Original operating manual

pewag winner inox WOX G6 PLUS

WOX G6 plus lifting chain

The lifting chain components described in this original operating manual are intended for the assembly of pewag winner inox lifting chains, grade 6, in compliance with the provisions of this operating manual as well as the current national standards for the lifting and transportation of loads. These components meet the requirements of the EU Machinery Directive 2006/42/EC and are only to be used in accordance with the declaration of incorporation and after reading and understanding the operating manual.
The operating manual must be available to the user at all times and until the chains are decommissioned. It is updated continuously and is only valid in its latest version, which can be downloaded at www.pewag.com.

Designated use

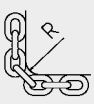
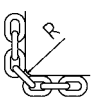
Use and purpose: Fitting of lifting chains; for the fastening, lifting and transporting of loads. The following pages contain detailed information on the use and purpose of this product.
Load capacity: Maximum load capacities are specified in the tables on the following pages. For detailed information on load capacity, check the respective sections for the individual products.

Operating temperature: -40°C to 350°C.
Impacts: The load must be applied without any impact or shock loading.
- The components must only be used by competent personnel.
- Components must be checked before each use for visible signs of damage.

Restrictions of use

Under certain conditions, the use of pewag winner inox lifting components G6 plus is restricted (see table below). The table lists certain loads with their corresponding reduction factors. Safe load capacity values can be calculated by multiplying the maximum load capacity with the reduction factor defined in the table. If several restrictions of use are applicable during a lifting process, all corresponding reduction factors must be taken into account. The use with chemical substances (e.g. acids, alkaline solutions and their fumes) – in particular food, cosmetics or pharmaceutical products – is only permissible in certain conditions and each individual case requires the prior approval of pewag. Surface coating procedures are also only subject to approval by pewag.

Reduction factors

Temperature*	-40°C – 350°C	-40°C – 350°C	above 350°C
Load factor	1	1	not permitted
Impact	Slight impacts, resulting from acceleration during lifting or lowering movement e	Medium impacts, for instance during loading of chain if the chain slips while adjusting to the shape of the load	Strong impacts, for instance if the load falls into an unloaded chain
Load factor	1	0,7	not admissible
Edge loading	R = larger than 2x d* 	R = larger than d* 	R = d* or smaller 
Reduction factor	1	0,7	0,5

* d = Material thickness of the chain

All instructions given in this operating manual assume the absence of extremely dangerous conditions. Such extremely dangerous conditions include offshore activities, lifting of people and potentially dangerous loads, such as liquid metals or nuclear material. In these cases, the admissibility and extent of the risks are to be assessed by pewag.

Reasonably foreseeable misuse

pewag winner inox lifting components G6 plus must not be used in explosion-protected areas. They must not be used under circumstances other than the ones described above (Designated use and Restrictions of use), i.e. not subjected to transverse loads or bending loads. They must not be hooked into excessively large crane hooks etc. Do not subject them to heat, welding or drilling processes.

Assembly instructions

Assembly may only be performed by a competent person with the required skills and knowledge. pewag winner inox lifting chain components G6 plus are assembled into lifting chains with other pewag stainless steel lifting chain components G6 plus, in particular stainless steel chains of the WOX series, using connecting links. The allocation to the correct chain dimension is done on the basis of the respective tables listed on the following pages. Lifting chain components G6 plus may also be used to replace repair parts of stainless steel chain slings (G5), provided that a wrongful assessment of load capacity or purpose of use (see “Restrictions of use”) can be excluded, for instance by means of correct labelling.
These components must not be used for the assembly or repair of Nicroman chain slings (grade 8), winner chain slings (grade 10) or pewag winner pro chain slings (grade 12). The system into which the components are integrated must comply with the provision of Directive 2006/42/EU.

Only non-defective parts may be assembled. Defective components may not be assembled and used components must be inspected prior to the assembly process as described below under the section „Maintenance, Inspections and Repairs”.

Safety precautions to be taken by the user

Gloves must be worn during the whole process. When using these components under conditions to which restrictions of use apply, load capacities must be reduced by the above reduction factors in order to assure the required safety level.

Residual risks

Failure of the lifting chain may be caused by overloading (for instance by exceeding the maximum load capacity or not reducing the load capacity for edge loading or impact loading), unsatisfactory adjustment, inappropriate use with chemical substances, food, cosmetic or pharmaceutical products, usage of non-genuine spare parts, transgression of the permitted angle of inclination, transverse loading and strong vibrations with high loads. In such cases, the load could fall, posing a direct and indirect danger to the health and safety of persons remaining within the hazard zone.

