

**pewag pushes  
past the limits**

**pewag hero friction-welded chain**



**the  
next  
generation  
of chains**

## A new era of chains.

For decades, chains have been produced using the same method: by cutting wire rod or rod steel, bending the round steel to the desired link shape and welding the links together using energy-intensive processes like resistance or flash-butt welding.

The limiting factors of this conventional technology are the shape of the chain links (round) as well as the weldability of the steel grade, which very much depends upon the carbon content and alloying elements.

pewag hero, an innovative friction-welded chain, goes beyond these limits and opens the door to a new world of chains.

Friction welding is a well-established “joining technology” which has been used by aviation and automotive industries for decades. pewag is the first chain producer to apply and refine the friction welding process for the production of the next generation of chains.

Friction-welded chains are produced from forged steel components, unlike round steel chains that start from drawn steel wire or rolled bars. The use of forged components offers the ability to increase the section modulus in areas of high stress or wear and eliminates the risk of tension cracks, which can occur during the bending process of round steel chains.

Friction welding is not a welding process in the traditional sense. Heat is generated through mechanical friction between the chain link components until the material plasticises. Lateral force is applied to exactly fuse the components to a whole chain link.

**For more details, please refer to our website [hero.pewag.com](https://hero.pewag.com)!**



Forged chain components



Finished friction-welded chain



Tensile test

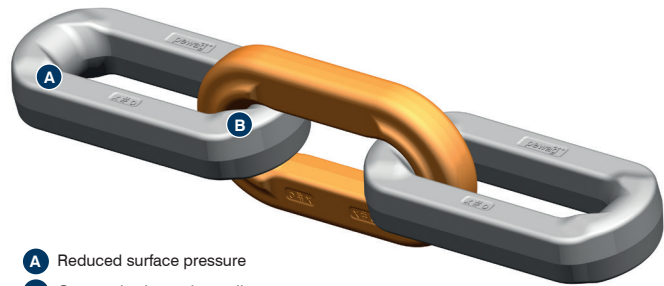


## Advantages of friction welding & pewag hero chain.

- **Melt-free technique**
  - no grain-growth
  - very small heat-affected zone (near zero residual stresses)
- **Clean joining**
  - Impurities between the contact surfaces are removed by the plasticised working mass and are forced out during the joining of the forged components.
- **No material limits**
  - even conventionally non-weldable steel grades, for example a 50CrV4 steel which offers excellent wear resistance, can be joined
- **No shape limits**
  - every chain application has its special demands – the use of forged components can address critical factors like adding wear volume in the interlink section or legs of the link to drastically improve wear life of the chain
- **No pairing process needed**
  - Due to the high production quality every strand has the same length with a very small tolerance.
  - Each strand with the same number of links can be installed parallel to each other.
  - Production tolerance of 0.05 % for matched chains.
- **Longer chain strands are possible**
  - Because of the friction welding process, the pewag hero chain can be delivered with longer chain strands compared to conventional round link chains.

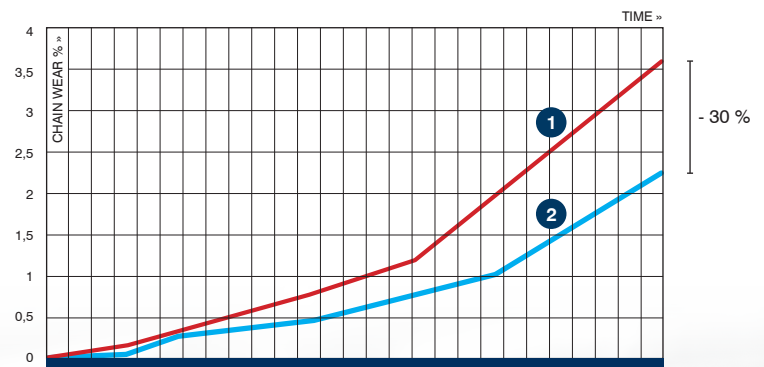
For example, the standard length of pewag hero chain is double the standard length of round link chains.
- **Longer lifespan & easy change**
  - Case hardened and in many different dimensions, the pewag hero is running over all different types of toothed and plain wheels, which are also used for round link chains. This has the advantage that changing from round-steel chain to pewag hero chain – for example at existing installations – is quite easy and also cost effective.
  - The bigger wear volume leads to a significantly longer lifespan compared to round link chains.
  - This results in: lower maintenance costs, lower operating cycles and lower downtime costs.

