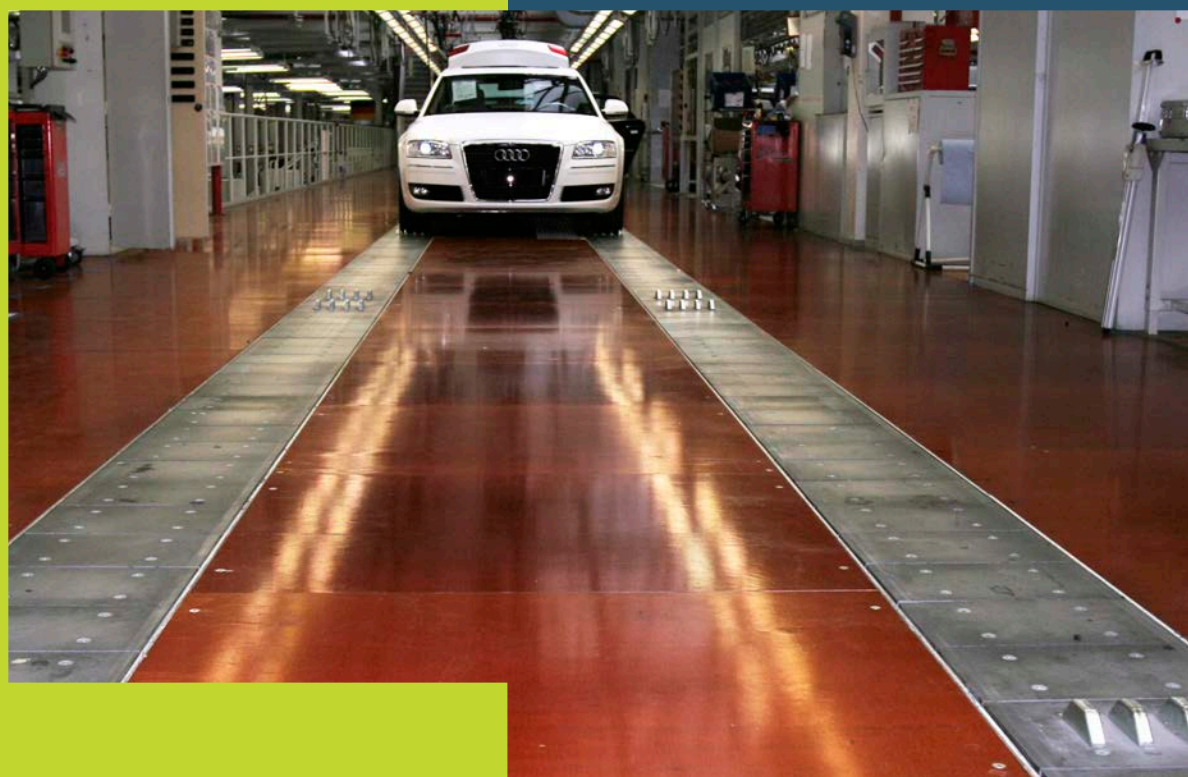


Chains and Sprockets for the Automotive Industry



Products for all conveyor processes
in the automotive industry

03	The KettenWulf Group worldwide
04	We are partners of the automotive industry
06	Chains for cross transfer
08	Chains for longitudinal transportation
12	Chains for submerged body conveying
16	Chains for slat conveyors
21	KettenWulf sprockets

The KettenWulf Group worldwide



**The headquarters
of the KettenWulf
Group in Kückelheim**

For over 85 years, KettenWulf, as an expanding global company, has stood for quality, reliability and flexibility. More than 1200 employees develop, produce and market customized solutions in the field of conveying and drive technology at ten locations across Europa, America and Asia. All around the globe, KettenWulf is your strategic partner when it comes to delivering optimum product quality.

Be it the Sauerland, Hangzhou, Atlanta or Pune – as an international company with worldwide operations, our employees are always at your service to meet your unique business needs and to provide you with industry leading technical support.

Trust, loyalty and commitment – these values are what KettenWulf stands for. As a medium-sized, family-run company, cultivating a strong, personalized partnership with both our customers and suppliers is our highest priority.



**Top Right: Our central
European storage
and sales facility in
Ghent, Belgium**



**Middle Right:
Production and sales
facility in Ferlach, Austria**



**Bottom Right: The
Chinese production
and sales facility
in Hangzhou**

Smooth production flow in the automotive industry primarily depends upon maximum machine uptime, equipment availability and minimal maintenance effort.

For decades notable vehicle manufacturers have utilized KettenWulf drive and conveyor systems. OEMs and vehicle manufacturers trust KettenWulf, because we understand the needs and requirements of the automotive industry.

KettenWulf combines the expertise of each department, from Research & Development, to Production and Assembly, in order to provide the best product tailored to your individual transport and conveying needs. Through our extensive experience and knowledge gathered from working with the automotive industry, we can provide innovative, economical and ecologically responsible chain solutions. Our customers are already benefitting from the use of our low maintenance and lube free technologies.

