Lashing in G12

Advantages and information

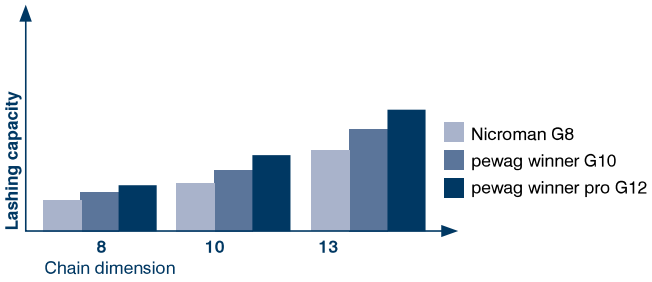
Features and benefits of pewag lashing chains in G12 quality

The higher lashing capacity (LC) of the pewag winner pro G12 program (50% more compared to G8 programs) allows significant weight reduction. Reducing the weight of the lashing chain assembly makes it easier to use for the end-user. Additionally, the profile of the chain improves the bending resistance of the chain. This is significant when loading the chain over a corner.

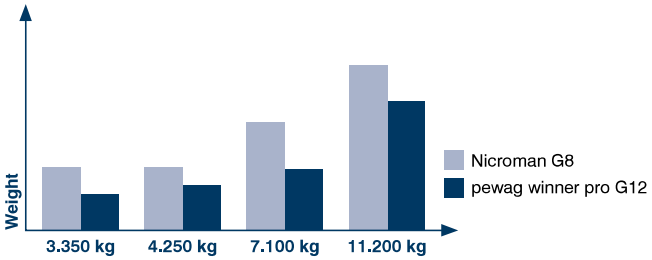
- **Intelligent profile –** because of the intelligent use of material, the major characteristics of the chain (i.e. fatigue resistance and bending resistance) were improved in a remarkable way, when you compare the same cross section of the profile chain versus the round steel chain. In order to reach the best mechanical performance, the material use was optimized on effective areas (blue area) and reduced on less relevant areas (red area)

- **Optimized bending resistance:** The section modulus which is important for preventing undesirable bending deformation is up to 16% higher with the profile chain compared to round steel chain with the same cross section. Therefore the max. stress in the chain is reduced (no red areas)

- **50% higher lashing capacity** which also means 50% higher securing capacity compared to G80



- **With the same chain dimension** it is possible to secure more and heavier loads. Plus 50% compared to G8 and 20% compared to G10 (direct lashing)



Lashing capacity LC	Previous chain weight	pewag winner pro chain weight	% Reduction
60	14,5	10,3	29%
100	26,1	15,6	40%
160	37,7	30,7	18%

- **A 7 mm chain is also provided** in the pewag winner pro program
- **Patent-registered material** with optimized strength and toughness properties at both high and low temperatures
- In most cases when direct lashing **you can downsize to a smaller chain dimension thus obviously reducing weight and costs.** Example of direct lashing: 8 mm G12 (LC = 60kN) replaces 10 mm G8 (LC = 63kN)
- **When friction lashing** at the same securing capacity (STF) you can always downsize to a smaller chain dimension thus obviously reducing weight and costs

Lashing capacity LC	Previous chain-ø	pewag winner pro chain-ø
60	10	8
100	13	10
160	16	13

- **Considerably lower weight** when using pewag winner pro for lashing and therefore easier handling
- **Maximum safety** due to special lashing tag made from stainless steel with separate area for periodic inspections

pewag winner pro Lashing tag Identification

Novel lashing tags with warning marks made from stainless steel material which guarantee longer lasting than standard lashing tags and therefore increases the safety of the lashing system.

pewag winner pro Data

- **Chain quality:** pewag winner pro meets the PAS 1061 standard with modifications (higher mechanical and impact strength values, reduced application temperature)
- **Stress at lashing capacity:** 600 N/mm²
- **Fatigue test:** 20.000 cycles at 450 N/mm² nominal stress
- **Test stress:** 750 N/mm²
- **Breaking stress:** 1.200 N/mm²
- **Breaking elongation:** min. 20% regardless of surface
- **Bending:** 0,8 x d
- **Stress crack corrosion:**
  Harmless against stress crack corrosion acc. to PAS 1061
- **Impact strength toughness:** 42J at -60°C
- **Admissible operation temperature:** -60°C – 300°C (please note WLL reduction at high temperatures)
- **Quality grade stamping:** pewag winner pro chain – 12 resp. 120 at a distance of 300 mm and 12 on the back of each link
  pewag winner pro components – 12
- **Manufacturer's name or symbol:** D16 and/or pewag
- **Surface:**
  Chain – light blue powdercoated – RAL 5012 or
  black corropro (PCP) coated – similar to RAL 9005
  Components – light blue powdercoated – RAL 5012
- **Lashing tag:** All the required data are shown on the tag
- **Compatibility:** pewag winner pro chains and components have only limited compatibility with chains and components of other suppliers; combinations should be checked in advance with the manufacturer

