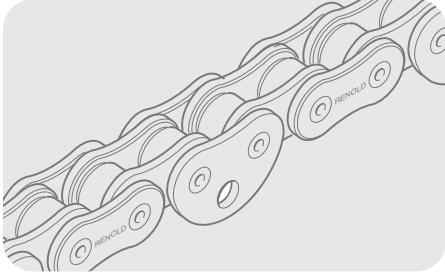


Section 4

Industry Applications

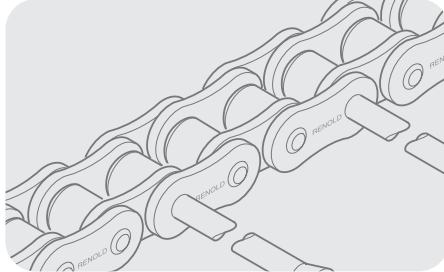
Special Engineered Chain



Aircraft chain

- 8mm to 12.7mm pitch
- Conforms to BAe spec.

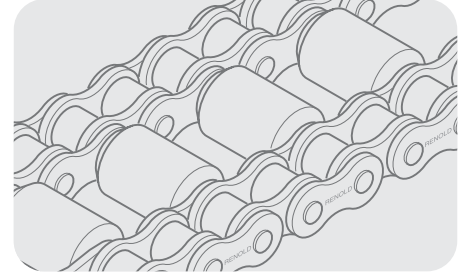
Renold aircraft chain provides a flexible connection for use in control systems and other operating gear, including the transmission of power, where a positive tension is required.



Can manufacture

- 9.05mm and 25.4mm pitch chain.

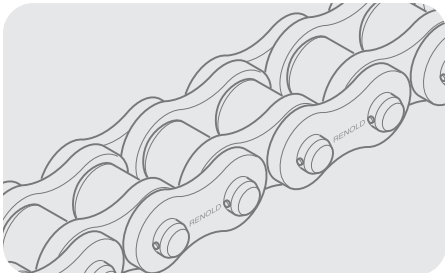
Standard and hollow bearing pin transmission chain fitted with plastic tipped, extended bearing pins used for transporting freshly painted cans through drying ovens. Special high temperature lubricant available on this product.



Escalator drive chain

- 584107
- 25.4mm pitch
- Breaking load 129.4 kN.

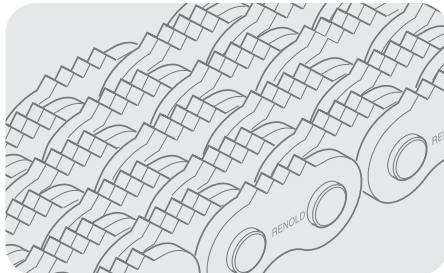
Two strands of matched chain connected by extended bearing pins and fitted with plastic rollers for silent drives in escalators.



Marine diesel chain

- 110245, 110281, 110325 and 110366.

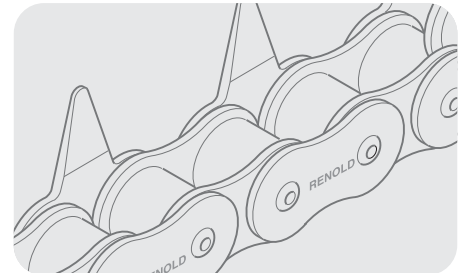
Matched in sets of two or three strands acting as timing chains within large marine diesel engines.



Pipe wrench chain - oil industry

- 586 927
- 31.75mm pitch.

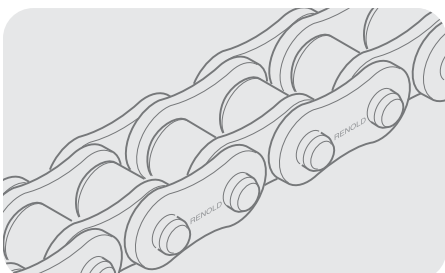
The oil industry use a pipe wrench chain system to assemble 'Down Hole Pipes'.



Polythene film production

- 6.35mm to 38.1mm pitch.

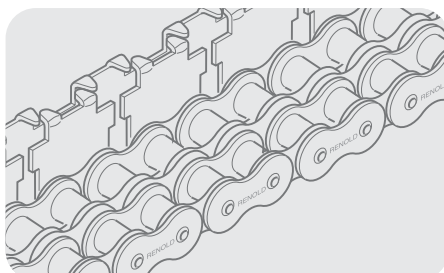
Sharpened spiked shaped attachments pierce the polythene and pulls it through various production processes.



Quarry chain - for rock drilling

- ANSI HV series 50.8mm pitch.

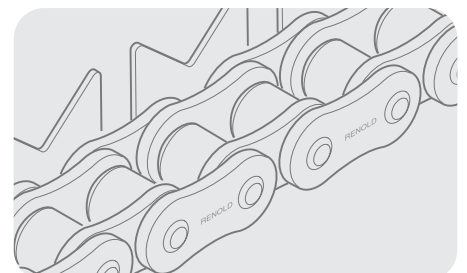
Face rock drilling machines with six chain driven heads are used to drill holes for explosive charges.