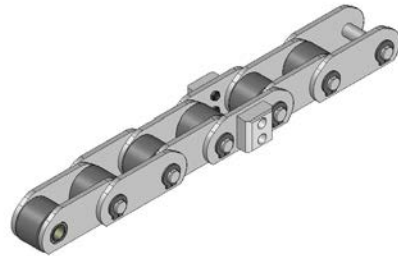
We are partners of the automotive industry

KettenWulf offers innovative conveyor chain technology for all applications in the automotive industry



Chains and sprockets for all conveyor processes in the automotive production

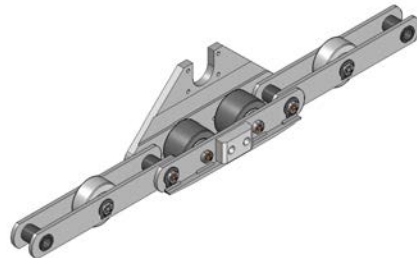
Chains for cross transfer



Chains for longitudinal transportation



Chains for submerged body conveying



Chains for slat conveyor



Cross transfer conveyors connect separate conveyor lines, transferring the material laterally from one conveyor line to the next.

Cross transfer conveyors are commonly used in various areas of automotive production and connect individual production processes.

High reliability is essential to ensure a smooth and fast transition between production steps.

Chains for cross transfer

Cross transfer conveyor in the paint shop



Cross transfer chain applications

Cross transfer chains are often tailored to specific applications, and are commonly supplied with lube-free chains. KettenWulf also has experience with the special circumstances surrounding automotive manufacturing, from forklift overtravel and drippings from the coating process, to using noise damping equipment in sounds sensitive areas, such as the assembly area.

Illustration 1:
Lube-free cross transfer chain, 160 mm pitch

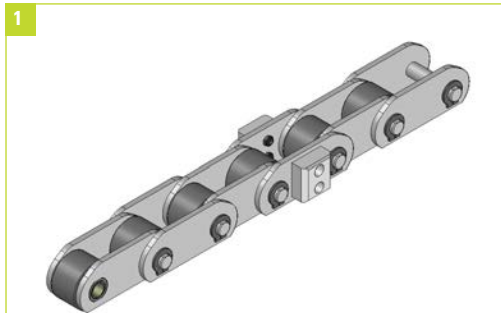


Illustration 2:
Lube-free polymer compound chain with ball bearing roller for cross transfer lines
p=80 mm or 160 mm

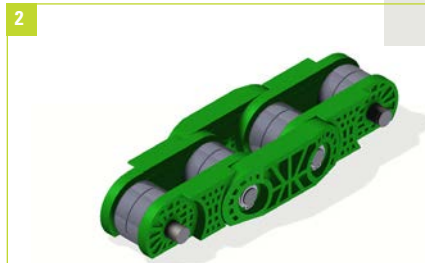


Illustration 3:
Lube-free cross transfer chain, 80 mm pitch



Illustration 4:
CC5-chain, 6" pitch



Illustration 5:
Sprocket with patented noise dampening system

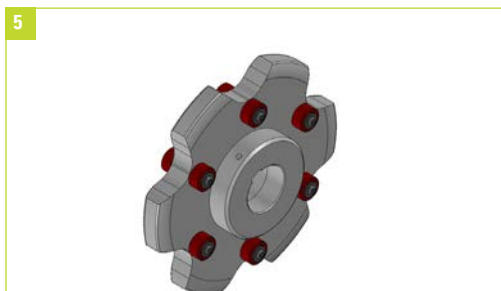


Illustration 6:
Lube-free roller chain for cross transfer conveyor in body shop



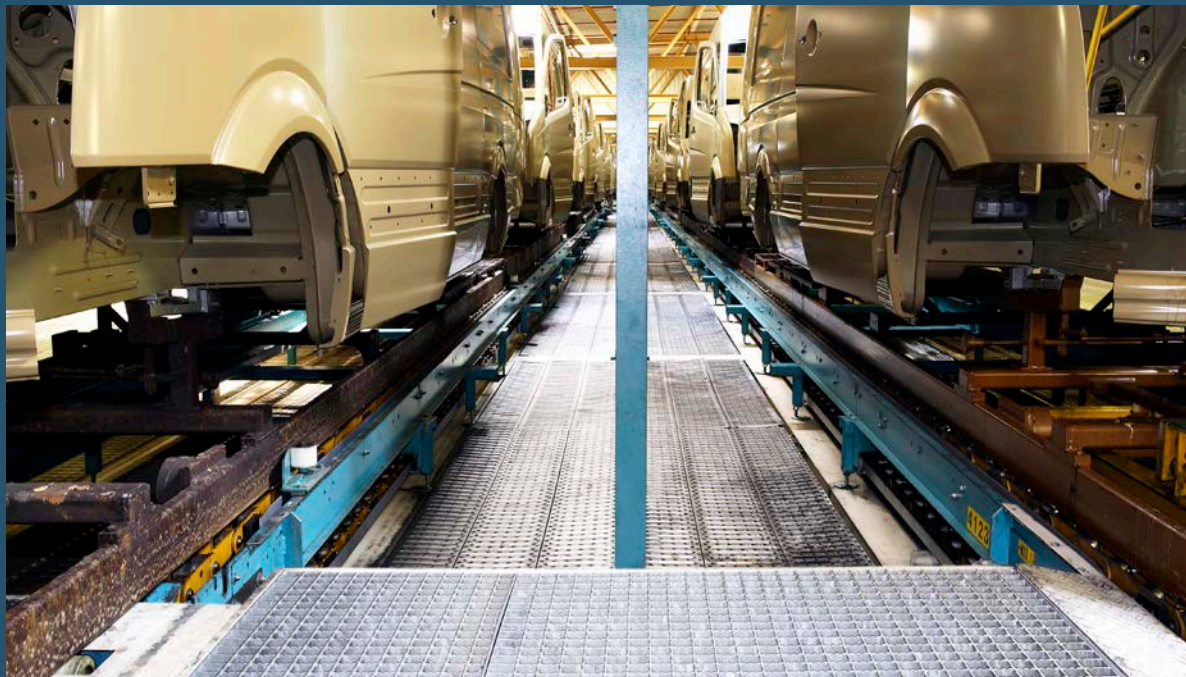
Car bodies travel through several different production steps in an automotive plant such as grinding, painting and drying. Usually the car bodies are moved lengthwise with skids or support frames. Depending on the client specifications, the chains are equipped with devices which are specifically designed to catch the skids or support frames and move them along.