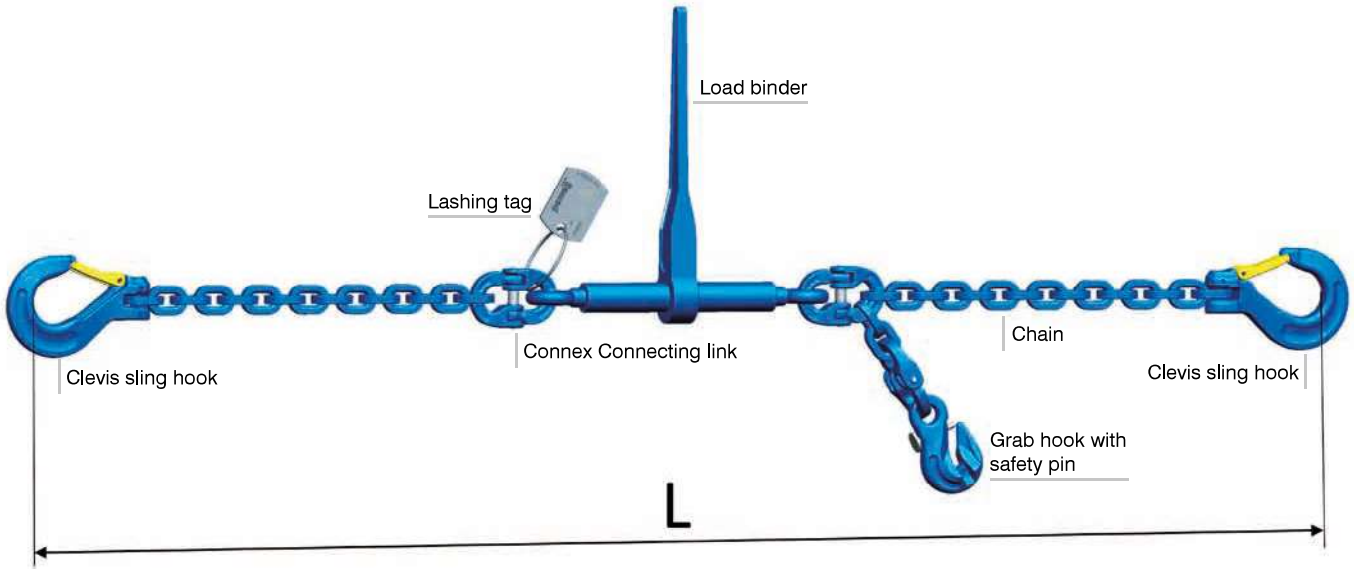
pewag winner pro Lashing Example of order text

Below you will find an example of a finished pewag lashing chain that can be commercially ordered.

pewag winner pro 8 mm – one-piece lashing chain with shortener and clevis sling hook, assembled with connex-connecting links, Length: 3.500 mm.

ZRSWP 8 I KHSWP – KHSWP – PSWP 3500

Nominal diameter	1-part	Clevis sling hook	Clevis sling hook	Grab hook with safety pin	Length (mm)



Direct lashing

ZRSWP 7 with RSWP 7/8 Loadbinder (LC 47kN; for 4 lashing chains)

Angle α	Angle β	Max. load at dynamic friction factor 0,01	0,1	0,2	0,3	0,4	0,5	0,6
15 - 35°	21 - 30°	-	-	-	16.550	22.050	30.250	46.600
15 - 35°	31 - 40°	7.500	9.150	11.600	15.000	19.800	27.200	42.050
15 - 35°	41 - 50°	6.300	7.800	10.000	13.100	17.000	23.500	36.450
15 - 35°	51 - 60°	4.900	6.250	8.200	10.500	13.750	19.150	29.950
36 - 50°	21 - 30°	-	-	11.100	14.750	20.250	29.400	47.750
36 - 50°	31 - 40°	5.950	7.600	10.100	13.550	18.750	27.400	44.700
36 - 50°	41 - 50°	5.000	6.550	8.850	12.050	16.900	24.900	41.000
36 - 50°	51 - 60°	-	5.300	7.400	10.350	14.750	21.850	35.550

ZRSWP 8 with RSWP 7/8 Loadbinder (LC 60kN; for 4 lashing chains)

Angle α	Angle β	Max. load at dynamic friction factor 0,01	0,1	0,2	0,3	0,4	0,5	0,6
15 - 35°	21 - 30°	-	-	-	21.150	28.150	38.600	59.500
15 - 35°	31 - 40°	9.600	11.700	14.800	19.150	25.300	34.750	53.700
15 - 35°	41 - 50°	8.050	10.000	12.800	16.750	21.700	30.000	46.550
15 - 35°	51 - 60°	6.300	8.000	10.450	13.450	17.550	24.450	38.250
36 - 50°	21 - 30°	-	-	14.150	18.850	25.850	37.550	60.950
36 - 50°	31 - 40°	7.550	9.750	12.900	17.300	23.950	35.000	57.100
36 - 50°	41 - 50°	6.350	8.350	11.300	15.400	21.550	31.800	52.350
36 - 50°	51 - 60°	-	6.800	9.450	13.200	18.800	27.900	45.400

