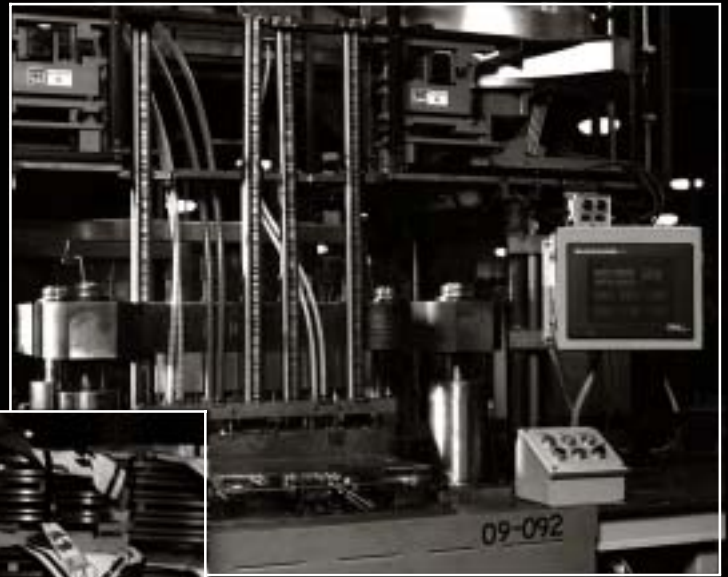


# Section 4

## Drives, Incorporated General Information



manufacturer

## American National Standards

### Chains, attachments, and sprockets for power transmission and conveying.

Precision Power Transmission Roller Chains, Attachments, and Sprockets	B29.1M-1993
Inverted Tooth (Silent) Chains and Sprockets	B29.2M-1982(R1994)
Double-Pitch Power Transmission Roller Chains and Sprockets	B29.3M-1994
Double-Pitch Conveyor Roller Chains, Attachments, and Sprockets	B29.4M-1994
Leaf Chains, Clevises, and Sheaves	B29.8M-1993
Heavy Duty Offset Sidebar Power Transmission Roller Chains and Sprocket Teeth	B29.10M-1994
Combination Chains, Attachments, and Sprocket Teeth	B29.11M-1994
Steel Bushed Rollerless Chains, Attachments, and Sprocket Teeth	B29.12M-1983(R1988)
"H" Type Mill Chains, Attachments, and Sprocket Teeth	B29.14M-1996
Steel Roller Type Conveyor Chains, Attachments, and Sprocket Teeth	B29.15M-1995
Welded Steel Type Mill Chains, Attachments, and Sprocket Teeth	B29.16M-1995
Hinge Type Flat Top Conveyor Chains and Sprocket Teeth	B29.17M-1983(R1995)
Welded Steel Type Drag Chains, Attachments, and Sprocket Teeth	B29.18M-1994
Drop Forged Rivetless Chains, Sprocket Teeth Drive Chain/ Drive Dogs	B29.19M-1996
Flexible Chain Couplings	B29.23M-1985(R1995)
Roller Load Chains for Overhead Hoists	B29.24M-1995
Open Barrel Steel Pintle Type Conveyor Chains, Attachments, and Sprockets	B29.25M-1994
700 Class Welded Steel and Cast Chains, Attachments, and Sprockets for Water and Sewage Treatment Plants	B29.21M-1996
Agricultural, Detachable, and Pintle Chains, Attachments and Sprockets	B29.300-1998

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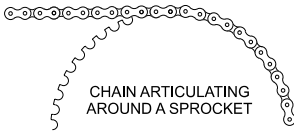
## Glossary

### A

**Angle of Flex:** The total angle of chain joint articulation as a chain enters or leaves a sprocket or wheel. The angle is equal to 360 degrees divided by the number of teeth in the sprocket.

**ANSI:** The abbreviation for “American National Standards Institute” which is the organization which sets the standards which chains should be manufactured.

**Articulation (v, “articulate”):** The action of a chain joint flexing from the straight to an angle and back to straight, as the joint enters and leaves the sprocket or other path, causing it to flex.



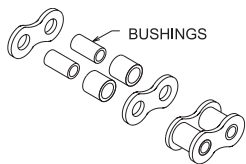
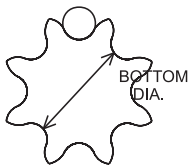
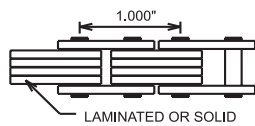
### B

**Backlash:** Movement (if any) of the chain along the pitch line of the sprocket when the direction of chain travel is reversed.