Also, it is possible to engineer other special features for your chain application:

- » use special non-stick coatings on the chains,
- » make the chains lubrication-free,
- » implement accumulation top rollers for buffering,
- » make the chains to withstand temperatures of up to 250°C/482 F.

Chains for longitudinal transportation

Accumulation chain
in the paint shop



Longitudinal conveyor – spray booth

To cope with the unique environment in a spray booth, KettenWulf has developed solutions to make the production flow substantially smoother. For example, our chains can be equipped with profiled C-shaped carrier pieces, prism-shaped supports for a better transition or welded-on slats for protection against overspray.

For easier cleaning, chains can be provided with a non-stick coating.

At high chain speeds our patented noise dampening system will reduce the noise from the sprockets considerably.

Illustration 1:
Double-strand
deep link chain



Illustration 2:
Chain with welded-
on support plates
(loose side)

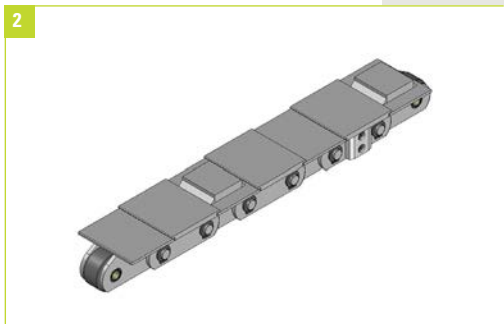


Illustration 3:
Spray booth chain with
welded-on top plates

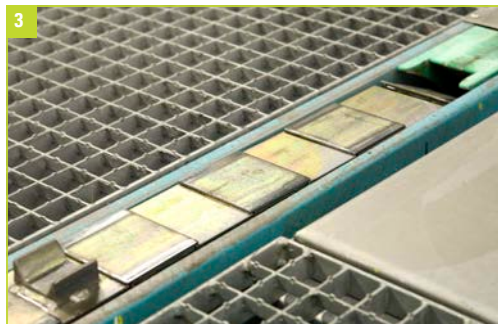


Illustration 4:
Chain with prism-shaped
supports (fixed side)

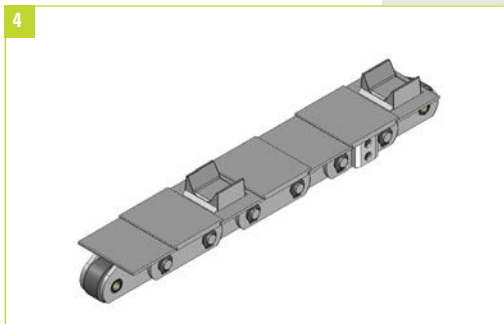


Illustration 5:
Spray booth chain with
sealed bearing rollers
to minimize surging

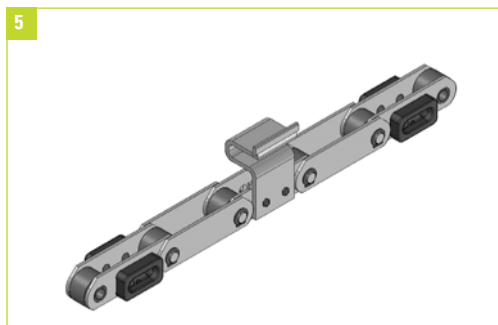
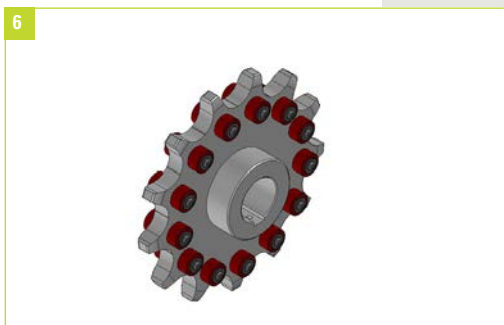


Illustration 6:
Sprocket with patented
noise dampening system



Longitudinal conveyor – oven application

After coating, the car bodies are moved through an oven, wherein the temperatures can reach up to 250°C/482°F.

Oven chains are available in lube-free configurations, which are carefully engineered for the extreme temperature variations this process involves.

For this application, oven chains are used to move the skids or support frames with the car bodies the oven. To compensate for irregularities with the skid positioning, these chains are very often supplied with a fixed and a loose side.