Sheet metal handling

- 19.05mm pitch and 25.4mm pitch chain.

'Bent-claw' attachments hold square rods which support steel sheets through printing and drying processes.



Small component manufacture

- 8mm, 12.7mm and 15.8mm pitch chain.

A typical V-shaped attachment plate used to locate small electrical components such as resistors and capacitors, through various production processes. The chains generally run in pairs with plates formed to suit specific products.

Aircraft Chain

Quality

Renold has manufactured and supplied chain for all types of aircraft for about 100 years and the company has been able to issue inspection certificates since 1927. Renold is an approved supplier to British Aerospace (Approval No. BAe/AG/3049/CHD).

The technical guidance notes detailed in this catalogue should be read in conjunction with the current requirements of the above mentioned and other similar authorities.

Function

Chain provides a flexible connection for use in control systems or other applications, including the transmission of power, where positive tension is required.

Correct and economical application of chain is, however, largely dependent upon an appreciation of the methods available for effecting connection of the chain to other parts of the system. When standard Renold chain and non-reversible chain are used in conjunction with the appropriate sprockets, guards and connectors, they make incorrect assembly impossible.

With the development of new aircraft, applications for chain are continuously increasing. Our technical staff are at the disposal of design engineers and manufacturers for collaboration in the application of chain for aircraft use.

Typical applications within the industry are:

Controls

- Ailerons
- Aileron trimming tabs
- Control columns
- Elevators
- Elevator trimming tabs
- Engine
- Propeller pitch
- Rudder
- Rudder trimming tabs

Operating gear

- Cowl gill
- Cockpit hood
- Door operation
- Fire interrupter
- Fuel valve
- Flight refuelling systems
- Engine nozzle rotation
- Landing flaps
- Loading hoists
- Radiator shutter
- Seat adjustment

Specification

Adaptability

The adaptability of chain makes it ideal for control runs. Changes in directions are readily made by the use of guide pulleys or sprockets. By the inclusion of bi-planar blocks, changes in the plane of motion through 90 degrees can be made.

Durability and strength

Our specification of specially selected steels enhanced by our own heat treatment, apart from providing the highest load/weight ratio, ensures minimum chain wear in service and the ability to withstand the most arduous flying conditions.

Precision manufacturing techniques, coupled with our proven chain specification, provides a positive, smooth and uniform action. The resilience of chain is also a safeguard against shock loading.

Benefits

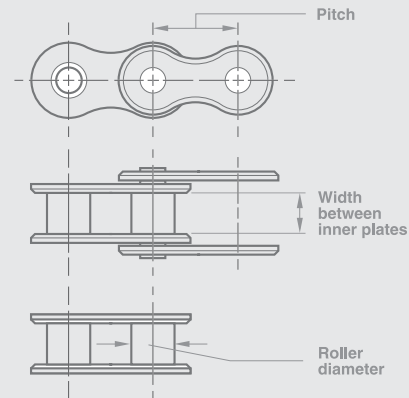
- Quality/certification
- BAe Approved
- Reliability
- Durability
- Safety
- Flexibility
- A Proven Track Record
- Experience



Aircraft Chain

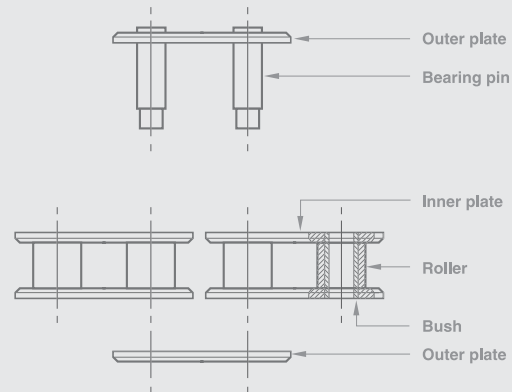
Gearing dimensions

A simple roller chain has three principal dimensions (detailed in diagram one) by which it can be identified. These dimensions, referred to as the gearing dimensions, since they are related to the sizes of the sprockets on which the chain will run, are the PITCH, the WIDTH BETWEEN THE INNER PLATES and the ROLLER DIAMETER.



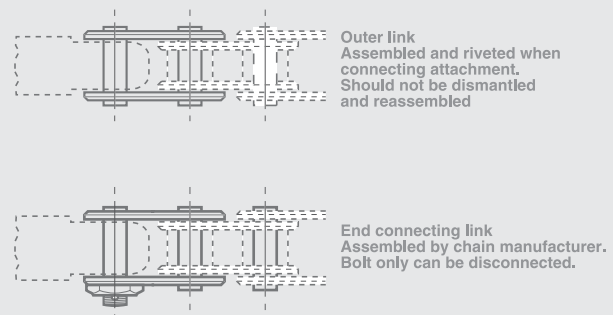
Component parts

The component parts of an outer link and an inner link of a simple roller chain are illustrated in diagram two to demonstrate the method of chain construction.



Attachment links

The various types of attachment link used for attaching components to an aircraft chain are shown in diagram three. Attachments, customer free issue or Renold supplied, should be assembled into the chain by Renold before proof loading takes place.