The friction welded pewag hero chain can be used for different applications such as conveyors or bucket elevators.



- A Reduced surface pressure
- B Geometric shape depending on application. Increased interlink wear volume

Reduced surface pressure



- Cement bucket elevator:
- 1 round steel chain 26 x 100, E 10
  - 2 pewag hero chain 26 x 100, E 10

## Friction welding – form follows function.

Friction welding is a tried-and-tested 'joining technology' that has been used by the aviation and automotive industries for decades. The method also allows for the joining of lightweight construction materials such as aluminium with high-strength steels.

With conventional welding techniques, the joining of materials with highly different welding points is not possible, which is why mechanical joining methods have to be applied to achieve this goal. With friction welding, such materials can be joined without any problems and without having to compromise when it comes to weld stability or having to accept a higher weight.

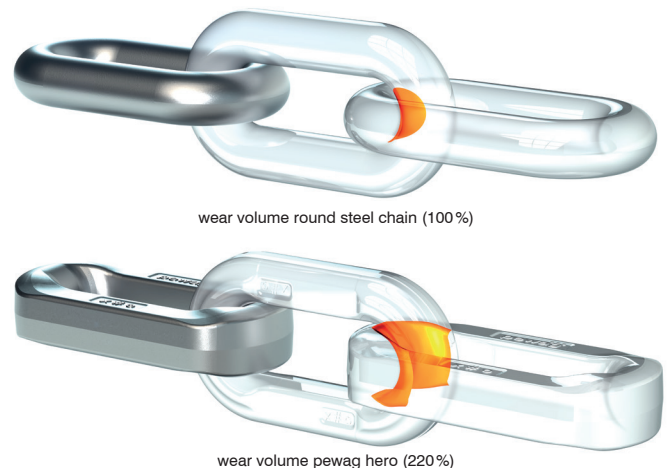
pewag is the first chain manufacturer worldwide to have taken up the innovative technology of friction welding and refined it for the manufacture of the next generation of chains. Unlike conventional round-steel chains, the friction-welded chain does not start out as wire rod or rod steel, but consists exclusively of forged parts. By using forged components, the risk of tension cracks, which are a typical byproduct of the cold-bending process of round-steel chains, is eliminated. As such, friction welding is not a conventional welding technique. In friction welding, heat is generated through mechanical friction between the links to be joined, which causes the material to plasticise.

A defined lateral force is applied to fuse the components to a whole chain link with precise pitch and strand lengths. Therefore the pairing operation is not longer required.

## Compared to round-link chains, the pewag hero chains offer the following advantages thanks to their design.

### 220% wear volume – 30% longer life.

The load-specific geometry of the pewag hero chain has an increased interlink contact area and more than twice the wear volume of a conventional chain. This leads to significantly reduced contact and maximum stress, better performance and an approximately 30% longer lifespan.

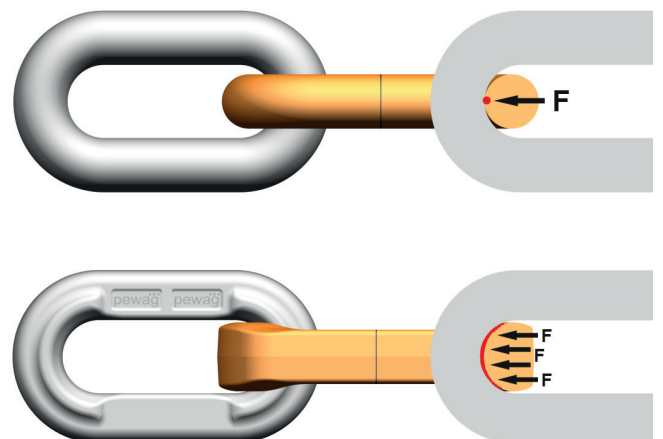


220% wear volume – 30% longer life

### Reduced surface pressure.

The geometry of traditional round steel chains provides a small interlink contact area and subsequent high stresses

- evenly distributed force
- less force per mm<sup>2</sup>
- lower maintenance cost
- longer operating cycles
- lower downtime cost