Illustration 1:
Oven chain with
inside mounted
rollers for fixed side

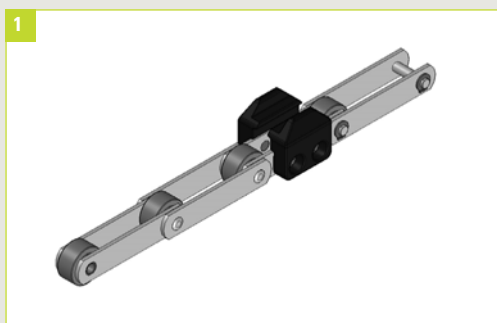


Illustration 2:
Equivalent oven
chain for loose side

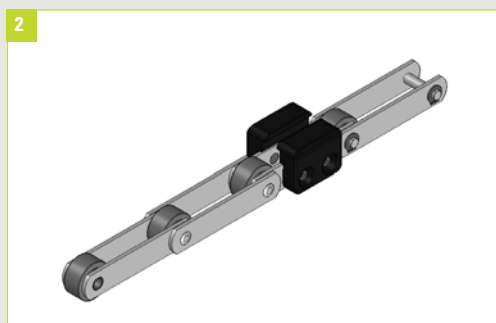


Illustration 3:
Oven chain with
outside mounted
rollers for fixed side

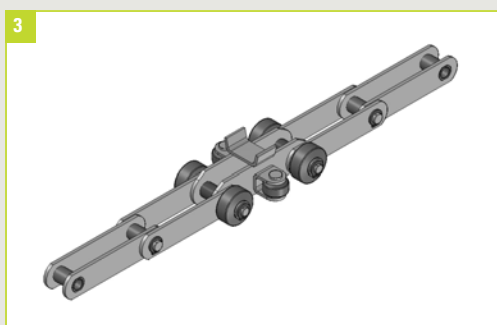


Illustration 4:
Equivalent oven
chain for loose side

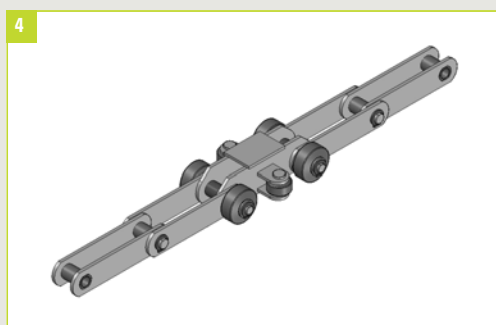


Illustration 5:
Lube-free oven
chain with mounted
top plates

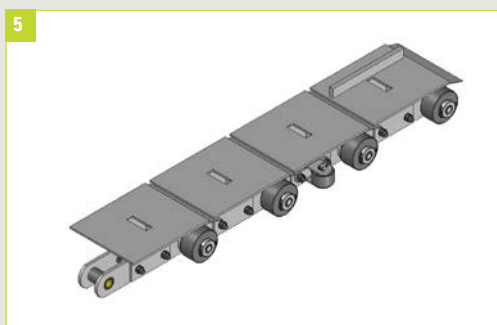


Illustration 6:
CC5-chain



Longitudinal conveyor – buffering

To compensate for different production figures of individual lines, conveyors for buffering are required. These buffering lines store the car bodies and are equipped with accumulation chains.

Such systems are very robust and therefore a cost-effective alternative. Depending on the load, the high roller sequence can be chosen to meet your load requirements.

Illustration 1:
Lube-free accumulation chain with high roller and guide-wheel strip combination

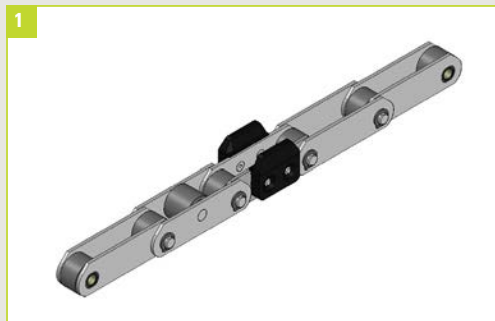


Illustration 2:
Lube-free accumulation chain



Illustration 3:
Lube-free accumulation chain with two high rollers for skid carriage

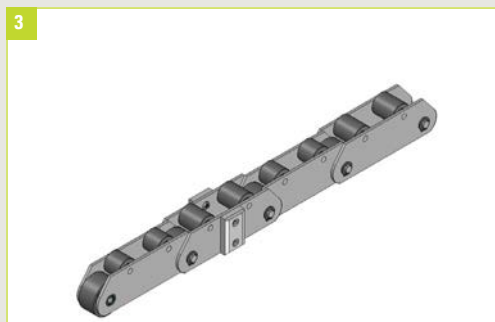


Illustration 4:
CC5-B chain with high rollers



Prior to the coating steps of the paint shop, the car bodies need to be chemically cleaned. During the pre-treatment they pass through several consecutive dip tanks.

Afterwards, the first coating – the Cataphoretic Dip Paint – is carried out in another dip tank.

For both processes two different chain conveyor systems are utilized:

- » RoDip-conveyors
- » Pendulum conveyors

Chains for submerged body conveying

Submerging of a car body in a dip tank



RoDip-conveyor

In the RoDip-system the chains are operated horizontally and only have to pass through sprockets at the conveyor end for circulation.

The car bodies are moved through the dip tanks by rotation. For this, the RoDip chains are equipped with rotational supports to which the car bodies are locked with their individual rotary axles.

