

CHAIN TYPE OVERVIEW GUIDE



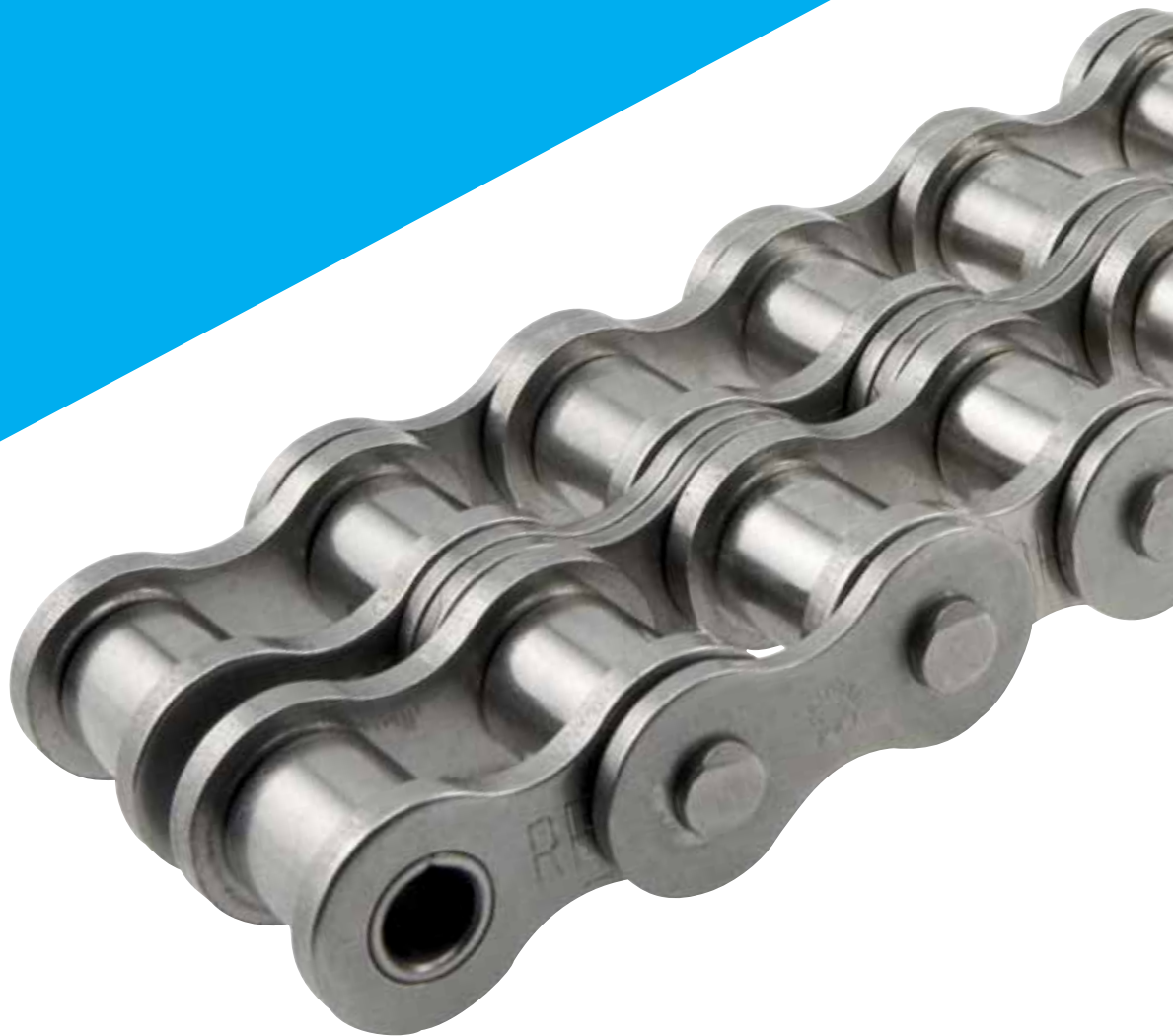
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Wippermann Catalogue 2015.