**Block Chain:** An alternative name used by some manufacturers for bar-link chain or for certain styles of leaf chain.

**Bottom Diameter:** The diameter of a circle measured between one toothgap and the opposite gap for a sprocket with even number of teeth.

**Bushing:** Internal component in a roller chain which the pin articulates around and the roller rotates on.



### C

**Cable Chain:** See Leaf Chain.

**Caliper Diameter:** The distance measured between one tooth gap and the nearest opposite gap for a sprocket with an odd number of teeth.

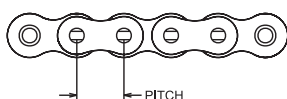
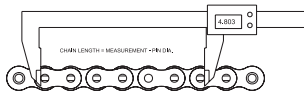
**Caterpillar Drive Chain:** Chain with pushers which is used to drive Drop Forged chain.

**Center Distance:** The distance between the centers of the shafts of a chain drive.

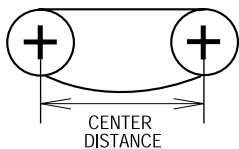
**Chain Casing:** An oil-retaining safety enclosure around a chain drive.

**Chain Guard:** An open guard of sheet metal, expanded metal, or similar construction around a chain drive.

**Chain Length:** The actual chain length between the joint centers at each end of a taut chain strand. This distance is usually expressed in feet and/or inches or in pitches.



**Chain Pitch (Nominal):** The average distance between the joints (except for staggered pitch chains) of an assembled chain. In some cases, “joint”, as defined here, will be a center of flexure not specifically identified with individual parts of the chain.



**Chain Pitch Elongation or Chain Elongation:** Increase in measured length due to wear or excessive load. Normally expressed in percent of length.

**Chain Take-up:** A mechanical device which takes-up chain slack. This could be an idler sprocket or similar device mounted on an adjustable bracket to adjust the slack in a chain installation.

**Chain Width:** Defined somewhat differently for various chains, but usually the inside width of the chain, between roller link plates.

**Chordal Effect (Chordal Action):** The effect produced by the chain joint centers being forced to follow arcs instead of chords of the sprocket pitch circle.

**Clevis Connector:** A connector which is used to connect a strand of leaf chain that has an inner link end to a clevis block that has an inner link configuration.

**Clevis Pin:** A pin which is used to connect a strand of leaf chain that has an inner link end to a clevis block that has an outer link configuration. The clevis manufacturer should supply this part so that one can be assured that it will be compatible with the clevis block.

**Compressive Stresses:** Stresses that act to compress a material and place the material in compression.

**Connecting Link:** For a Roller Chain, a pin link made with one link plate easily detachable to facilitate connecting or disconnecting the chain.

**Cotter Key:** The retaining pin for a connecting link.

**Creep:** The flow of plastic deformation of metals held for long periods of time at stresses lower than the normal yield strength. The effect is particularly important if the temperature of stressing is in the vicinity of the recrystallization temperature of the metal.

**Crescent Chain:** Standard chain with a crescent shape top plate.

**Curve Chain:** Chain designed to bend around curves in the horizontal position.

**Cycle:** Change in load level as a chain completes a cycle around a system. Usually the change is from negligible load to a load peak on a regular basis as the chain undergoes a complete cycle of operation.

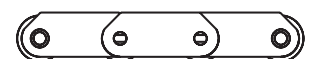
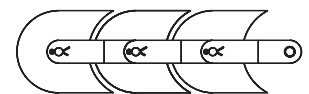
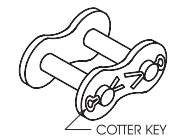
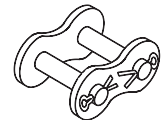
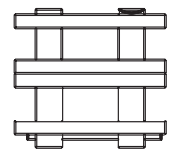
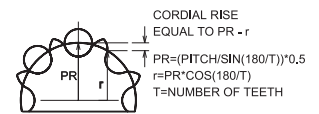
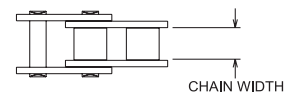
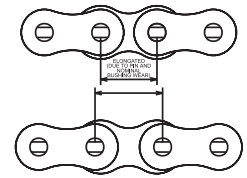
## D

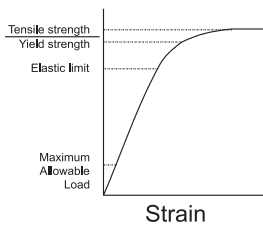
**Deep Link Conveyor Chain:** Chain design with a carrier roller which protrudes down below the side bar but does not protrude above the side bar.