Illustration 1:
Rotation tunnel with
rotary axles and RoDip
chains at each end



Illustration 2:
Car body during
rotation



Illustration 3:
RoDip chain: At the
rotation supports the
load is carried by ball-
bearing support rollers

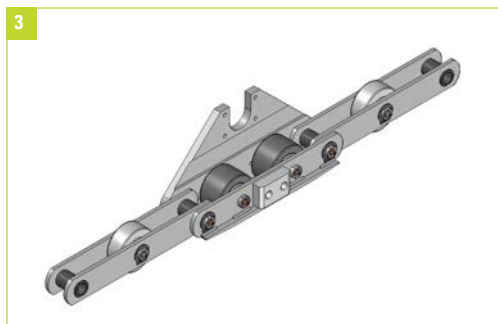


Illustration 4:
Low-maintenance
chain hinge with the
KettenWulf Sandwich-
Sealing System

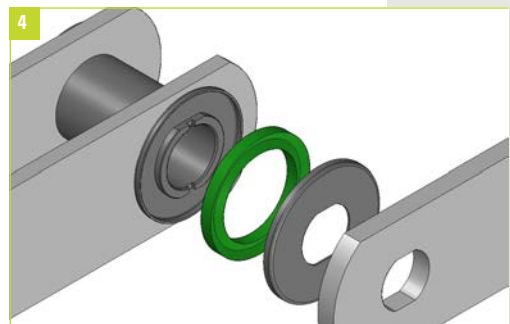


Illustration 5:
Rotation support rollers

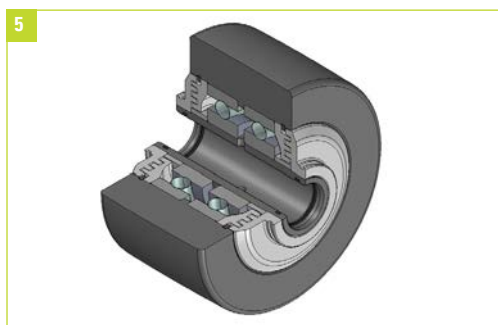
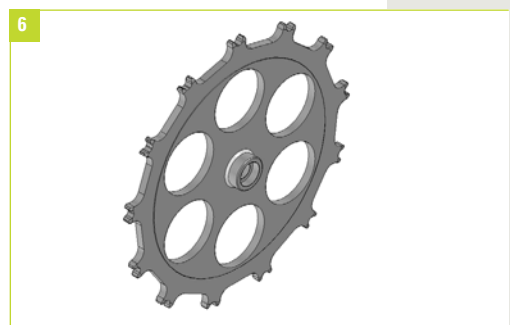


Illustration 6:
Return sprocket for
RoDip-system



Pendulum conveyors

Pendulum conveyor with sprockets

In this type of application the pendulums are fixed to the pendulum chain. The chain is returned using a sprocket system.

Specifically engineered sprockets from KettenWulf are used particularly in such conveyors. These engineered sprockets have many advantages over ordinary sprockets since changing a rim or a tooth gap insert saves both costs and decreases down time.

Illustration 1:
Pendulum conveyor chain in the pre-treatment system

Illustration 2:
Sprocket with exchangeable tooth gaps



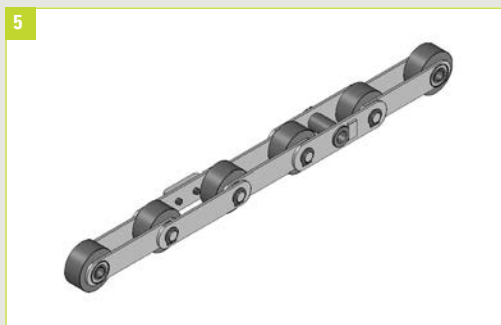
Illustration 3:
Pendulum conveyor chain in the Cataphoretic Painting dip tank

Illustration 4:
Pendulum conveyor chain with rollers located at the middle of the chain pitch



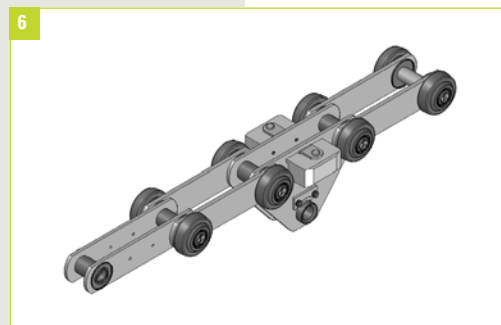
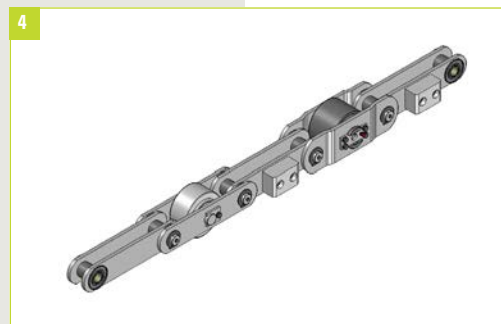
Illustration 5:
Pendulum conveyor chain with rollers located over the chain bushings

Illustration 6:
Lube-free pendulum conveyor chain



Pendulum conveyor with return arches

Pendulum conveyor chains for return arches have outside-mounted rollers with ball-bearings, which run in U-profiled track systems. These chains are not driven by sprockets, but by means of a caterpillar chain.