How to act in case of accidents or defects

If the safety latches are blocked or individual components are stuck in the load, do not apply force to avoid damage. Put down the load and remove the blockage using normal manual force. If deformation of the chains occurs because of overloading or other extraordinary events, take the chains out of service for inspection or repair by a qualified person.

Maintenance, inspections and repairs

Maintenance: Clean the components regularly.
Inspections: Components must be inspected when clean, i.e. free from oil and dirt. Painting is only permissible if an evaluation of the chain condition is possible. Cleaning processes which cause material embrittlement, overheating (e.g. flame cleaning), material abrasion (e.g. sand blasting), etc. are not permitted. Surface cracks or other defects must not be covered. The components must be checked before each use for visible signs of damage. At least once a year, an inspection must be carried out by a competent person. Depending on the conditions of use, this interval may be shortened (for instance in cases of frequent use with maximum load capacity or under conditions in which restrictions of use apply). It is recommended to subject the components to a crack test every two years, for instance by subjecting the chain to a load test with 1.5 times the working load limit, followed by a visual inspection or the dye-penetration method.

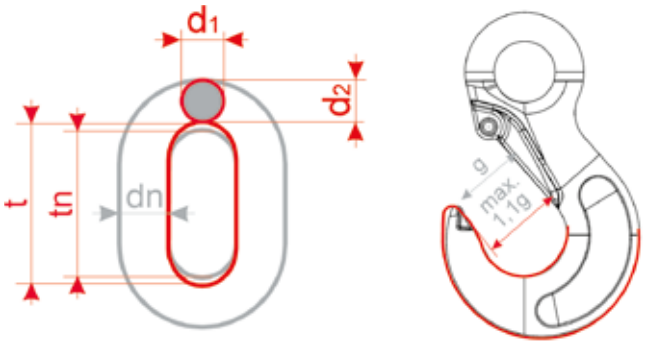
Criteria for withdrawal:
- Breakage
- Unrecognizable identification marking
- Deformation of components or the chain itself
- Elongation of the chain: the chain must be discarded if the inside pitch of the link is $t > 1{,}05\ t_n$, with tn being the nominal pitch from the chain link (see picture).
- Wear: The mean diameter dm is permitted to be 90 % of the nominal thickness dn. D_m is determined as the mean value of the diameters d_1 and d_2 measured at right angles on the corresponding cross section (see figure). The chain must be discarded if

$$d_m = \frac{d_1 + d_2}{2} \leq 0{,}9\ d_n$$

- Cuts, notches, furrows, cracks, all of which may cause sudden breakage, in particular if they are located across the direction of the tensile force!
- Wear or chemical removal of material (for instance localised corrosion), discolouration of material caused by heat, signs of retrospective welding
- Lack of or malfunctioning safety latch or signs of the hook widening. The width of the jaw opening must not exceed 10 % of the nominal value. If the safety latch opens out, the hook is overloaded.
- In case of any doubts regarding the correct functioning or safety of the components.

Maximum admissible dimensional change, based on the nominal dimension:

Component	Dimension	Change
Chain	d_m	-10 %
	t	+5 %
Rings	d	-10 %
	t	+10 %
Hook	e	+5 %
	d_2 and h	-10 %
	g	+10 %
CWI	Moveable halves	No change admissible
	e	+5 %
	c	-10 %
Shackle	Moveable bolts	No change admissible
	e	+5 %
	d, d_1 and M	-10 %
Connex bolt	d	-10 %



Repair: Repairs may only be performed by competent persons with the required knowledge and skills. Small cuts, notches and marks may be removed by careful grinding or filing. Care should be taken to ensure a smooth transition from the repaired section to the surrounding material, without a sudden change of diameter occurring between the sections. Note that the complete elimination of a defect must not cause a reduction of material thickness in the repaired section of more than 10 %! Take care to ensure that no withdrawal criteria apply after repair works. Welding, heat treatments as well as the straightening of bent components are not permitted. Inspections and repairs have to be documented and the corresponding reports have to be retained during the service life of the chains.

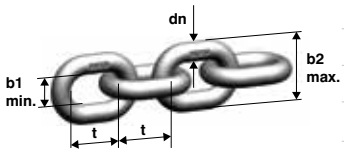
Storage

pewag winner inox lifting components G6 plus must be stored clean and dry. They must not be exposed to chemical, thermal or mechanical influences while stored.