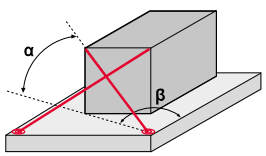
ZRSWP 10 with RSWP 10 Loadbinder (LC 100kN; for 4 lashing chains)

Angle α	Angle β	Max. load at dynamic friction factor 0,01	0,1	0,2	0,3	0,4	0,5	0,6
15 - 35°	21 - 30°	-	-	-	35.250	46.900	64.350	99.150
15 - 35°	31 - 40°	16.000	19.550	24.700	31.950	42.150	57.950	89.500
15 - 35°	41 - 50°	13.450	16.650	21.350	27.900	36.200	50.000	77.600
15 - 35°	51 - 60°	10.500	13.300	17.450	22.400	29.300	40.800	63.800
36 - 50°	21 - 30°	-	-	23.650	31.450	43.150	62.600	101.600
36 - 50°	31 - 40°	12.650	16.250	21.500	28.850	39.900	58.350	95.200
36 - 50°	41 - 50°	10.650	13.950	18.850	25.700	35.950	53.050	87.250
36 - 50°	51 - 60°	-	11.350	15.800	22.000	31.350	46.550	75.700

ZRSWP 13 with RSWP 13 Loadbinder (LC 160kN; for 4 lashing chains)

Angle α	Angle β	Max. load at dynamic friction factor 0,01	0,1	0,2	0,3	0,4	0,5	0,6
15 - 35°	21 - 30°	-	-	-	56.400	75.100	103.000	158.650
15 - 35°	31 - 40°	25.650	31.300	39.550	51.150	67.450	92.700	143.200
15 - 35°	41 - 50°	21.550	26.650	34.200	44.700	57.950	80.000	124.150
15 - 35°	51 - 60°	16.800	21.300	27.950	35.850	46.900	65.300	102.100
36 - 50°	21 - 30°	-	-	37.850	50.300	69.000	100.200	162.600
36 - 50°	31 - 40°	20.250	26.000	34.400	46.200	63.900	93.350	152.300
36 - 50°	41 - 50°	17.000	22.350	30.200	41.150	57.550	84.900	139.600
36 - 50°	51 - 60°	-	18.150	25.300	35.250	50.200	74.450	121.100

This table provides information on how to get the best use from the pewag lashing systems. This table also shows you the maximum load which can be secured with 4 equal lashing systems given the angles and dynamic friction factors referred to. Additional securing methods (i.e. wedges, or similar) have not been taken into account. These could be used to secure loads with even higher weights. Please contact our customer service. Every lashing system has its own table. The maximum forces occurring due to acceleration, braking and avoidance maneuvers in road traffic acc. EN 12195-1 were taken into account. Other tables are applicable for transport by rail and sea. Please contact our customer service.



Frictional lashing

ZRSWP 7 with RSWP 7/8 Loadbinder STF 1900 [daN]

Angle to surface	Max. load at dynamic friction factor					
α	0,1	0,2	0,3	0,4	0,5	0,6
90	400	950	1.710	2.850	4.750	8.550
85	400	940	1.700	2.830	4.730	8.510
80	400	930	1.680	2.800	4.670	8.420
70	380	890	1.600	2.670	4.460	8.030
60	350	820	1.480	2.460	4.110	7.400
50	310	720	1.300	2.180	3.630	6.540
40	260	610	1.090	1.830	3.050	5.490
30	200	470	850	1.420	2.370	4.270

ZRSWP 8 with RSWP 7/8 Loadbinder STF 1900 [daN]

Angle to surface	Max. load at dynamic friction factor					
α	0,1	0,2	0,3	0,4	0,5	0,6
90	400	950	1.710	2.850	4.750	8.550
85	400	940	1.700	2.830	4.730	8.510
80	400	930	1.680	2.800	4.670	8.420
70	380	890	1.600	2.670	4.460	8.030
60	350	820	1.480	2.460	4.110	7.400
50	310	720	1.300	2.180	3.630	6.540
40	260	610	1.090	1.830	3.050	5.490
30	200	470	850	1.420	2.370	4.270

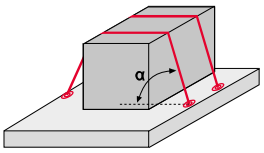
ZRSWP 10 with RSWP 10 Loadbinder STF 3000 [daN]

Angle tosurface	Max. load at dynamic friction factor					
α	0,1	0,2	0,3	0,4	0,5	0,6
90	640	1.500	2.700	4.500	7.500	13.500
85	640	1.490	2.680	4.480	7.470	13.440
80	630	1.470	2.650	4.430	7.380	13.290
70	600	1.400	2.530	4.220	7.040	12.680
60	550	1.290	2.330	3.890	6.490	11.690
50	490	1.140	2.060	3.440	5.740	10.340
40	410	960	1.730	2.890	4.820	8.670
30	320	750	1.350	2.250	3.750	6.750

ZRSWP 13 with RSWP 13 Loadbinder STF 2500 [daN]