Lubrication-free and low-maintenance pendulum chains

The chain hinges of a pendulum chain can be built in a lubrication-free or low-maintenance configuration. Due to the harsh environment caused by the pre-treatment chemicals and the cataphoretic paint, the chain hinges of low-maintenance chains must be protected with our patented Sandwich-Sealing System. This system shields the grease in the pin and bushing areas from infiltration of chemicals or paint and thus allows for longer re-lubrication intervals.

Moreover, the Sandwich-Sealing System not only protects the chain hinges and reduces grease consumption, but also improves your painting results considerably since there is less debris in your system.

Lube-free chains are properly sealed by the Sandwich-Sealing System to allow for a smooth chain operation. No lubrication is required.

Illustration 1:
Sandwich-Sealing
System with interior
lip sealing

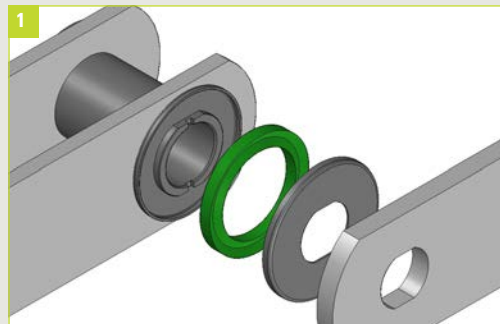


Illustration 2:
Re-lubrication system
with the Sandwich-
Sealing System

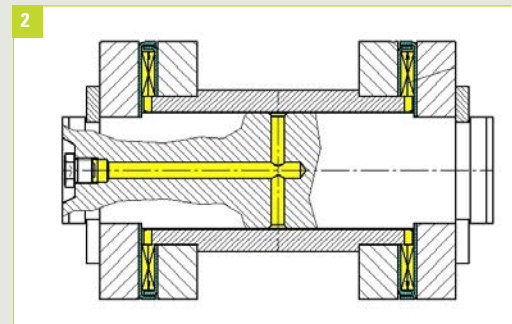


Illustration 3:
Sandwich-Sealing
System for lube-
free chains

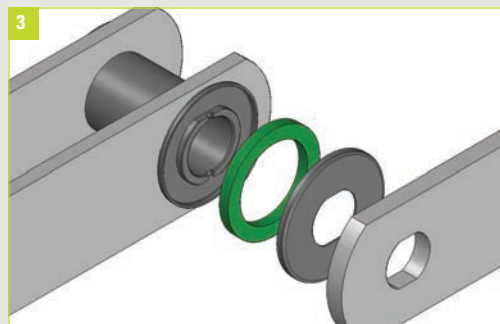
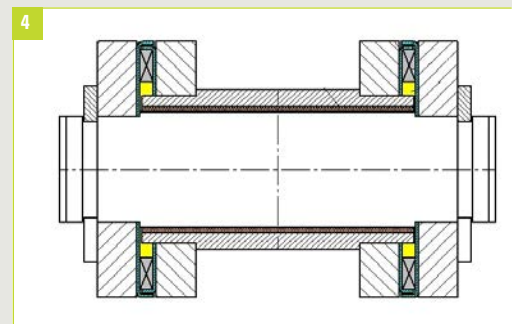


Illustration 4:
Lube-free chain
with the Sandwich-
Sealing System



Slat conveyors are used for transportation of car bodies on skids for assembled vehicles in several parts of an automotive plant:

- » Body Shop
- » Final Assembly
- » Finishing and Fluid Filling
- » Water Test
- » Waxing

For slat conveyors, primarily lubrication-free chains are used due to accessibility issues, lower maintenance effort, and less contamination caused by old grease, such as waste water from the water of water test conveyors.

Chains for slat conveyors

Double-strand slat conveyor in a finishing line



Slat conveyors – body shop

In this department the car bodies are moved with skids or support frames. A re-lubrication of the chains is especially problematic in this application since abrasive grinding dust is swept into the chain hinges by the oil from the lubricator. Therefore, KettenWulf has developed specific lube-free slat conveyor chains, which also use the patented KettenWulf Sandwich-Sealing System for smoothly operating chains.

Illustration 1:
Sandwich-Sealing
System for lube-free
chain executions

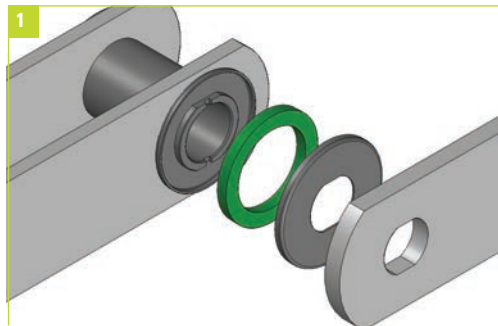


Illustration 2:
Chain hinge with the
Sandwich-Sealing
System in a conveyor
with grinding dust
exposure