Specific information on the individual product groups

Stainless steel lifting chain WOX G6 plus

Use and purpose: Formation of chain strands in lifting chains; lifting and transportation of loads.
Loading: In the longitudinal direction with a maximum load capacity as described in the table below. Chain links must be free to align with the load direction.
Edge loading: To be avoided. In case of possible edge loading, the load capacity must be reduced accordingly (see table attached).

WOX chain	Code	Material thickness dn [mm]	Standard delivery length [m]	Pitch t [mm]	Inside width b1 min. [mm]	Outside width b2 max. [mm]	Load capacity [kg]	Breaking force [kN]	Weight [kg/m]
	WOX 4-6	4	50 m	12	6,2	14,8	400	16,0	0,38
	WOX 5-6	5	50 m	15	7,5	18,5	630	25,0	0,58
	WOX 6-6	6	50 m	18	8,7	20,9	900	37,5	0,82
	WOX 7-6	7	50 m	21	9,5	25,2	1.250	50,0	1,11
	WOX 8-6	8	50 m	24	10,8	28,6	1.600	63,0	1,43
	WOX 10-6	10	50 m	30	13,5	36,0	2.500	100,0	2,25
	WOX 13-6	13	25 m	39	17,5	46,8	4.250	170,0	3,77
	WOX 16-6	16	25 m	48	21,5	57,6	6.300	250,0	5,62
	WOX 20-5	20	-	60	27	72	8.000	314,0	9,29
	WOX 26-4+	26	-	78	35,0	93,6	12.000	471,0	16,20

Edge load	R = larger than 2x d*	R = larger than d*	R = d* or smaller
			
Reduction factor	1	0,7	0,5

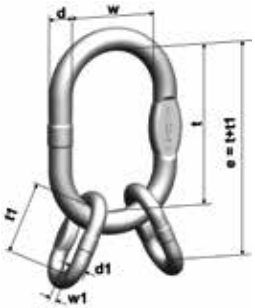
* d = Material thickness of the chain

AWI master links and VWI and VAWI master link assemblies

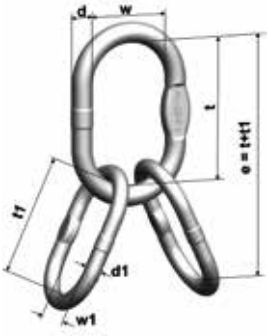
Use and purpose: Chain legs are fitted into master links and master link assemblies. They serve as the connecting piece between the lifting chain and the crane hook and/or hooks or arms attached to the load. See the table for the maximum size of the crane hook to which a master link/master link assembly may be fitted. In the same way, master links and master link assemblies may be fitted to wire rope slings. Check the tables for the correct chain dimension.
Loading: The load must act in the longitudinal direction and in the plane of the link. The inclination angle of the adjusted chain legs must not exceed 60°.
See tables for maximum load capacity. Master links and master link assemblies must be free to move and to align with the load direction. For wire rope slings, please note that the indicated load capacity applies with a safety factor 4.

AWI master link	Code	Load capacity 0 – 45° [kg]	Can be used up to single hook according to DIN 15401 No.	d [mm]	t [mm]	w [mm]	s [mm]	Weight [kg/unit]	For I-leg master links	For II-leg master links
	AWI 8-6	560	0,5	8	60	35	-	0,08	4	4
	AWI 10-6	850	1,6	10	80	50	-	0,14	5	5
	AWI 13-6	1.600	2,5	13	110	60	10	0,34	6/7/8	6
	AWI 16-6	2.600	2,5	16	110	60	14	0,53	10	7/8
	AWI 18-6	3.500	5	18	135	75	14	0,92	-	10
	AWI 22-6	6.300	6	23	160	90	17	1,60	13/16	13
	AWI 26-6	8.900	8	27	180	100	20	2,46	20	16
	AWI 32-6	13.200	10	32	200	110	26	4,14	-	20
	AWI 36-6	14.700	16	36	260	140	29	6,22	-	-
	AWI 45	12.000		45	340	180	-	12,82	26	-

Also available as a customised model with a flat spot.