Angle to surface	Max. load at dynamic friction factor					
α	0,1	0,2	0,3	0,4	0,5	0,6
90	530	1.250	2.250	3.750	6.250	11.250
85	530	1.240	2.240	3.730	6.220	11.200
80	520	1.230	2.210	3.690	6.150	11.070
70	500	1.170	2.110	3.520	5.870	10.570
60	460	1.080	1.940	3.240	5.410	9.740
50	410	950	1.720	2.870	4.780	8.610
40	340	800	1.440	2.410	4.010	7.230
30	260	620	1.120	1.870	3.120	5.620

This table provides information on how to get the best use from the pewag lashing systems. This table also shows you the maximum load which can be secured with 1 lashing system given the angles and dynamic friction factors referred to. Please note that when friction lashing min. 2 lashing systems are needed. Additional securing methods (i.e. wedges, or similar) have not been taken into account. These could be used to secure loads with even higher weights. Please contact our customer service. The values in the table are applicable in the event that the same tension force (STF) is not effective in the lashing system on both sides of the load due to the deflection and edges. If this can be determined (e.g. using a pretensioning gauge), the values in the table may be increased by a factor of 1.3. The maximum loading weight depends on the STF value of the tensioning system – the value is shown on the lashing system's tag. Every lashing system has its own table. The maximum forces occurring due to acceleration, braking and avoidance maneuvers in road traffic acc. EN 12195-1 were taken into account. Other tables are applicable for transport by rail and sea. Please contact our customer service.

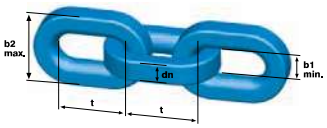


Accessories in G12 – Lashing

Product overview

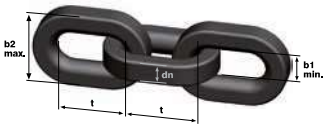
PC/B Profile chain pewag winner pro

Corresponds to PAS 1061 with modifications.
The high duty chain in grade 12.
Specially rugged profile chain in G12. Perfect for lashing

WINPRO chain PC/B	Code	Material thickness dn [mm]	Standard delivery length [m]	Pitch t [mm]	Inside width b1 min. [mm]	Outside width b2 max. [mm]	Lashing capacity LC [kN]	Breaking force [kN]	Weight [kg/m]
	WINPRO 7	7	50	22	10	26	47	92,60	1,36
	WINPRO 8	8	50	25	11	29	60	118,00	1,64
	WINPRO 10	10	50	33	14	37	100	196,00	2,70
	WINPRO 13	13	50	41	19	50	160	314,00	4,80

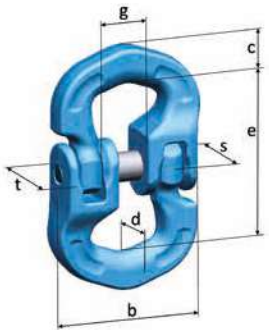
PCP Profile chain pewag winner pro

Corresponds to PAS 1061 with modifications.
The high duty chain in grade 12.
Specially rugged profile chain in G12. Perfect for lashing.

WINPRO chain PCP	Code	Material thickness dn [mm]	Standard delivery length [m]	Pitch t [mm]	Inside width b1 min. [mm]	Outside width b2 max. [mm]	Lashing capacity LC [kN]	Breaking force [kN]	Weight [kg/m]
	WINPRO 7	7	50	22	10	26	47	92,60	1,36
	WINPRO 8	8	50	25	11	29	60	118,00	1,64
	WINPRO 10	10	50	33	14	37	100	196,00	2,70
	WINPRO 13	13	50	41	19	50	160	314,00	4,80

CWP Connex connecting link

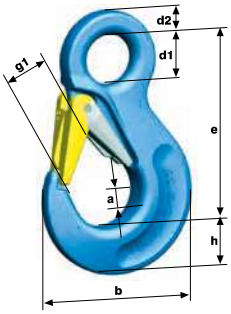
Corresponds to EN 1677-1 with lashing capacity according to G12.
For pewag winner pro connex system.
Connex connecting link for easy assembly of chains and components.



CWP Connex connecting link	Code	Lashing capacity LC [kN]	e [mm]	c [mm]	s [mm]	t [mm]	d [mm]	b [mm]	g [mm]	Weight [kg/pc.]
	CWP 7	47	63	12	13	16	9	47	17	0,20
	CWP 8	60	62	14	15	20	10	58	20	0,30
	CWP 10	100	78	18	21	25	13	66	22	0,57
	CWP 13	160	107	22	25	34	17	84	25	1,24

HSWP Eye sling hook

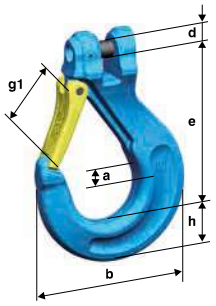
Corresponds to EN 1677-2 with lashing capacity according to G12.
For pewag winner pro connex system. For general lifting applications.
All hooks with forged and galvanized safety latch.