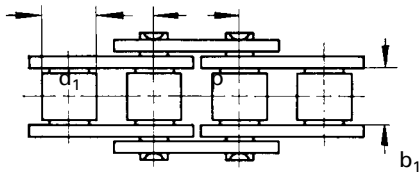
A TransDev Technical Report

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The information in this Technical Guide can also be found in the Wippermann Catalogue 2015. It forms part of a series designed to help you specify and identify the optimum Wippermann chain solution for your needs.

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Steel link chains

Generally, steel link chains can only operate on one plane, and they are primarily used as drive elements for chain drives.

They are precisely determined by three main measurements:

p = **Pitch** is the distance from pin centre to pin centre.

b_1 = **Inner width** is the distance between the inner plates.

d_1 = **Roller diameter, bushing diameter or pin diameter** is the outer dimension of the cylindrical parts between the inner plates.

The characteristic feature of a steel link chain is the chain joint.

It consists of an outer and an inner link. On this joint the calculated bearing area equals the projection of the pin onto the bearing area of the inner link. It has a different size depending on the type of chain.

In the following overview the characteristic features of various types of steel link chains are briefly described.

Galle chains

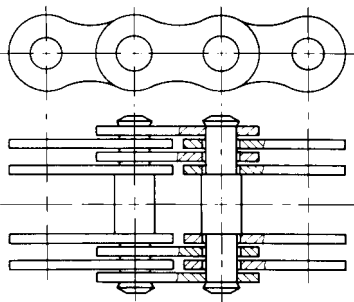
Galle chains were named after their inventor André Galle (1761-1841). A Galle chain is the simplest type of steel link chain.

The plates rotate directly on the pin lug. With this type of chain the bearing area is very small.

Therefore the chain speed should not exceed 0,3 m/s.

Consequently, Galle chains are less suitable for power transmission, and they are almost exclusively used as load chains (e.g. counterweight chains, lock chains and tack chains).

Galle chains on request



Leaf chains

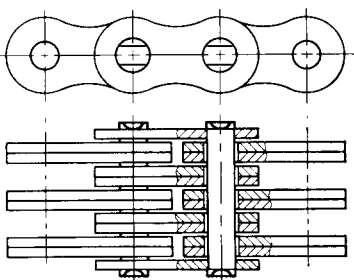
Leaf chains in normal design or reinforced design are used as load chains in cranes, hoisting gear and lifting equipment as well as for counterweights, e.g. on machine tools, and also to transmit back-and-forth movements.

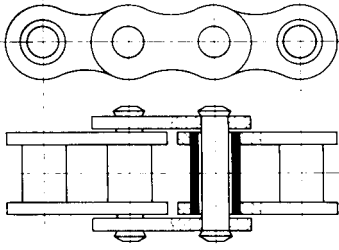
The plates of leaf chains are punched from high-grade steel and are subsequently hardened and tempered to guarantee high fatigue strength. Very narrow tolerances ensure that all plates bear the same load proportions. Pins made of high alloy case-hardened steel are tempered to achieve high wear resistance. The tightly adjoining plates are designed in various combinations and rotate on the pins.

One special design is the heavy-duty type series U. On chains of this type all plates are mounted with a sliding fit and are also secured with laterally attached riveted disks. This design guarantees an even load distribution and reduces the bending load of the pins. These chains were especially developed for heavy loads and operations under harsh conditions. Due to their high fatigue strength they are particularly suitable for such application areas.

Due to their design (no tooth meshing) leaf chains cannot transmit torques. Their force direction, however, can easily be deflected by means of rollers. Even with a small working width they have a high breaking load.

Dimensions as of page 68 ff.