Outer link

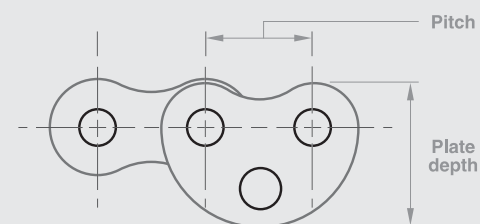
Assembled and riveted into the chain when connecting an attachment. Never dismantle and re-assemble.

End connecting link

Assembled into the chain by Renold. Bolt only may be disconnected.

Non-reversible chain

The component parts of non-reversible chain shown in diagram four are similar to simple chain with the exception of the special outer plates assembled into the chain at four pitch spacing.



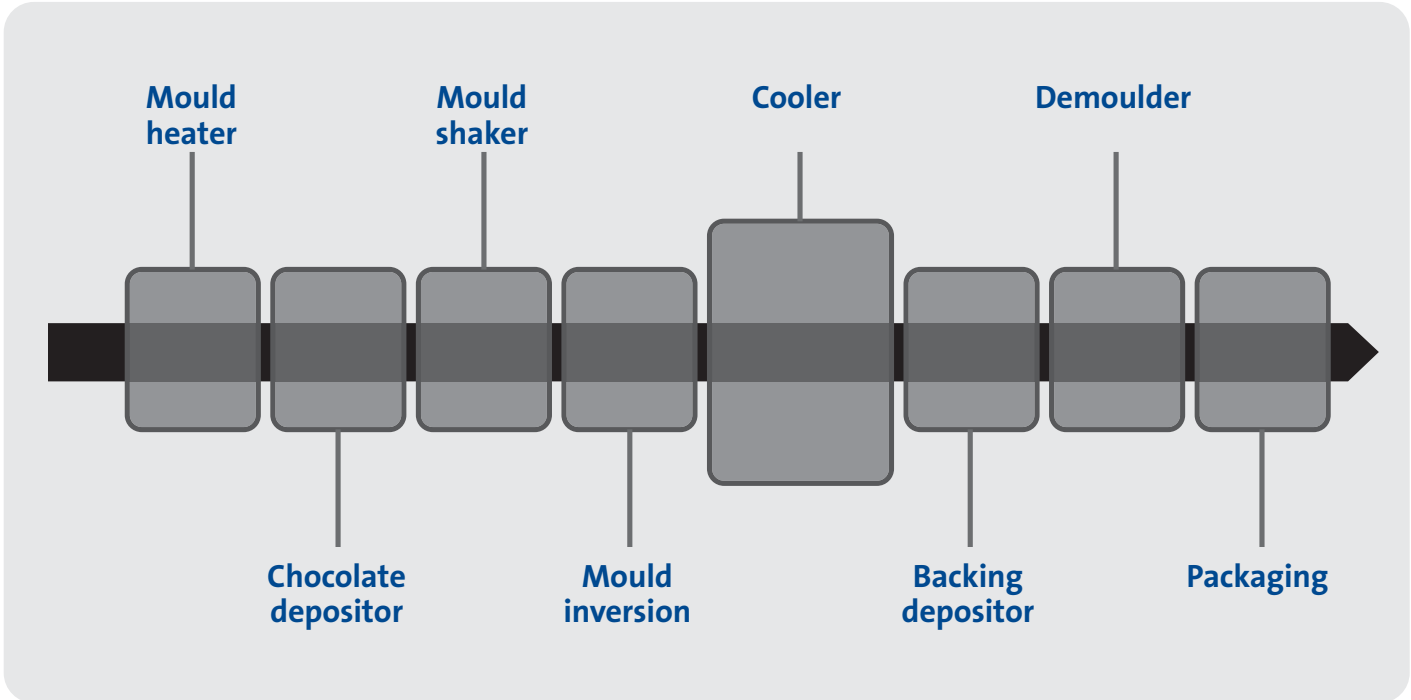
Chocolate Industry Chain

Renold supplies a comprehensive range of chain to meet the demands of manufacturing confectionary products. Environmental requirements such as hygiene are catered for as well as considerations such as corrosion and wear resistance.

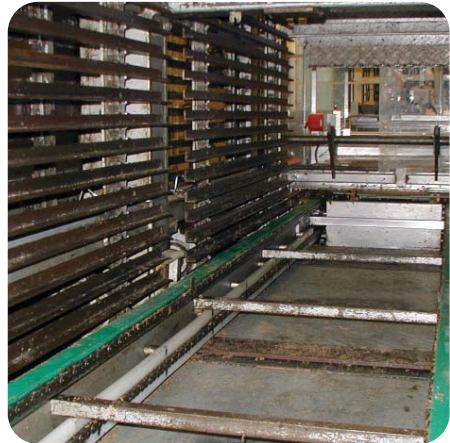
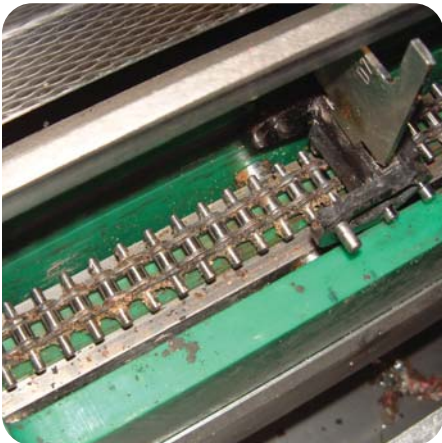
Standard and non-standard attachments are available to suit your needs. Renold has the experience to provide products and support to keep your high volume production lines operational.