HSWP Eye sling hook	Code	Lashing capacity LC [kN]	e [mm]	h [mm]	a [mm]	d1 [mm]	d2 [mm]	g1 [mm]	b [mm]	Weight [kg/pc.]
	HSWP 7/8	60	106	27	19	25	11	26	88	0,50
	HSWP 10	100	131	33	26	34	16	31	108	1,10
	HSWP 13	160	164	43	33	43	19	39	132	2,20

KHSWP Clevis sling hook

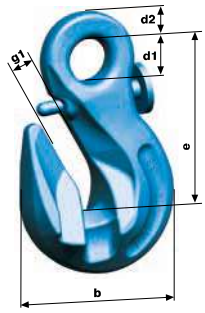
Corresponds to EN 1677-2 with lashing capacity according to G12.
For pewag winner pro clevis system. For general lifting applications.
All hooks with forged and galvanised safety latch.
Alternative to eye sling hook HSWP with wider throat opening.



KHSWP Clevis sling hook	Code	Lashing capacity LC [kN]	e [mm]	h [mm]	a [mm]	d [mm]	g1 [mm]	b [mm]	Weight [kg/pc.]
	KHSWP 7	47	105	26	19	9,5	36	101	0,84
	KHSWP 8	60	105	26	19	10,7	36	101	0,84
	KHSWP 10	100	121	33	26	14	41	118	1,51
	KHSWP 13	160	148	43	30	17,5	49	147	2,85

PSWP Grab hook with safety pin

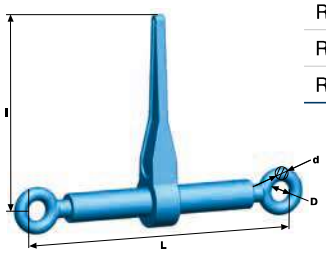
Corresponds to EN 1677-1 with lashing capacity according to G12.
For pewag winner pro connex system. Hook for shortening which prevents the accidential release of the chain. Special design of the chain contact area for optimal interaction between chain and hook.



PSWP Grab hook with safety pin	Code	Lashing capacity LC [kN]	e [mm]	b [mm]	d1 [mm]	d2 [mm]	g1 [mm]	Weight [kg/pc.]
	PSWP 7/8	60	68	63	18	11	10	0,48
	PSWP 10	100	88	81	22	14	13	1,03
	PSWP 13	160	110	103	26	18	17	2,10

RSWP Loadbinder

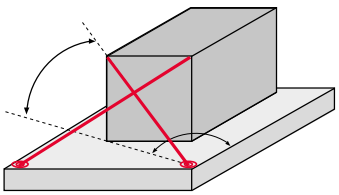
Corresponds to EN 12195-3 with lashing capacity according to G12.
For pewag winner pro connex system. Load binder with optimized lever length.



RSWP Loadbinder	Code	Marking	Lashing capacity LC [kN]	Standard tension force STF [daN]	Length closed L [mm]	Length open L [mm]	Tension range [mm]	Lever length l [mm]	D [mm]	d [mm]	Weight [kg/pc.]
	RSWP 7/8	Type A	60	1.900	355	500	145	237	20	16	3,20
	RSWP 10	Type B	100	3.000	365	510	145	355	26	18	3,80
	RSWP 13	Type C	160	2.500	576	866	290	359	31	22	9,90

Comparison of pewag lashing chains in G8, G10, G12

Direct lashing of loads on trucks



When using 4 lashing chains of type	Permitted load weight when using 4 lashing chains α = 35°, β = 30°, friction coefficient μ = 0,3		
	ZRS G8	ZRSW G10	ZRSWP G12
Lashing chain 8 mm	14.100	17.600	21.150
Lashing chain 10 mm	22.200	28.200	35.250
Lashing chain 13 mm	35.250	47.200	56.400

Spare parts

Product overview

CBHWP Connex bolt and bushing set

Spare parts for CWP Connex.

CBHWP Connex bolt and bushing set	Code	For connex type
	CBHWP 7	CWP 7
	CBHWP 8	CWP 8
	CBHWP 10	CWP 10
	CBHWP 13	CWP 13

SFGWP Forged safety catch set

Safety catch set for HSWP Eye sling hook.

SFGWP Forged safety catch set	Code	For hook type
	SFGWP 7/8	HSWP 7/8
	SFGWP 10	HSWP 10
	SFGWP 13	HSWP 13

SFGWP-K Forged safety catch set

Safety catch set for KHSWP Clevis sling hook

SFGWP-K Forged safety catch set	Code	For hook type
	SFGWP-K 7/8	KHSWP 7 + KHSWP 8
	SFGWP-K 10	KHSWP 10
	SFGWP-K 13	KHSWP 13

KBSWP Clevis load pins

Clevis load pins for KHSWP Clevis sling hook.

KBSWP Clevis load pins	Code	For hook type
	KBSWP 7	KHSWP 7
	KBSWP 8	KHSWP 8
	KBSWP 10	KHSWP 10
	KBSWP 13	KHSWP 13

VLHWP Trigger set

Trigger set for LHWP Safety hooks.