VWI four-leg assembly	Code	Consists of	Can be used up to single hook according to DIN 15401 No.	Load capacity 0 – 45° [kg]	e [mm]	d [mm]	t [mm]	w [mm]	d1 [mm]	t1 [mm]	w1 [mm]	Weight [kg/unit]
	VWI 4-6	AWI 10-6 + 2 BWI 9-6	1,6	840	124	10	80	50	9	44	20	0,28
	VWI 5-6	AWI 13-6 + 2 BWI 10-6	2,5	1.300	154	13	110	60	10	44	20	0,52
	VWI 6/7-6	AWI 16-6 + 2 BWI 13-6	5	2.600	164	16	110	60	13	54	25	0,91
	VWI 8-6	AWI 18-6 + 2 BWI 16-6	6	3.350	205	18	135	75	16	70	34	1,64
	VWI 10-6	AWI 22-6 + 2 BWI 20-6	8	5.250	245	23	160	90	20	85	40	3,02
	VWI 13-6	AWI 26-6 + 2 BWI 22-6	10	8.900	295	27	180	100	23	115	50	4,78
	VWI 16-6	AWI 32-6 + 2 BWI 26-6	16	13.200	340	32	200	110	27	140	65	7,98

Also available as a customised model with a flat spot.
The number next to the code refers the chain to be used with the component.

VAWI four-leg assembly for wire ropes	Code	Consists of	Can be used up to single hook according to DIN 15401 No.	Load capacity 0 – 45° [kg]	e [mm]	d [mm]	t [mm]	w [mm]	d1 [mm]	t1 [mm]	w1 [mm]	Weight [kg/unit]
	VAWI 6	AWI 18 + 2 AWI 13	2,5	1.600	245	19	135	75	13	110	60	1,60
	VAWI 7	AWI 18 + 2 AWI 16	5	2.100	245	19	135	75	16	110	60	1,98
	VAWI 8	AWI 22 + 2 AWI 18	6	3.000	295	23	160	90	19	135	75	3,44
	VAWI 10	AWI 26 + 2 AWI 22	8	4.800	340	27	180	100	23	160	90	5,66
	VAWI 13	AWI 32 + 2 AWI 26	10	7.100	380	33	200	110	27	180	100	9,06
	VAWI 16	AWI 36 + 2 AWI 32	16	10.500	460	36	260	140	33	200	110	14,50

The number next to the code refers the chain to be used with the component. For allocation to the ropes, load capacity limits as defined by the relevant norms for rope lashings must be taken into account.

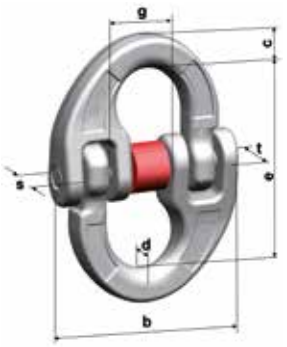
CWI connecting links and BWI transition links

Use and purpose: CWI Connex connecting links serve as connecting elements to link pewag stainless steel lifting chain components for welded systems and the Connex system with each other and for stainless steel lifting chains of the same nominal size.
BWI transition links serve as a link between the master link/ master link assembly and the chain, or between the chain and the hook. They may also be used as end links in chain assemblies to link these assemblies to the crane hook or the load. All welding must be handled by pewag!

Loading:
CWI: The load must only act in the longitudinal direction and on the centre of the radius on the bow with a maximum working load limit described in the table below. CWI connecting links must be completely aligned in the load direction. If 2 parts are mounted on one half of the connecting link, only one of the parts shall be loaded during the lifting process. This part must be free to move to the centre of the radius on the bow when loaded.

BWI: In the longitudinal direction and in the plane of the transition link. The inclination angle of attached chain legs must not exceed 60°. See tables for maximum load capacity. Master links and master link assemblies must be free to move and to align with the load direction. For wire rope slings, please note that the indicated load capacity applies with a safety factor 4. The transition links must be free to move and to align with the load direction.

CWI Connex connecting link



Code	Load capacity [kg]	e [mm]	c [mm]	s [mm]	t [mm]	d [mm]	b [mm]	g [mm]	Weight [kg/unit]
CWI 5	630	36	7	10	11	7	34	13	0,06
CWI 7	1.250	54	9	13	14	9	51	17	0,14
CWI 10	2.500	73	13	18	18	13	70	25	0,37
CWI 13	4.250	92	17	23	25	17	86	29	0,76
CWI 16	6.300	104	21	32	28	20	105	37	1,41

The number next to the code refers to the chain to be used with the component.