Illustration 3:
Lube-free double-strand
chain with outside
mounted rollers

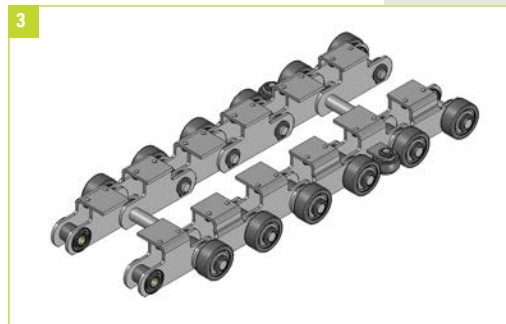
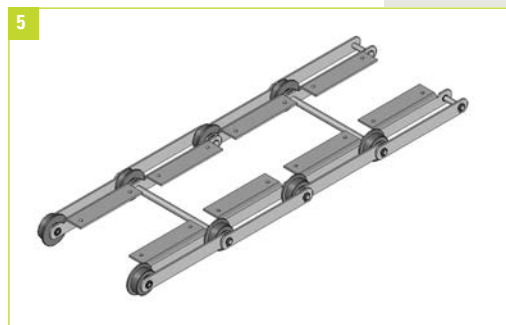


Illustration 4:
Chain hinge with
flanged rollers and
the Sandwich-Sealing
System after several
years of grinding
dust exposure



Illustration 5:
Lube-free double-
strand chain with
inside mounted rollers



Slat conveyors – finish area, fluid filling and final product inspection

For ergonomic reasons, in this section of the plant, it is usually necessary for staff and equipment to move along with the vehicles. This is why the slat conveyors can have a width of up to 4m/12ft.

In the fluid filling area, the chains can be protected against spills and debris by coatings and sealing systems. Lubrication-free technology is also available.

Illustration 1:
Slat conveyor with
4m/12ft. wide slats
in finishing area



Illustration 2:
Two double-strand
chains in combination
with two single-
strand chains

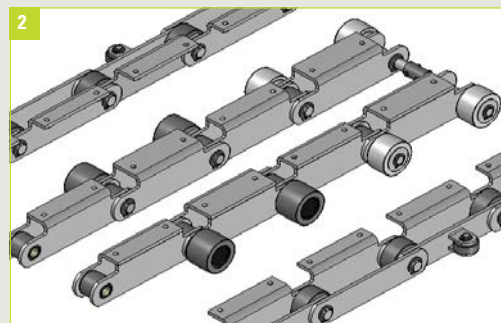


Illustration 3:
Slat conveyor in the
finishing area and fluid
filling, with staff stand-
ing on the conveyor



Illustration 4:
Installation of double-
strand chains in a new
automotive plant



Illustration 5:
Double-strand con-
veyor in final product
Inspection line

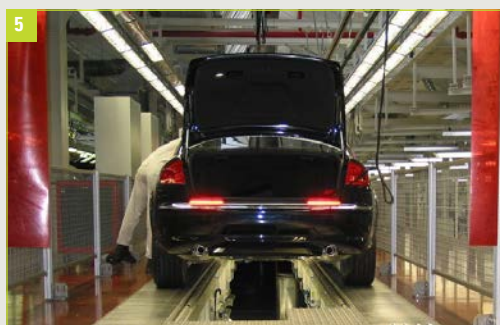
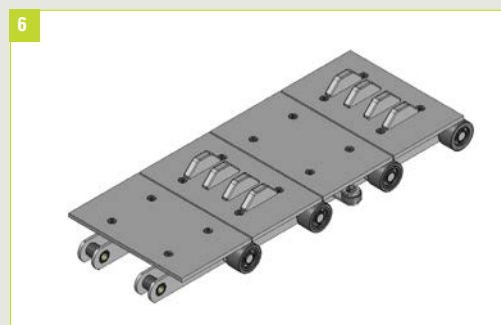


Illustration 6:
Double-strand conveyor
chain with mounted
wheel carrier plates



Slat conveyors – final assembly

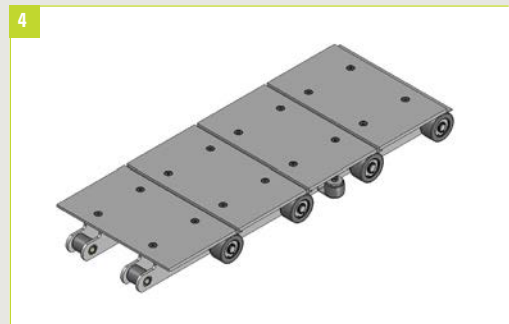
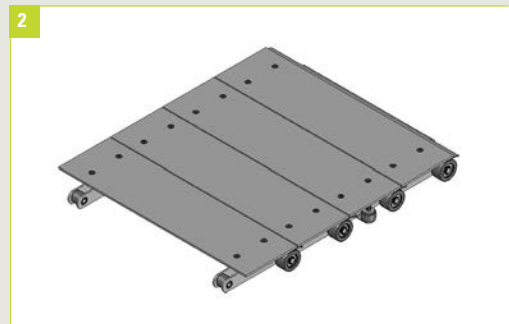
Requirements are toughest in final assembly lines where the conveyors usually are the longest and experience high level wheel loads. To cope with the given conditions, KettenWulf designs and engineers special conveyor chains according to the requested specifications.

Illustration 1:
Automatic wheel assembly with double-strand chain; vehicles standing on their own wheels for the first time.