We don't just provide products that make a difference; you get the best services from Renold too!

At every stage of the process Renold provides exactly what you need. Precision in our chain ensures accurate indexing of moulds along a production line, minimising waste chocolate.



Section 4



Food Industry Chain

One of the largest and most diverse industries imaginable, the processing, manufacturing and packaging of the world's food products delivers challenges to engineers looking to meet tough productivity targets. This requires first class technical support and the right product for the job.

Renold offers the most comprehensive range of chain products designed for the food industry and works with many of the leading international brand names that we encounter every day.

Chain aimed at reducing maintenance, delivering high levels of resistance to wear, fatigue and corrosion and keeping your production levels at their highest; that's our speciality!



Renold has options, whatever your application environment!

Conditions	The Chain Solution	
Washdown	Syno PB Syno SS Stainless steel chain	Hydro-Service chain Nickel plated chain Polymer bushed conveyor chain
Corrosive conditions - Mild (pH between 5 and 7)	Syno NP ^{3 4} Syno SS ^{3 4} Stainless Steel ^{1 3 4 5} Steriliser chain ^{1 3 4 5}	Polymer bushed conveyor chain ^{3 4} Hydro-Service chain ³ Nickel Plated ^{3 4}
Corrosive conditions - High (pH below 5 and above 7; temperatures above 60°C)	Nickel Plated	Stainless Steel ²
Cannot lubricate	Syno NP Syno SS	Syno PB
Direct contact with food	Stainless steel	Syno SS
High shock loads	Standard roller chain Standard conveyor chain	Engineering class chain
Heavy loads	Standard conveyor chain	Renold Synergy
Temperature: Hot or Cold (Between -40°C and 180°C. Above 180°C special lubrication would be required)	Stainless steel Syno SS Steriliser chain	Standard conveyor chain Engineering class chain
High humidity	Stainless steel Hydro-Service	Steriliser chain
High speed	Standard roller chain Double Pitch roller chain	Can feeder chain
Vertical system	Standard roller chain	Engineering class chain
Indexing / moulding applications	Standard roller chain	Apron chain
High Abrasion	Sovereign	

1 = Suitable for temperatures over 60°C (stainless steel and steriliser chain)
2 = Suitable for highly corrosive conditions of more than 60°C (stainless steel)
3 = Suitable for environments associated with general corrosion

4 = Suitable for environments associated with pitting or crevice corrosion such as salt water, moderately high temperatures or a pH of 3 - 5
5 = Suitable for environments associated with galvanic corrosion

Marine Diesel Chain

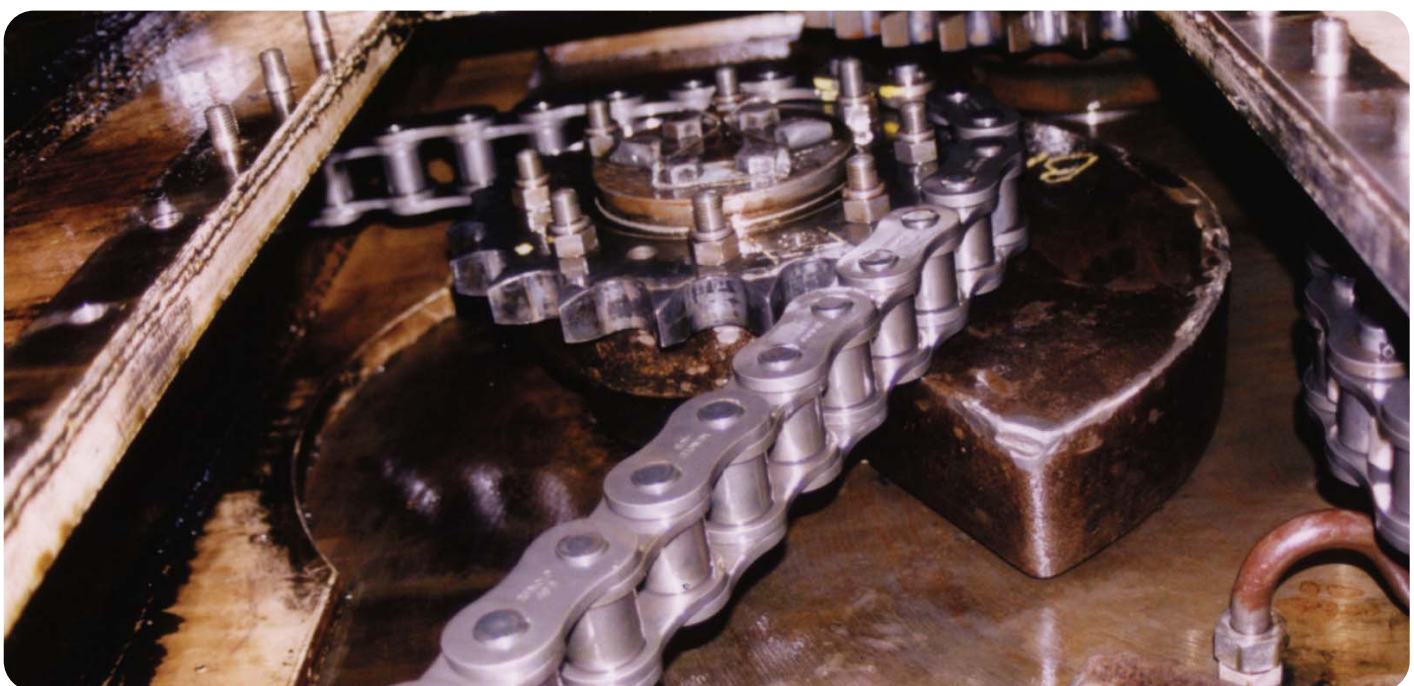
In one of the toughest and potentially most remote applications there is, chain is required to keep a ship's engine operational with a high resistance to wear and fatigue, which is where the expertise and design specification of a Renold chain comes into play.