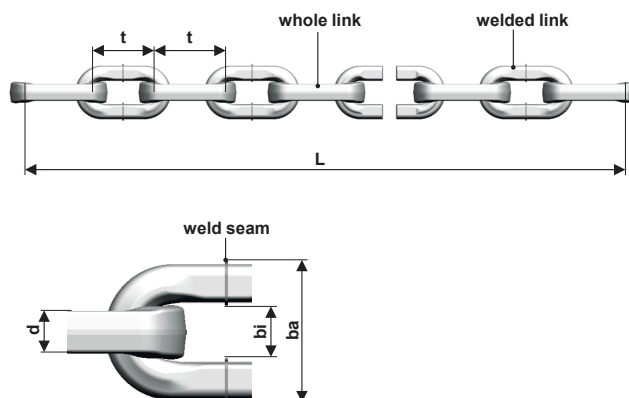
Reduced surface pressure



## pewag hero friction-welded chain.

pewag hero – chains are made from CrNiMo-special alloyed steel and are suitable for high-capacity bucket elevators and scraper conveyors with high dynamic and static loads. The combination of increased wear volume and reduced surface pressure results in a significant increase of the chain life of approx. 30 %.

The pewag hero chain fits on conventional wheels and sprockets. Pairing is not required due to the high manufacturing precision.



Surface finish: blank, shot peened, waxed

Chain d x t [mm]	bi min [mm] welded link on the weld	ba max [mm] welded link on the weld	Weight [kg/m]	Chain length [links]	L chain length [mm]	PF proof load [kN]	BF breaking load [kN]
22x86	28.3	73.5	9.90	239	20554	182	304
26x100	33.5	85.5	14.20	167	16700	255	425
30x120	38.7	99.3	18.69	95	11400	340	566
34x136	43.5	112.7	23.70	71	9656	425	710
38x144	48.4	129.0	30.00	59	8496	545	910

### Technical data

Chain length L production tolerance =  $+0.3 / -0.15\%$  = 0.45 % total;  
this means that the difference between chain lengths of 10 m is max. 45 mm.  
Chain length production tolerance  $\Delta S$  of matched chain lengths is 0.05 %  
or max. 3 mm for two or multiple chain strand conveyors.

### Example of the order

16 pcs. pewag hero 22x 86 6580 G80 E BK L= 239 links = 20.554 mm supplied as matched pairs.

Material	CrNiMo, alloy steel
Breaking stress [N/mm <sup>2</sup> ]	400
Proof stress [N/mm <sup>2</sup> ]	240
Breaking elongation approx. [%]	2
Surface hardness [HV 10] <sup>1)</sup> / inner link curve	min. 800
Core hardness [HV]	ca. 550
Surface	blank, shot peened, waxed
Marking	batch number on the forgings
Chain length production tolerance	0,05 % for matched chains, double and multiple chain strand conveyors
Chain length "L" production tolerance	$+0,30 / -0,15\%$ = 0,45 %
Remark	manufactured of forgings in friction welding process

<sup>1)</sup> Proof/Breaking load tolerance -10 % permissible depending on the batches.

## pewag hero accessories & components.

Most of the pewag accessories are compatible with pewag hero. However, some accessories are designed specifically for use with pewag hero to ensure optimal performance. For details, see the pewag hero compatibility matrix.

### V-hero connecting links

For individual chain lengths of pewag hero chains. The connecting links have the same technological characteristics as the corresponding highly wear-resistant chain. Ensure that the connecting links are assembled and installed according to the instructions. These connecting links are mounted as vertical links in bucket elevators with back mounted buckets. For positive discharge bucket elevators, the connecting links have to be installed as horizontal links.



V-hero, surface finish: shotblasted and waxed

### K-hero chain couplings

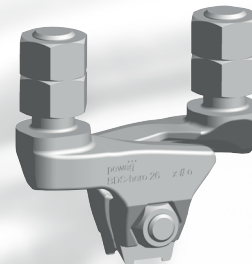
Chain coupling for individual chain lengths of pewag hero chain. The chain couplings have the same technological characteristics as the corresponding highly wear-resistant chain. Ensure that the couplings are assembled and installed according to the instructions included in the packaging. These couplings can only be mounted as vertical links. Run as vertical links over sprockets, plain and grooved wheels.