VLHWP Trigger sets	Code	For hook type
	VLHWP 7/8	LHWP 7/8
	VLHWP 10	LHWP 10
	VLHWP 13	LHWP 13

PSGWP Safety pin set

Spare parts for PSWP Grab hooks with safety pin.

PSGWP Safety pin set	Code	For hook type
	PSGWP 7/8	PSWP 7/8
	PSGWP 10	PSWP 10
	PSGWP 13	PSWP 13

IDWP Tag sets for lifting

Tag sets for pewag winner pro lifting chains.

IDWP Tag sets for lifting	Code	For lifting chains
	IDWP Lifting	
	ID-Tag set neutral	I- and multi-leg slings, plain tag + cable with quick release fastener + safety information
		

IDWP Tag set for lashing

Tag set for pewag winner pro lashing chains.

IDWP Tag set for lashing	Code	For lashing chains
	IDWP Lashing	

pewag stands for innovation, quality and safety and offers in the area of lifting chains high quality products, that set new standards within the chain industry.

User manual

for lifting and lashing in G12

User manual

User manual for assembly, use, storage and maintenance of pewag winner pro chain slings.

General

The pewag winner pro chain system can be used in a wide range of applications. These applications must be checked for suitability by a competent authorized person, or by pewag itself in the event of doubt. One major application field of the pewag winner pro chain system is overhead lifting. The following information was prepared for this area in acc. with EN 818-6. The specifications for assembling chain slings and rating of the capacity only refer to the uniform load method with angle ranges of 0-45° and 45-60°.

In addition, there is also an alternative method of rating the capacity. This method should only be used where weight and distribution of the load and the angles of the sling legs are known. In such cases please contact our technical department as the information given in this catalogue does not include details for chain sling rating using this alternative rating method! pewag winner pro lifting chains may only be assembled, tested and used by competent authorized people.

If used properly pewag winner pro lifting chains have a long service life and provide a high level of safety. Personal injury and damage to property can, however, only be prevented by proper use. It is, therefore, very important that you read and understand this user manual and act in a responsible and forward-thinking manner when using lifting equipment.

Limitations on use

The shape of the chain slings must not be modified – e.g. by bending, grinding, detaching individual parts, drilling, etc. The chain slings may also not be heated to above 300°C. Do not remove any safety components, such as latches, safety pins, safety catches, etc. Do not apply any surface coatings to pewag winner pro chain slings, e.g. do not subject them to hot dip galvanizing or electro galvanizing. Dipping or removing the coating with chemicals is also dangerous and must be agreed upon with pewag.

If necessary, please contact our technical department who will be pleased to provide.

Assembling chain slings

pewag winner pro chains and accessories may only be assembled by competent authorized people using pewag winner pro chains and accessories from the pewag winner pro chain system. When modifying or repairing pewag winner pro chain slings use only original parts supplied by pewag (e.g. bolts, safety pins, screws, etc.). pewag winner pro chains and components have only limited compatibility with chains and components of other suppliers. Compatibility should be checked in advance by competent authorized people. pewag will not be responsible for any damage arising as a result of combination with products from a different supplier.

At any rate it is imperative to adapt the WLL to the weakest link in the assembly. Appropriate marking/colouring must be used to prevent the user from misinterpreting the load capacity. pewag winner pro chain slings must be labelled with specially developed identification tags for identification purposes. This tag may only be used if the WLL of the chain slings used is referred to in the table on pages 18+19. Deviating WLL (e.g. caused due to combination with products from a different supplier) must be highlighted with a separate tag (e.g. round shape).

Restrictions of use

due to hazardous or dangerous conditions (see table on page 20 of catalogue)

Effects of temperature
Reduction of the load capacity caused by high temperatures, as stated on page 20, ceases once the chain and/or lifting component returns to room temperature. pewag winner pro lifting accessories may not be used outside the temperature range stated. If this has nevertheless been the case, do not use the chain slings and remove them from service.

Effects of acids, caustics and chemicals
Do not subject pewag winner pro lifting accessories to acid or caustic solutions or use them in acid or caustic-laden atmospheres. Important: Certain production procedures release acids and/or fumes. Use of pewag winner pro lifting accessories in highly concentrated chemicals in combination with high temperatures is only permitted with explicit prior approval.

Working load limit
The working load limits in this catalogue and those on the chain sling have been determined on the basis that the loading of the chain sling is symmetrical and there are no particularly hazardous conditions. Such hazardous conditions would be offshore applications, the lifting of people and potentially dangerous loads, such as liquid metals, corrosive or caustic substances or nuclear material. If the chain sling is to be used for such purposes, the extent of the risk is to be assessed by an expert and the safe working load be adjusted accordingly.