Running at high speeds and with safety factors in mind, Renold manufactures chain specifically for marine diesel engines. The large pitch sizes, listed below, are matched prior to despatch to ensure optimum performance.

Renold manufactures chain not only for large vessels but also engines for small and medium sized engines too.

Renold design experience

- Specification makes safety a priority
- Wear and fatigue resistance is a Renold strength
- Chain manufactured specifically for the application

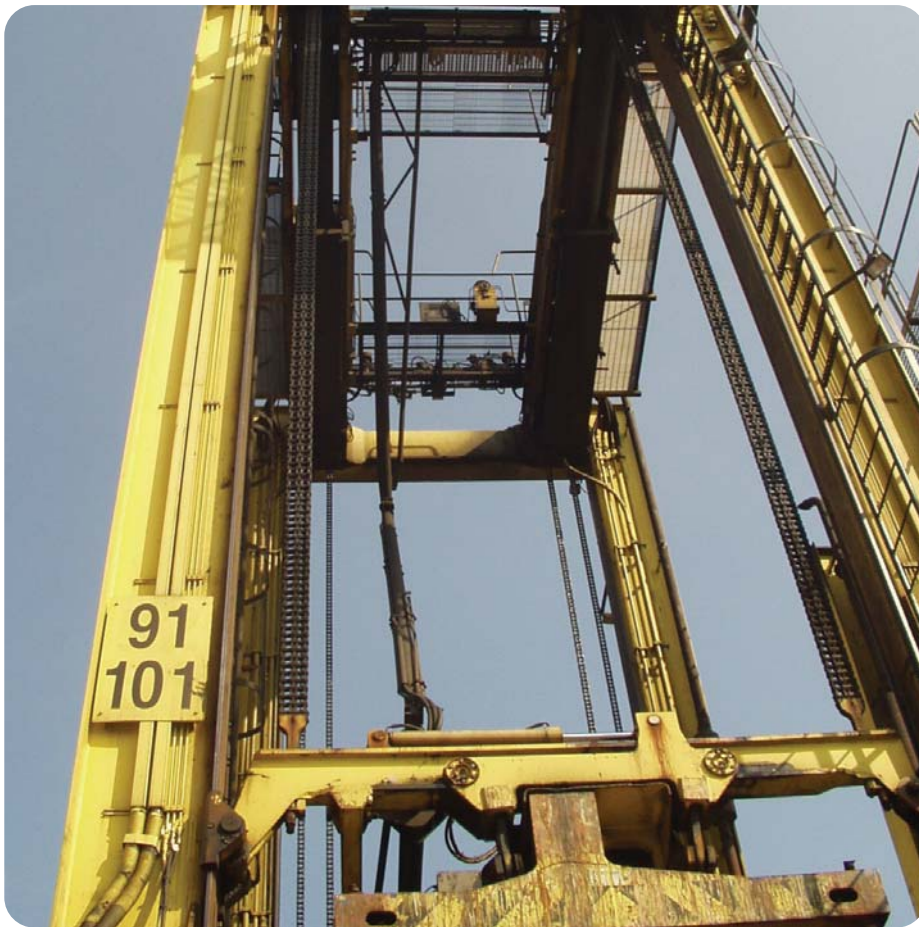


Ports & Container Handling Chain

Renold supplies a wide range of chain for lifting applications at ports around the world. With a comprehensive range of both roller and leaf chain for lifting machinery running on either wheels or rails, the Renold specification of designing chain to be highly resistant to wear and fatigue delivers lasting performance.

Factors of safety are critical when large payloads are being transported and Renold understands the importance of ensuring long working life based on product integrity.

- ANSI standard large pitch roller chain
- Differing specifications to suit application
- Wide range of leaf chain sizes
- Galle chain also available



Renold Oilfield chain is best because...