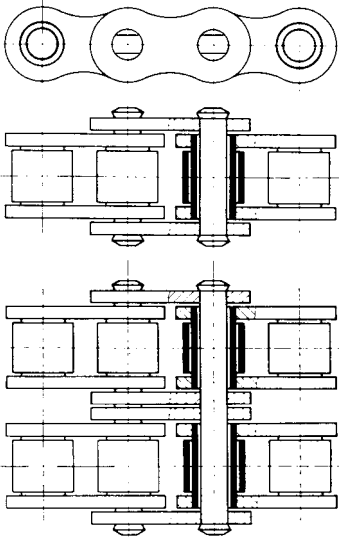


Bush chains

Bush chains are more wear-resistant than Galle chains. The inner links consist of two inner plates with two force-fitted bushings. The outer links consist of two outer plates with two force-fitted and riveted pins.

Chain speeds of up to 5 m/s are possible depending on the pitch.

Due to their robust design bush chains are mainly used as drive and conveyor chains, particularly where there are rough operating conditions, e.g. in mining or construction site equipment.



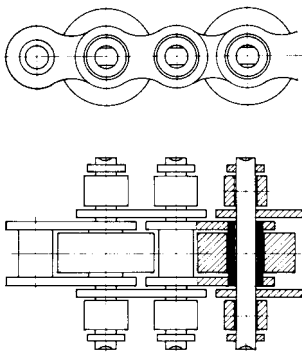
High performance roller chains

Compared to bush chains, high performance roller chains are of better quality due to the use of higher steel grades and heat treatment. Furthermore, they are produced with higher accuracy and narrower tolerances. The visible difference is the rollers, which are mounted on the bushings with running fit, and which absorb the meshing impact in the sprocket and thus reduce sprocket wear. Plates and rollers are hardened and tempered in order to achieve high fatigue strength, whereas bushings and pins, which are subject to wear, are case-hardened.

For high power transmission under restricted mounting conditions multi-strand roller chains can be used. This means that several simplex roller chains are connected by means of an end-to-end pin to form one single unit. Duplex and triplex chains are standardised.

Roller chains can be employed universally and are therefore the most common chain type. They are not only used as drive and gear chains in machine construction, but also in special designs with attachments for transport and conveyance purposes or instead of rack and pinion arrangements.

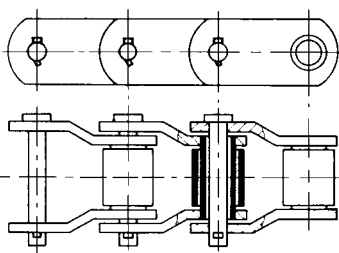
Roller chains RF made of stainless and acid-resistant steel grade 4301 have proved their value on corrosion-endangered drives and because of their anti-magnetic properties for many years. They are mainly used in the chemical, beverage and food industry.



Accumulator chains

Accumulator chains are employed, when accumulation of piece goods during transportation is required. The chain runs on lateral support rollers, whereas the conveyor roller in the middle runs freely.

The particular advantages of this type of chain lie in the simple control, the exact guiding possibilities as well as in the smooth transition from one direction to another without abrupt acceleration. During intentional or unintentional accumulation of the transported piece goods no excessive impact pressure is put on the following transport units since the power and free conveyor chain will continue to run smoothly under the goods until the end of the accumulation, when transportation will continue due to friction.



Cranked link chains (Rotary chains)

Cranked link chains (Rotary chains) are in fact roller chains, but only cranked plates are used. These plates help to give the chain a high amount of elasticity so that load impacts can easily be absorbed. It is also quite straightforward to repair cranked link chains since each individual link can be replaced.

Cranked link chains (Rotary chains) are mainly employed for applications with intermittent impacts and where the drive is exposed to rough soiling, e.g. in excavation machinery, crawlers for excavators and dozers or drilling equipment.