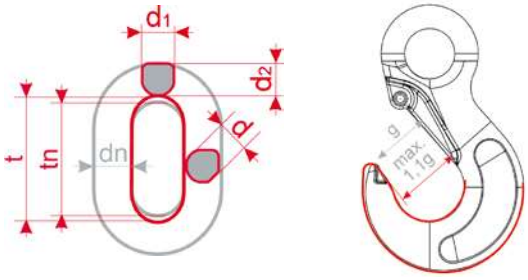
Inspection and tests
Before using any lifting equipment for the first time, it should be ensured that:
- the chain sling corresponds exactly to the order
- the inspection certificate or certificate of conformity has been supplied
- marking and load capacity stated on the chain sling correspond to the information given on the inspection certificate or certificate of conformity
- all particularities of the chain sling have been entered into a register of lifting equipment, if required
- instructions for the proper use of chain sling has been supplied and read and understood by personnel

Check the chain slings before each use for visible damage or signs of wear. In case of doubt or damage do not use the chain slings and have them inspected by a competent person.
After extraordinary, unusual events that could cause impairment

of the chain sling, the chain sling must be checked by an expert (e.g. after exposure to uncontrolled heat). As per EN 818 we recommend subjecting the chain sling every two years to a load test with 1.5 times the load capacity, followed by a visual inspection, or another type of crack test (fluxing).

Elimination criteria following visual inspection

- broken part
- missing or illegible marking of the chain sling, i.e. identification data and/or load capacity data
- deformation of suspension or sling parts or the chain itself
- elongation of the chain. The chain must be discarded if
  $t > 1{,}05\ t_n$
- wear is determined as the mean value of two measurements of diameters d_1 and d_2 carried out at a right angle (see picture). The chain must be discarded if
  $$dm = \frac{d_1 + d_2}{2} \leq 0{,}9\ dn$$
- for wear at the profile edges the criteria for withdrawel is
  $d < dn$



- cuts, notches, grooves, surface cracks, excessive corrosion, discoloration due to heat, signs of subsequent welding, bent or twisted links or other flaws
- cracks: Chains with cross-cracks that are visible to the naked eye must be discarded
- missing or non-functional safety device (safety latches 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. A jumped out safety catch shows an overload of the hook

Maximum appproved dimensional change:

Designation	Dimensions	Admissible deviation
Chain	dn	-10%
	tn	+5%
	wear at edges	d = dn
Links	d	-10%
	t	+10%
Hooks	e	+5%
	d_2 and h	-10%
	g	+10%
Connecting links	halves must be moveable	must be given
	e	+5%
	c	-10%
	d	-10%
Clevis- and connex bolts	d	-10%

Maintenance and repair
pewag lifting accessories and chain slings should only be repaired by qualified personnel using genuine pewag parts.

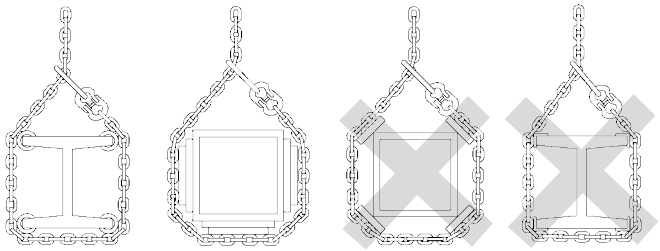
Documentation
Records of inspections, and in particular their findings, as well as details of repairs carried out must be kept on file during the entire service life of the chain sling.

Storage
pewag chain sling should be stored in cleaned and dried condition and protected from corrosion, e.g. lightly lubricated.

Correct use of pewag winner pro chain sling

Angle of inclination – sling points
Select slinging points and chain sling type in such a way that the angles of inclination of all chain strands (legs) lie within the data given on the CE marked plate. All angles of inclination should preferably be the same. Avoid angles of inclination of less than 15°, because of the high risk of load instability. Never use chain slings with the angle of inclination exceeding 60°.

Edge load – protection of load and chain
The maximum load capacity of pewag chain slings was defined under the assumption that the individual chain legs are pulled straight under load, i.e. that they do not run over edges.
In the case of edge loading, load protection (packing) should to be used to avoid damage. For correct and incorrect use see below mentioned illustrations.



If chains are guided over edges without proper protection, their load capacity is reduced. For the corresponding load factors please refer to the table on page 20. But if chains looped at a beam or other round shaped loads the diameter should be minimum 3 times the chain pitch. For smaller diameters the WLL of the chains must be reduced by 50%.

Impact
The maximum load capacity of pewag chain slings are defined under the assumption that the load on the individual chain strands (legs) is applied without any impact or shock loading. In cases of possible impact/shock, the load factors on page 20 must be taken into consideration.