Renold Oilfield Chain

- API Approved
- Proven longer life in offshore environments
- Supreme performance at high speed and shock loads
- Excellent return on investment



Function

Renold oilfield chains are used on:

- Mud pump drives
- Engine compounds
- Tubular and casing draw works input
- Transmission drives
- Catshafts
- Low and high drum
- Rotary countershafts
- Rotary tables

In fact wherever chains are required in oilfields because reliability is paramount.

Key Features

- Close control of material specifications to ensure consistent response to heat treatment
- Renold's plate profile ensures optimum stress distribution for greater reliability
- Fatigue life is enhanced by shot peening and other pre-stressing processes on plates, bushes and rollers

- Renold's special holing processes for oilfield chain were specifically developed to give improved fatigue resistance while minimising susceptibility to stress corrosion cracking
- Bearing pins undergo customised heat treatment and surface finish operations to ensure unsurpassed toughness and wear life
- Closely controlled tolerances ensure smooth robust running even at high speeds.
- Specially formulated factory lubrication gives substantially better initial wear performance and enhanced corrosion resistance.
- Detachable chains for ease of fitting and replacement.
- All chains are proof loaded before packing in durable containers.
- Roll pins optional for extra security.

Product Description

As standard Renold offer chain:

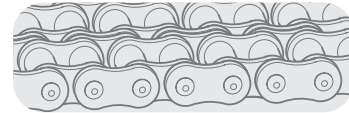
- To API specification 7F-0008
- Fully detachable along its length
- Both Split and roll pin options are available on all sizes, although roll pin recommended on quadruplex and above
- With slip fit intermediate plates

Options available on request include:

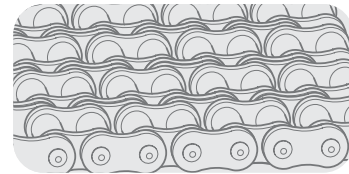
- Split pins/roll pins
- Press fit intermediate plates
- Special lubrication
- Renold ANSI Xtra for particularly arduous conditions
- Pipe wrench chain

Many common oilfield chains are held in stock at our factories and many outlets worldwide.

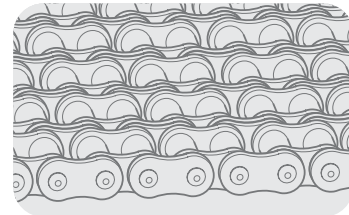
Chain types



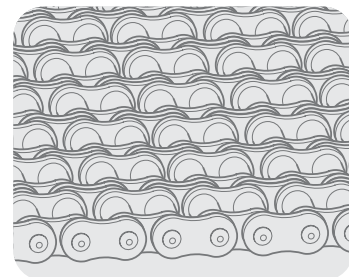
▲ Duplex chain
Standard
ANSI B29.1 ISO 606 A



▲ Quadruplex chain
Standard
ANSI B29.1 ISO 606 A



▲ Sextuplex chain
Standard
ANSI B29.1 ISO 606 A



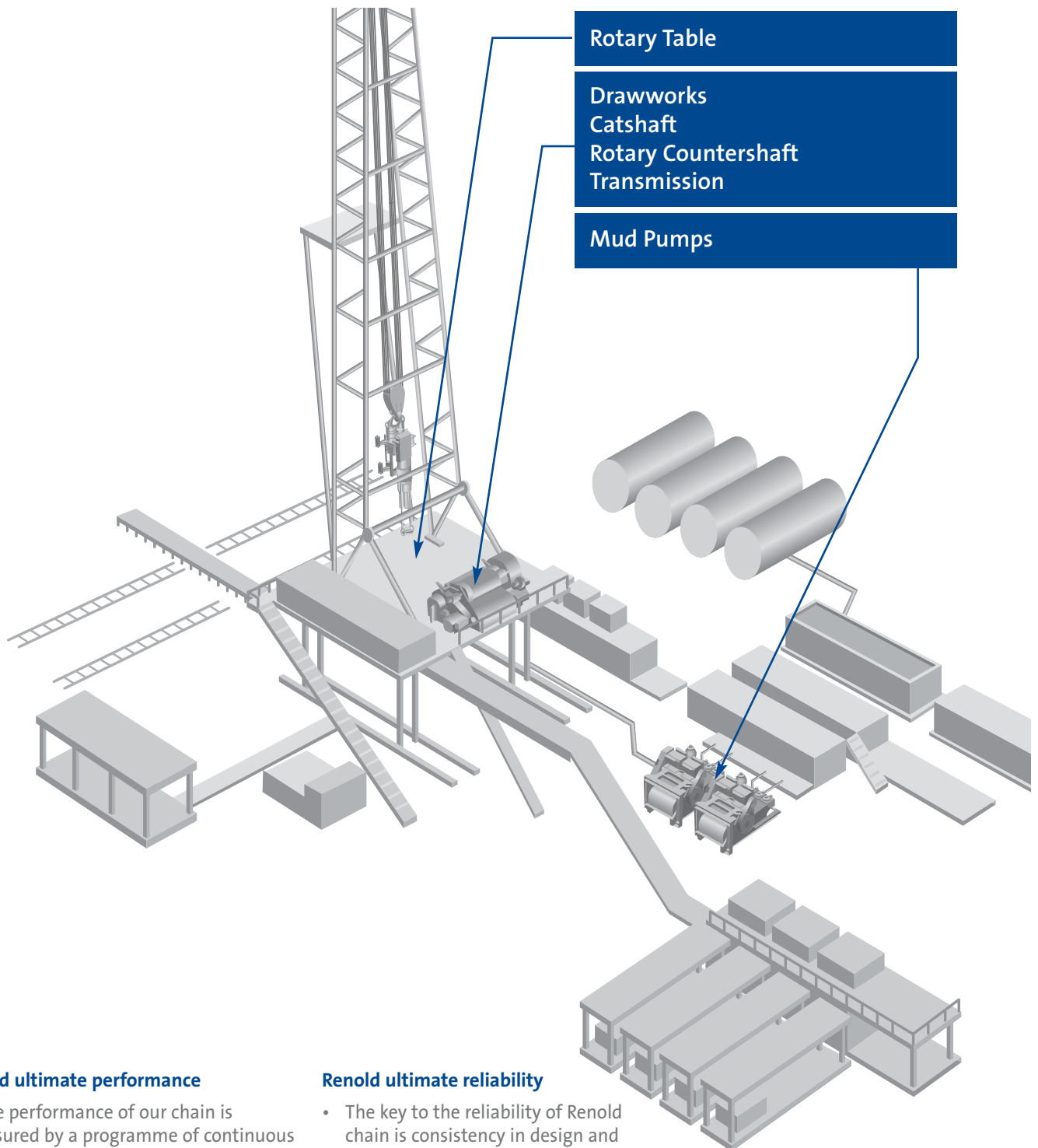
▲ Octuplex chain
Standard
ANSI B29.1 ISO 606 A