In order to avoid errors or misunderstandings please supply the following details:

Number of chains

⚙️-Chain No. of the basic chain

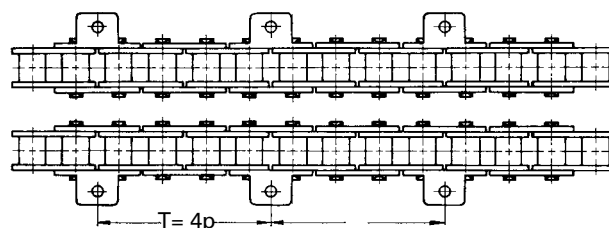
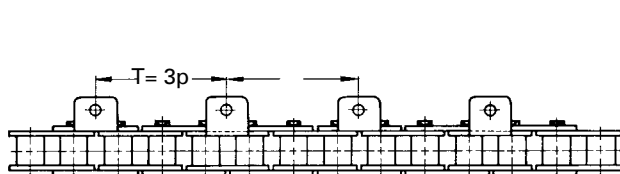
Type of attachment links

(e.g. A, B, C, D, E or F); for other special designs please state if single-sided or double sided attachments are required.

Attachment spacing T of special links

in (preferably even) multiples of pitch p

If attachments are also available on the inner link, the attachment spacing can be arranged in any way. In case of an odd number (e.g. $T = 3p$) the attachment is alternated on the outer and inner rings. If inner link attachments are not available, an odd number spacing can only be made possible by mounting a cranked connecting link No. 12 or a double cranked link No. 15. In this case the chain may only have 80 % of the breaking load!



Length of chain in metres and links

- When ordered by length in metres, the end links are always inner links. Connecting links must be ordered separately!
- When ordered by a certain number of links, this number should be divisible by the distance T of the special links (e.g. chain length 176 links, $T = 4p$, i.e. every 4th link is a special link; the chain includes $176 : 4 = 44$ special links).

If the chain length cannot be a multiple of T , but has to be longer or shorter for design reasons, this fact must be clearly stated as: "Does not work out even!"

In such a case the distance T at the end of the chain will be alternately longer or shorter.

Chains with an even number of links will be delivered with a connecting link and are ready for assembly. With a distance of $T = 2p$ (each outer link is a special link) the connecting link is supplied in the respective special design. With a distance of $T = 4p$ and more the connecting link will be supplied in the standard design.

Please note: When cranked links are used, roller chains may only have 80% of the breaking load. Avoid if possible!

Matched or pre-stretched special chains

Parallel running chain strands used for transport and conveying purposes are often required to have highly matching opposite attachments. At extra cost we will supply the appropriately matched chain strands and mark them accordingly.

When ordering your chain, please state clearly: Please supply matched, pre-stretched and marked chain strands!

The installation of guide rails is recommended to help support and guide chains with long span lengths.



Questionnaire for chain drives

Fax: +44(0)1202 677 466 Email: sales@transdev.co.uk

What is to be conveyed or driven by the chain? (If an existing chain drive is to be replaced, please state which one!)

.....

.....

Chain drive

Please underline where applicable and enter the respective data if necessary!

Power requirement
(max. power to be transmitted)

power output $P = \dots\dots\dots$ PS/kW torque $M = \dots\dots\dots$ Nm tensile force $F = \dots\dots\dots$ N

Drive
(type and performance)

$\dots\dots\dots$ / $\dots\dots\dots$ hp/kW
(e.g. electric motor, internal combustion engine / 2, 4, 6 cylinders etc.)

Chain loading

operation period $\dots\dots\dots$ hours/day

☐ regular ☐ cyclic ☐ impact ☐ alternating direction $\dots\dots\dots$ times per hour