K-hero, surface finish: shotblasted and waxed

### BDS-hero bucket attachments

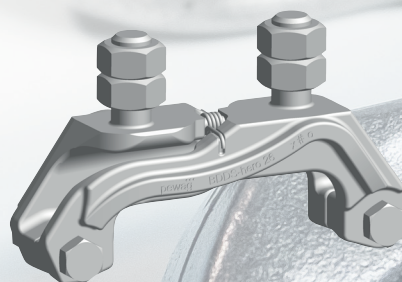
Bucket attachment suitable for pewag hero chains with chain sprockets RHV and plain segmented chain wheels, suitable for back mounted buckets, simple assembly and disassembly on the chain, pre-assembled bucket attachment BDS-S ready for the installation on the chain, no additional connecting screw – self locking or as usual BDS – halves with connecting bolt and safety nut. Two identical halves, completely forged (including the bolts) and heat-treated. The same buckets and chain wheels can usually be used. Higher service safety because the BDS attachment doesn't have to transmit any chain pull. No wear part – can be reused.



BDS-hero, surface finish: natural black and waxed

### BDD-S-hero bucket attachments

Bucket attachment suitable for pewag hero chains with chain sprockets RHV and plain segmented chain wheels, suitable for back mounted buckets, simple assembly and disassembly on the chain, pre-assembled bucket attachment BDD-S ready for the installation on the chain, no additional connecting screw – self locking, two identical halves, completely forged (including the bolts) and highly wear-resistant and hardened at the chain contact areas. Mounting dimensions of the BDD-S attachment correspond to the standard shackles, existing chain end and shackle system can be converted. The same buckets and chain wheels can usually be used. Higher service safety because the BDD-S attachment doesn't have to transmit any chain pull.



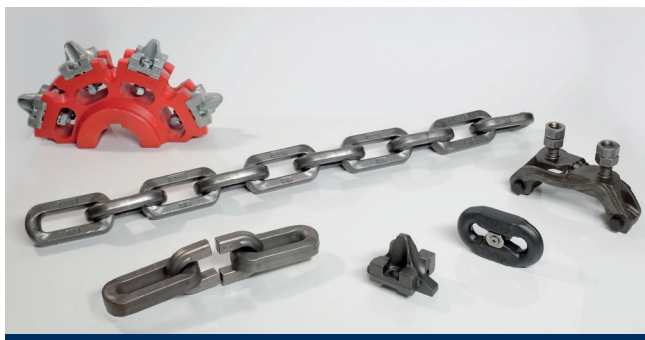
BDD-S-hero, surface finish: natural black and waxed



## pewag hero compatibility matrix.

The table below shows the compatibility of accessories and attachments with the pewag hero chain.

✓ compatible  
✗ not compatible



hero chains	BDD-S hero	BDS hero	K-hero	V-hero
22x86	✓	✓	✓	✓
26x100	✓	✓	✓	✓
30x120	✓	✓	✓	✓
34x136	✓	✓	✓	✓
38x144	✗	✗	✓	✗

RHV-drive wheel	IR-drive wheel	SEG, SES - tail wheel	TR-pocket <sup>1)</sup> wheel	KR-pocket <sup>1)</sup> wheel	ULR, ULS, UK, UL wheel	BR, SR, SUR wheel	UHV - wheel
✓	✓	✓	✗	✗	✓	✓	✓
✓	✓	✓	✗	✗	✓	✓	✓
✓	✓	✓	✗	✗	✓	✓	✓
✓	✓	✓	✗	✗	✓	✓	✓
✓	✓	✓	✗	✗	✓	✓	✓

hero chains	BHV	SDS <sup>2)</sup> SDD	FDD	FDB	KFB	KBE-I <sup>2)</sup> KBE-A	ST	KE-I <sup>2)</sup> KE-A	U <sup>2)</sup>	VHV	KHV	BDS	BDD-S
22x86	✓	✗	✓	✓	✓	✗	✓	✗	✗	✗	✗	✗	✗
26x100	✓	✗	✓	✓	✓	✗	✓	✗	✗	✗	✗	✗	✗
30x120	✓	✗	✓	✓	✓	✗	✓	✗	✗	✗	✗	✗	✗
34x136	✓	✗	✓	✓	✓	✗	✓	✗	✗	✗	✗	✗	✗
38x144	✓	✗	✓	✗	✓	✗	✓	✗	✗	✗	✗	✗	✗

1) in development

2) available on request



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