Illustration 2:
Double-strand chain with wide slats for twin wheels

Illustration 3:
Finishing line with a shaft distance of 173m, conveyor speed 0,8m/min

Illustration 4:
Double-strand chain with mounted carrier plates



Slat conveyors – water test, vehicle washing & conservation

Due to contact with washing water, the conveyor chains for Water Test Conveyors are primarily made of stainless steel. Ideally, these chains should be lube-free and equipped with the Sandwich-Sealing System and sealed rollers to avoid contamination of the washing water with lubricants.

After final assembly and water test some vehicles pass through the protection area for wax coating to protect them for overseas shipping. KettenWulf lubrication-free technology ensures a high process-safety since the conveyor chains can operate without being impacted by external factors.

Illustration 1:
Vehicles entering the Water Test



Illustration 2:
Slat conveyor chain with slats sliding on tracks

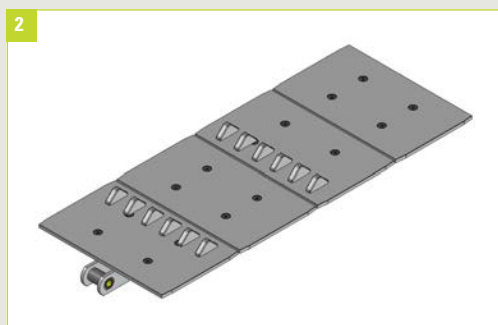


Illustration 3:
Vehicles leaving the Water Test onto the Finish Line



Illustration 4:
Double-strand chain with outside mounted rollers and wheel carrier pieces

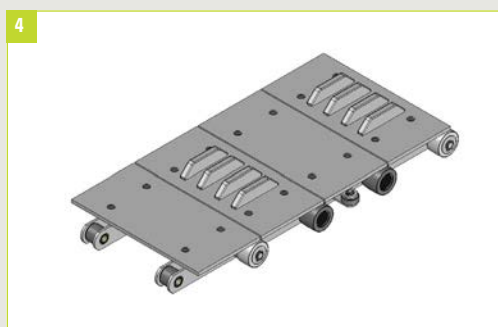
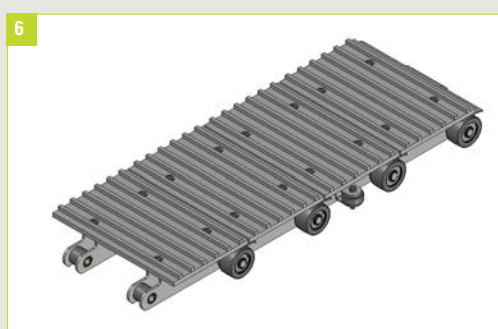


Illustration 5:
This slat conveyor chain in the Conservation area is operated in intervals with a speed of up to 40m/min. The sprockets are equipped with the patented KettenWulf noise dampening system.



Illustration 6:
Double-strand chain with anti-skid surface



Sprockets are a critical factor for the capacity and endurance of every chain system. In order to ensure the quality of all products, KettenWulf relies on the production of their own sprockets.

Besides sprockets with DIN/ ISO/ ANSI gearing, our product range also covers individual solutions for the automotive industry. For instance, the use of KettenWulf sprockets with segmented tooth rims or exchangeable tooth gaps ensures a considerable reduction of maintenance costs and down time. Moreover, the patented KettenWulf noise dampening technology allows for better and healthier working conditions.

KettenWulf sprockets

KettenWulf produces sprockets in various dimensions and designs according to customer requirements



Optimum tooth forms for all chain types

KettenWulf provides matching sprockets for all applications and chain types, be it with DIN standard tooth forms or optimized tooth shapes.

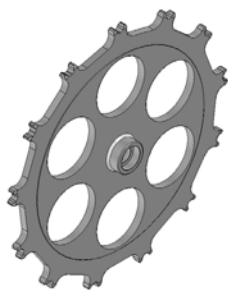
Parts of the sprocket such as tooth rims or tooth gaps can be heat-treated or induction-hardened for a better surface hardness.

For maximum service life, we only use high-grade material and state-of-the-art production technology.

Illustration 1:
Sprocket for RoDip-chain

Illustration 2:
Sprocket with exchangeable tooth gaps

1



2



Illustration 3:
Sprocket with patented noise dampening system

Illustration 4:
Sprocket with a three-segmented sprocket rim

3



4

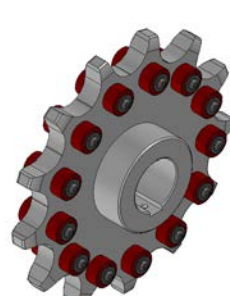
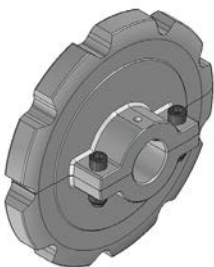


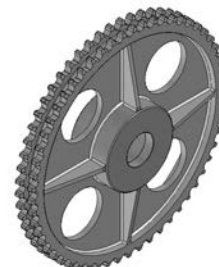
Illustration 5:
Split sprocket with one-sided hub

Illustration 6:
Sprocket for roller chain

5



6



For further information please visit our website at www.kettenwulf.com or request the following company brochures:

- » Focus on the KettenWulf Group
- » Chains and sprockets for the bulk material handling industry
- » Chains and sprockets for the steel and aluminium industries
- » Chains and sprockets for the wood industry
- » Chains and sprockets for the wood industry
- » KettenWulf conveyor chains and sprockets
- » KettenWulf roller chains

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