BWI transition link

Code	Load capacity 0-45° [kg]	d [mm]	t [mm]	w [mm]	s [mm]	Weight [kg/unit]	For I-leg assemblies	For II-leg assemblies
BWI 7-6	900	7	36	16	-	0,03	5/6	5/6
BWI 9-6	1.250	9	44	20	-	0,07	7	7
BWI 10-6	1.600	10	44	20	-	0,09	8	8
BWI 13-6	2.500	13	54	25	10	0,19	10	10
BWI 16-6	4.250	16	70	34	14	0,36	13	13
BWI 20-6	6.300	20	85	40	16	0,71	16	16
BWI 22-6	8.000	23	115	50	17	1,16	20	-
BWI 26-6	10.070	27	140	65	20	1,92	-	-
BWI 32-6	12.000	32	150	70	26	3,18	26	-

Also available as a customised model with a flat section.

HSWI eye-sling hooks

Use and purpose: These eye-sling hooks serve as end hooks or suspension hooks for the simple, quick linking of the lifting chain to the load or another lifting device. They may also be fitted to the chain to create a loop. It must always be possible to close the safety latch after connection. The safety latch prevents the hook from opening unintentionally and must always be present.

Loading: The load must only act in the longitudinal direction and on the centre of the radius on the hook with the maximum load capacity described in the table below. The hook must be aligned with the direction of the load.

HSWI eye-sling hooks	Code	Load capacity [kg]	e [mm]	h [mm]	a [mm]	d1 [mm]	d2 [mm]	g1 [mm]	b [mm]	Weight [kg/unit]
	HSWI 5/6-6	900	84	20	14	21	8	22	67	0,25
	HSWI 7/8-6	1.600	112	29	20	27	13	32	98	0,70
	HSWI 10-6	2.500	133	33	28	37	15	39	115	1,35
	HSWI 13-6	4.250	172	43	35	48	18	51	147	2,60
	HSWI 16-6	6.300	213	51	44	55	24	66	182	4,80

The number next to the code refers to the chain to be used with the component.

VLWI shortener

Use and purpose: These VLWI Shorteners serve as a shortening element for winner inox lifting chains of the same nominal size, for instead to create loops. For this purpose, a chain link of the same nominal size will be hooked into the slot of the shortener. The chain link must be free to move to the end of the slot.

Load: VLWI Shorteners must only be loaded by a chain of the same nominal size. The chain is hooked into the slot of the shortener, taking care to ensure that the chain is hooked into the slot from the correct direction (see images).
VLWI Shorteners must be able to align themselves freely with the load direction. See table for maximum load capacity.

VLWI shortener	Code	Load capacity [kg]	e [mm]	e1 [mm]	a [mm]	d [mm]	d1 [mm]	g [mm]	Weight [kg/unit]
	VLWI 5/6-6	900	80	114	52	16	26	8	0,22
	VLWI 7/8-6	1.600	111	156	68	22	34	11	0,57
	VLWI 10-6	2.500	133	183	86	27	40	12	1,06
	VLWI 13-6	4.250	169	242	108	32	52	16	2,20
	VLWI 16-6	6.300	204	284	134	38	64	20	4,16

The number next to the code refers to the chain to be used with the component.

Correct use

Correct use

Correct use

Incorrect use

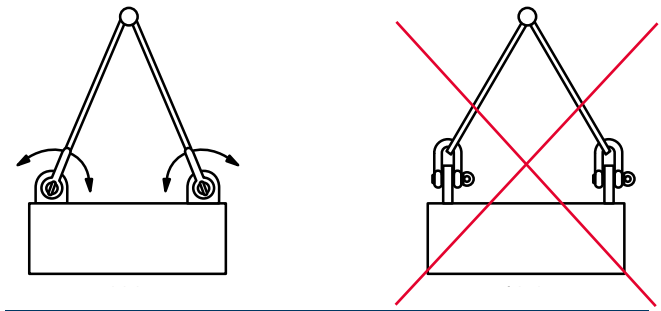
SSWI Safety shackle

Use and purpose: These safety shackles serve as end fittings or suspension elements for the quick and easy linking of the load-securing device with the load or lifting device. Please note that the safety bolt must always be tightened once connected and secured with the safety splint to prevent accidental opening of the shackle.

Loading: The load must only act in the longitudinal direction, on the bearing points of the shackle (centre of the radius on the bow and the bolt) or equally distributed over the whole length of the bolt, with the maximum load capacity as listed in the table below. The shackle must be free to align with the direction of the load.