▲ Pipe wrench chain
Special



Oilfield Chain



Renold ultimate performance

- The performance of our chain is ensured by a programme of continuous testing and quality audits
- Breaking loads exceed the minimum international standards
- Our specially formulated lubricants reduce initial wear, give corrosion protection and ensure long storage life
- Renold chain is highly fatigue resistant giving up to four times the life of other brands
- Fatigue life is enhanced by shot peening and other pre-stressing techniques

Renold ultimate reliability

- The key to the reliability of Renold chain is consistency in design and manufacture
- Renold's sophisticated quality assurance systems continually monitor and improve our output
- For more than 100 years Renold has had a proven track record in demanding, arduous industries

Steel Industry Chain

Wherever arduous conditions, corrosion and wear occur . . . steelmakers demand Renold Chain

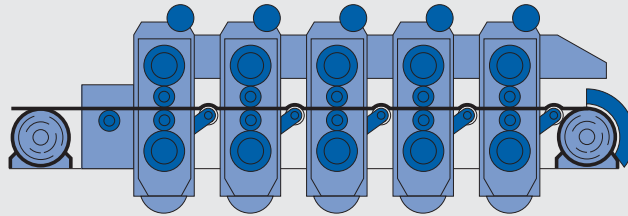


The steel industry covers many varied activities, from raw material processing to finished product handling, each stage having its own particular needs from the power transmission and mechanical handling equipment used.

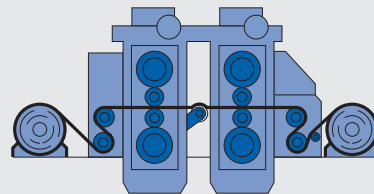
When corrosion, slipping or excessive wear occur on transmission or mechanical handling equipment used on steel processing lines the equipment can quickly take a turn for the worse, resulting in damaged product, expensive maintenance and replacement costs. That's why more and more steelmakers rely on Renold Chain to help their equipment last longer and operate more efficiently.

Renold are helping to improve equipment performance and are reducing maintenance requirements right down the line. Wherever the destructive forces of high speed operation exist, from cold reduction mills to hot dip coating lines, steelmakers around the world insist on Renold Chain.

