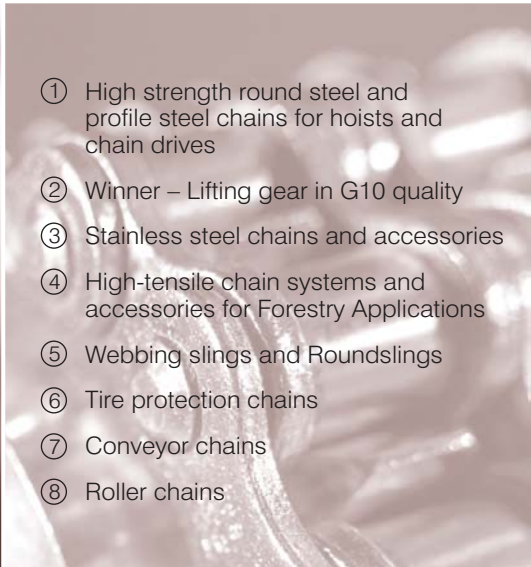
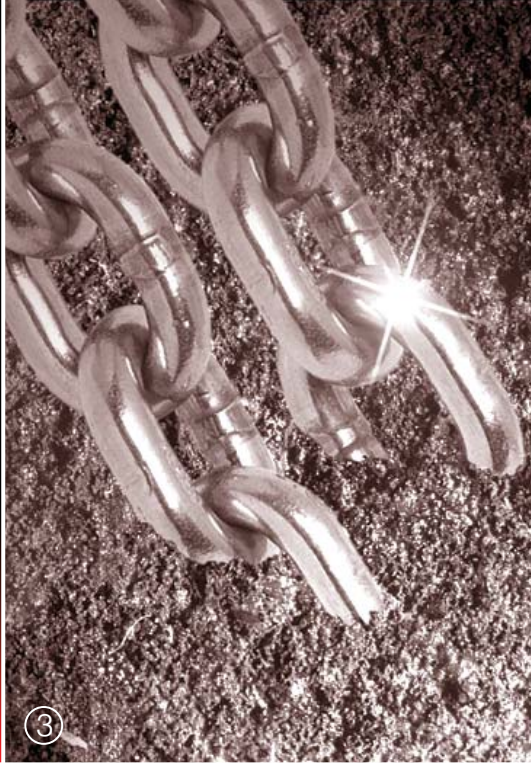
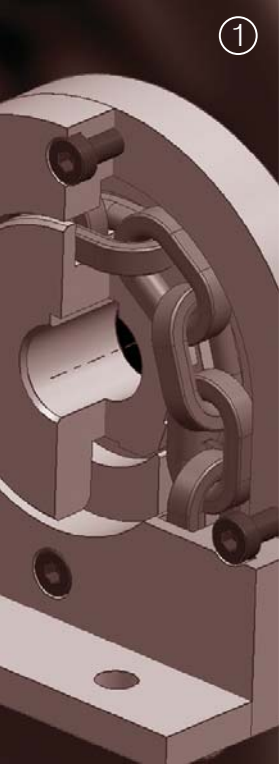
■ Lashing chain systems in use



Product variety

A long chain of options for industrial applications

www.pewag.com



- ① High strength round steel and profile steel chains for hoists and chain drives
- ② Winner – Lifting gear in G10 quality
- ③ Stainless steel chains and accessories
- ④ High-tensile chain systems and accessories for Forestry Applications
- ⑤ Webbing slings and Roundslings
- ⑥ Tire protection chains
- ⑦ Conveyor chains
- ⑧ Roller chains



innovative
safety



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