SSWI shackle	Code T	Load capacity [kg]	e [mm]	a [mm]	b [mm]	d [mm]	d1 [mm]	c [mm]	Weight [kg/unit]
	SSWI 0,5 t-S	500	33	8	18	8	9	18	0,07
	SSWI 1,25 t-S	1.250	40	12	25	12	13	25	0,22
	SSWI 2 t-S	2.000	60	16	32	16	17	32	0,52
	SSWI 3,2 t-S	3.200	78	19	41	19	21	47	0,80
	SSWI 5 t-S	5.000	109	25	56	25	29	60	2,2
	SSWI 26-C	13.000	152	34	76	34	38	75	7

Other sizes and designs are available upon request.
Stronger shackles are available upon request.



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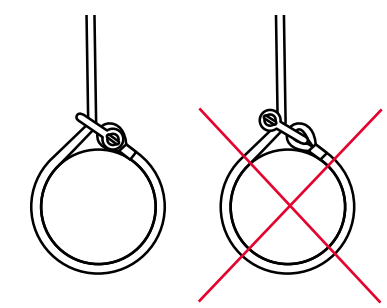

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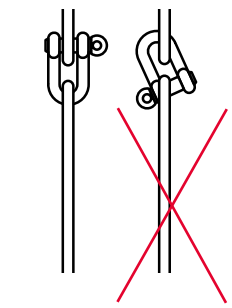
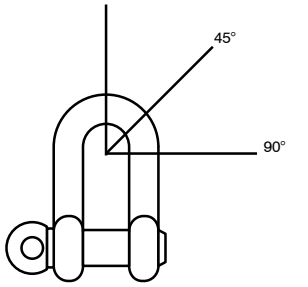


Correct Incorrect

Side loading: The SSWI shackles are not designed for side loading. Side loading should therefore be avoided. If side loading cannot be avoided completely, load capacity must be reduced accordingly:
With loads placed on the shackle axis: 100 % of the load capacity
With 45° loads: 70 % of the load capacity
With 90° degrees: 50 % of the load capacity



Along the central axis of the shackle body

Point loading: Point loading of SSWI shackles is permitted, if the diameter of the component is at least equal to or larger than the diameter of the shackle bow. Components with large diameters and/or flat elements which are mounted on the side of the bolt offer considerable advantages due to the larger contact surface. Avoid sharp edges.

Declaration of incorporation, valid for products chain WOX, AWI, BWI, VWI, VAWI, CWI, HSWI

Declaration of conformity valid for products VLWI, SSWI

Declaration of incorporation

In accordance with the requirements established in Annex II, part B, of the EU Machinery Directive 2006/42/EC for components in lifting accessories:
We herewith declare that the products mentioned in this original operating manual are designed to be incorporated in lifting accessories complying with all essential requirements of the EU Machinery Directive 2006/42/EC. This product must not be put into service until the final lifting accessory into which it is to be incorporated has been declared in conformity with the provisions of the Directive. Moreover, it is a precondition that this operating manual has been read and understood.
This declaration has no legal effect if any changes to the product are introduced without pewag's approval.

The following essential safety and health and safety requirements of Annex I of the Directive apply and are fulfilled: 1.1.3, 1.3.4, 1.5.4,4.1.2.3, 4.1.2.5, 4.3, 4.4.1.

Additionally, we declare that the relevant technical documentation is compiled in accordance with part B of Annex VII and will be transmitted electronically upon well-founded requests by the competent national authority.

The person authorised to compile the technical documentation:
DI Bernhard Oswald; Mariazeller Straße 143;
A-8605 Kapfenberg

Kapfenberg, 2010-01-25

pewag austria GmbH
Karl Schmid

Declaration of conformity

In accordance with the requirements established in Annex II, part A, of the EU Machinery Directive 2006/42/EC and in the Machinery Safety Regulations (MSV) 2010 for components in lifting accessories:

The person authorised to compile the technical documentation in accordance with Annex VII part A:
DI Bernhard Oswald; Mariazeller Straße 143; A-8605 Kapfenberg

We herewith declare that the products mentioned in this original operating manual comply with all the essential requirements of the EU Machinery Directive 2006/42/EC.
This declaration has no legal effect if any changes to the product are introduced without pewag's approval.

The following standards apply and are complied with:
EN 818 Part 4 modified.
This product must not be put into service until this operating manual has been read and understood.

Kapfenberg, 2010-01-25

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