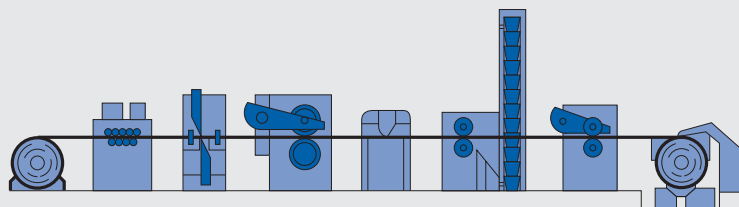
Cold Reduction Mill



Temper Mill



Slitter Lane

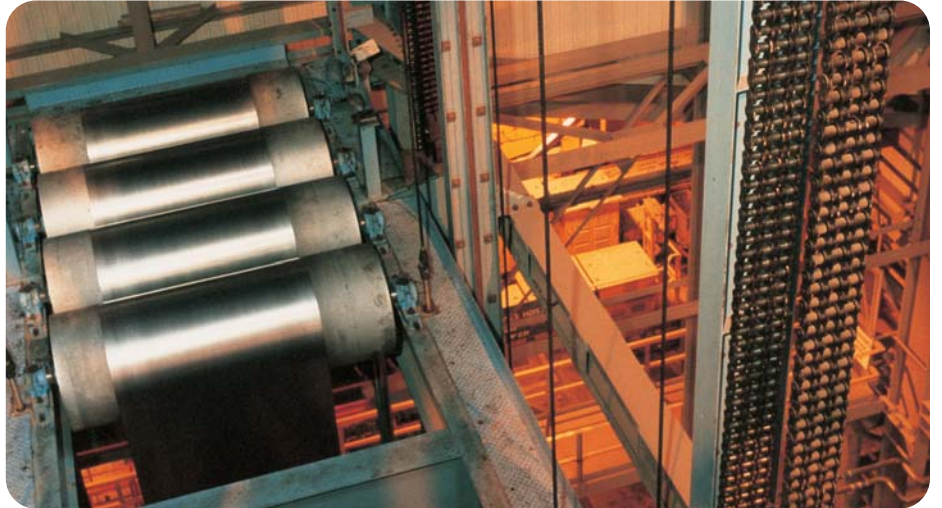


Steel Industry Chain

Key Applicational Areas

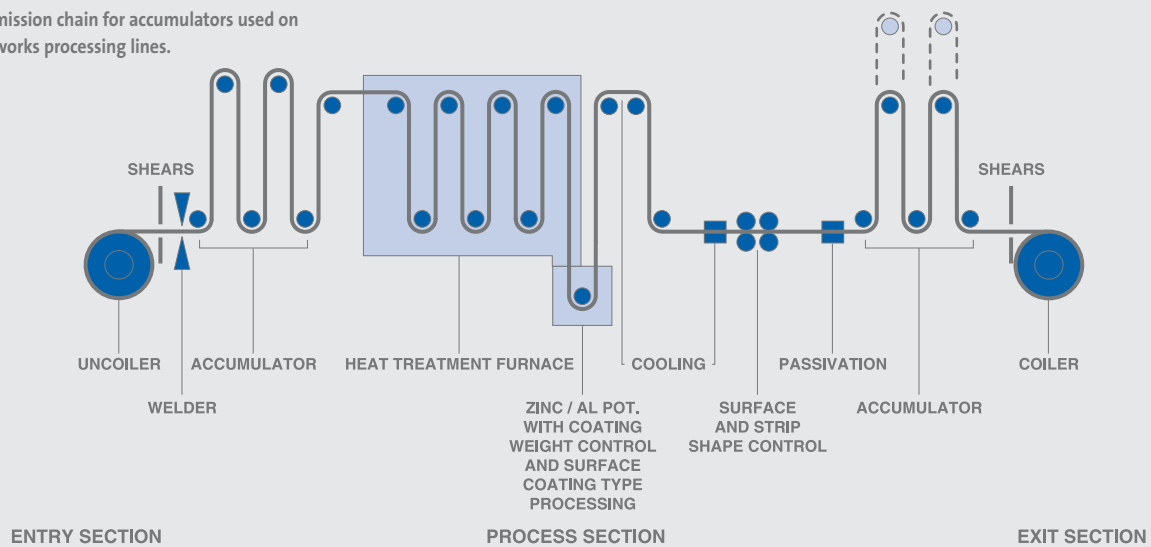
- Casting
- Coil handling
- Coil treatment
- Sheet handling
- Raw material processing
- Slab handling
- Steel section manufacture/handling
- Tube manufacture

Accumulator Chain



Hot Dip Coating Line

Transmission chain for accumulators used on steel works processing lines.



When coils of thin steel plate have been produced it is sometimes required to be coated - painted, galvanised or plastic coated.

Obviously, the coating process, whichever type it is, necessitates numerous operations and tight control - especially the speed at which the steel passes through the process area. It is, therefore, necessary that the steel plate being coated passes through the process section at a constant speed and is continuous and uninterrupted.

For this reason it is necessary to accumulate the steel plate before the process area to allow time, say 2 to 3 minutes, so that when the end of the coil is reached a new coil can be positioned and the beginning of the new one welded to the end of the previous one.

Skid Steer Vehicle Chain

Operating in tough conditions, chain for skid steer vehicles has to be designed to exceed the demands placed upon it. Renold has a wealth of experience supplying chain to manufacturers of these specialist vehicles.

The drive systems deliver high loads and stress which means the chain must be able to withstand wear and fatigue for as long as possible, something that has always been at the very heart of Renold chain design. The

sudden shocks caused by rapid changes of direction will soon expose any chain that isn't up to the job.

Using simplex chain from the Renold ANSI Xtra range, with thicker side plates and a through-hardened pin, vehicle manufacturers can be sure that they are specifying a product that meets their own high standards. The chain can also be supplied as endless loops so that sprocket centre distance can be adjusted to accommodate the chain.

- Demanding application requires Renold fatigue resistance
- Plate and pin specification ideal for shock loadings
- Endless loops available
- Tough chain for a tough job