☐ interruption (re-start) approx. $\dots\dots\dots$ times per hour

Centrifugal mass for impact compensation

☐ existing ☐ possible ☐ not existing ☐ not possible

Axial distance

$a = \dots\dots\dots$ mm

shaft distance is adjustable by $\dots\dots\dots$ mm / not adjustable

☐ jockey sprocket ☐ clamping rail ☐ clamping spring ☐ automatic chain tensioner

Ambient influences

☐ nothing in particular ☐ dust ☐ fibres ☐ sand ☐ humidity

temperatures up to $\dots\dots\dots$ °C corrosion caused by $\dots\dots\dots$

Chain protection box

☐ dust proof ☐ not dust proof ☐ installation not possible

☐ chain unprotected ☐ chain protected by engine / machine housing

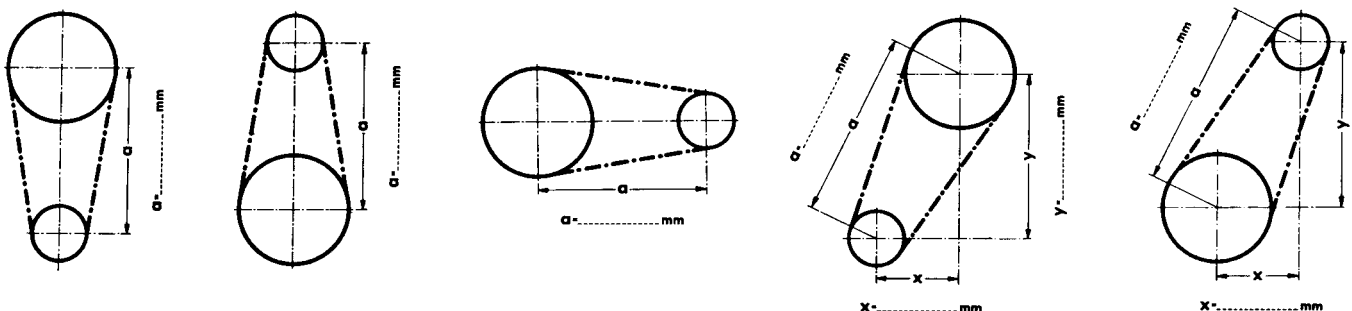
Lubrication

☐ not permitted ☐ manually (occasionally) ☐ drip feed

☐ oil bath ☐ pressure circulation

Sprockets

	Driving sprocket	Driven sprocket
Speed or planned transmission ratio	$n_1 = \dots\dots\dots$ rpm $i = \dots\dots\dots$	$n_2 = \dots\dots\dots$ rpm
Sprocket diameter (\varnothing) Largest possible incl. chain	max. = $\dots\dots\dots$ mm	max. = $\dots\dots\dots$ mm
Sprocket width Largest possible incl. chain	max. = $\dots\dots\dots$ mm	max. = $\dots\dots\dots$ mm
Sprocket design	$\dots\dots\dots$	$\dots\dots\dots$
Hub bore (shaft \varnothing)	$d_1 = \dots\dots\dots$ mm	$d_2 = \dots\dots\dots$ mm
Hub length	$L_1 = \dots\dots\dots$ mm	$L_2 = \dots\dots\dots$ mm
Hub design One-sided: standard Double-sided: symmetrical or asymmetrical	$\dots\dots\dots$	$\dots\dots\dots$
Installation on the shaft (groove sizes according to DIN)	$\dots\dots\dots$	$\dots\dots\dots$



Please enter the dimensions of the requested drive into the drawing. The driving wheel designation should be T. Please indicate the rotation direction by an arrow and in case of alternating rotation direction by a double arrow (\longleftrightarrow).



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Trans-flat

TYCO

Drive-flex

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Founded over 50 years ago, TransDev are major manufacturers and stockists of major timing and conveyor belt and chain brands; with in-house customisation available.

We are the UK's largest manufacturer of Pulleys, Gears and Sprockets. Large gear, pulley and sprocket stocks for rapid rework and made-to-order are a speciality. We are also a 'one stop shop' for Plastic materials, machining, routing and injection moulding.



Belts

Pulleys

Chain

Sprockets

Gears

Hardware

Plastics

Wippermann Technical Chain Guides:

Chain Drive Design Guide
Chain Maintenance Guide
Chain Type Overview Guide
Leaf Chain Guide
Roller Chain Guide
Sprockets Guide

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