Impact/shock is defined as follows:

- slight impact: created, for example, when accelerating the lifting or lowering movement
- medium impact: created, for example, when the chain slips when adjusting to the shape of the load
- strong impact: created, for example, when the load falls into the unloaded chain

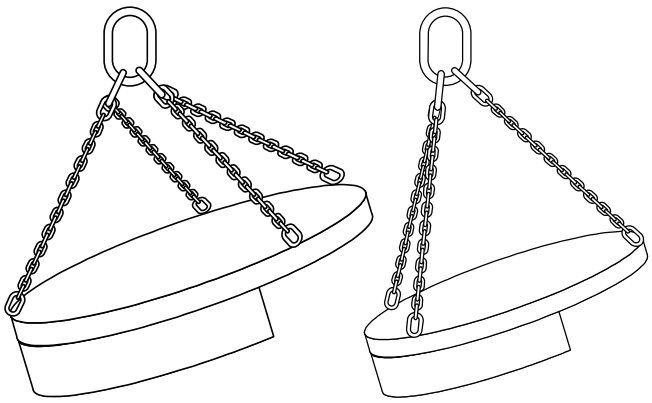
Vibrations
pewag winner pro chains and accessories are rated according to regulations for 20,000 load cycles. At high dynamic forces there may nevertheless be a risk of damage to the chain and accessories. According to the employer's liability insurance association Metall Nord Süd this risk may be prevented if the stress at load capacity limit is reduced by using a larger chain dimension.

Symmetrical loading
The load capacities of pewag chain slings are defined with the assumption that the load of the individual chain strands (legs) is symmetrically distributed. Lifting of the load then leads to identical angles of inclination, and the individual strands (legs) are symmetrical to each other.

The load can still be considered symmetrical when the following conditions are met:

- the load is smaller than 80% of the stated load capacity (WLL)
- the chain sling leg angles to the vertical are all not less than 15°
- the angles to the vertical of all chain legs are identical or deviate max. 15° from each other
- in the case of three and four strand sling chains, the corresponding plan angles are within 15° of each other

Example of asymmetry



The majority of the load is carried by I strand (leg)

The majority of the load is carried by II strand (legs)

If all of the listed parameters are not met, load is considered to be asymmetric and an expert must be called in to assess the lifting process. In case of doubt, only one chain strand (leg) should be considered as load-bearing. For the corresponding load capacity please refer to the load capacity table.

Use of pewag chain slings for other than the intended purposes
Use chain slings only for the intended purpose. In cases where not all individual strands (legs) are used simultaneously or where several chain slings are used at the same time, please refer to the load capacity table to find out the load capacity. In case of doubt or as an alternative, change the load capacity according to the following table.

Type of chain sling	Number of individual strands (legs) used	Use factor in relation to the load capacity given on the tag
two-stranded (II-leg)	1	1/2
three- and four-stranded (III/IV-leg)	2	2/3
three- and four-stranded (III/IV-leg)	1	1/3
2x single-stranded (single leg)	2	1,4
2x two-stranded (II-leg)	3 or 4	1,5

Hang any individual strands (leg) that you do not use, back into the master link to prevent hazards caused by freely swinging chains or unintended hooking.
Before using several chain slings at the same time, make sure that the crane hook is big enough for all the master rings. Make sure that the master rings cannot fall out of the hook during lifting. No angles of inclination of more than 45° allowed. Use only chain slings of the same nominal thickness and grade at the same time.

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User manual

User manual for pewag winner pro lashing system

General

The information regarding the use of the pewag winner pro system for lifting can also be used by analogy for the lashing system. Attention must be paid to the following additional information:
pewag winner pro lashing chains have been developed for securing loads during transport. If properly used pewag winner pro lashing chains are have a long service life and offer a high level of safety. Personal injury and damage to property may result from improper use. It is, therefore, very important that you read and understand this user manual and act in a responsible and forward-thinking manner when using lashing equipment.
We offer tools to assist with selection and proper usage of the lashing chain assemblies. Nevertheless, adequate experience of load securing and use of lashing equipment is indispensable. Only authorized people as defined by EN 12195-1 and 2 are allowed to assemble and use pewag winner pro lashing chain systems.

Important: lashing chains have safety factor = 2, lifting chains have safety factor = 4. This means that for safety reasons lashing chains must not be used as lifting chains. Therefore lashing chains must have the correct identification tag with the appropriate warning note.
The number of the lashing assemblies should be calculated according to EN 12195-1. Some impact loads may arise which will be balanced by the vehicle and by the flexibility of the lashing system.

Information on use

Lashing points
Choose lashing points so that the angles of the lashing chain assemblies are within the range given in our lashing table and so that the lashing chain assemblies are symmetrical to the driving direction. Use only lashing points with adequate strength. Deviations from this should only be considered after consulting our technical department.

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 12195-1. In accordance with this standard, pewag has integrated the commonly used lashing methods in an easy to use lashing table. Please look for more detailed info on pages 40 and 41. 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 bearing area. 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.

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 i.e, rods or levers is forbidden. Consider sufficient edge protection. During transport check 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 possible further transport on the load to avoid the 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.

Dynamic friction factor
The dynamic friction factor depends on the combination of the various materials used. The following table gives several „Dynamic friction factor“ of different material pairings in case of doubt, please consider the lower value as significant – (poor adhesion).

Material	dry	wet	oiled
Wood/Metal	0,20–0,50	0,20–0,25	0,05–0,15
Metal/Wood	0,20–0,50	0,20–0,25	0,02–0,10
Metal/Metal	0,10–0,25	0,10–0,20	0,01–0,10
Concrete/Wood	0,30–0,60	0,30–0,50	0,10–0,20