**Design Horsepower:** The specified horsepower for a chain drive multiplied by a service factor. It is the value used to select the chain size for the drive.

**Double-Pitch Roller Chain:** A Roller Chain having double the pitch of a standard Roller Chain, but otherwise having standard pins and bushings and standard or over-size rollers.

**Duplex Roller Chain:** Double strand chain (80-2)  
(Double Strand)



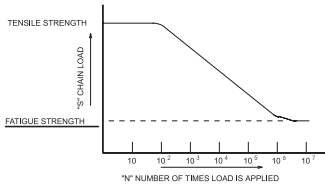
**E**

**Elastic Limit:** The highest load a part (i.e., chain strand) can sustain without incurring a permanent change in length.

**Embrittlement:** Reduction in ductility of materials due to exposure to certain environments or temperatures.

**F**

**Fatigue Strength:** Fatigue is the phenomenon leading to fracture under repeated fluctuating stresses having a maximum value less than the tensile strength of material. Fatigue strength is the maximum stress that can be sustained for a specified number of cycles ( $10E7$ ) without failure.

**G**

**Galling:** Developing a condition on the live bearing surface of a pin or bushing of a chain where excessive friction between high spots results in localized welding with subsequent tearing and a further roughening of the contact surfaces.

**Gap Tooth Sprocket:** An even number tooth sprocket designed with clearance for a thru rod or saddle. D-5 or GKI attachment chains are used on this style sprocket.

**H**

**Hardness:** Chain hardness is typically measured in Vickers, Brinell or Rockwell.

**Hollow Pin Roller Chain:** Chain manufactured using a bushing as the pin holding the pin link plates. This chain is generally used in pairs with the two strands running parallel and a thru rod tying them together.

**Hoist Chain:** Chain manufactured strictly for a lifting application.

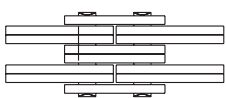
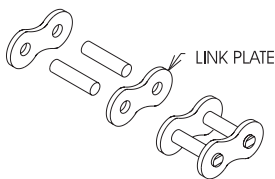
**J**

**Joining Link:** See Connecting Link.

**L**

**Length Tolerance:** The length of new chain must be within when measured under a given load.

**Link Plate:** One of the side plates of either a pin link or a roller link in a Roller Chain.



**Leaf Chain:** Is a chain manufactured from standard chain parts consisting of interlacing side plates and riveted pins. These chains are manufactured in accordance with ANSI standard B29.8. This chain is typically used in lifting and/or tensioning applications.

**Load Classification:** A classification of drive loads based on the intensity of shock that is imposed on the drive.

**Loading Frequency (Time):** Loading frequency is the number of times per unit of time that the chain is exposed to a complete cycle of loading. A complete loading cycle normally occurs when a particular link moves completely around the system and returns to its starting point.

## M

**Master Link:** See Connecting Link.

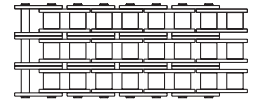
**Matching & Tagging:** 2 or more strands are to vary with a given tolerance. Chains are to be measured under a specified measuring load.

**Maximum Allowable Load:** A maximum tension a chain may be safely subjected to. This value should never be exceeded by actual design load factored by speed, temperature and dynamic adjustments as applicable.

**Measuring Load:** The specified standard load under which a chain is to be measured for length. (1% of tensile strength)

**Multiple Strand Chain:** A Roller Chain (or other chain) made up of two or more strands assembled as a single structure on pins extending through the entire assembly.

**Multiple Strand Factor:** A factor by which the horsepower rating of a single-strand chain is multiplied to obtain the horsepower capacity of a chain with two or more strands.



NUMBER OF ROLLER CHAIN STRANDS	MULTIPLE STRAND FACTOR
2	1.7
3	2.5
4	3.3
5	3.9
6	4.6

## O

**Offset Link:** A special offset link, as termed in Roller Chain descriptions, made for use in straight link chain when an uneven number of links in the total strand is required.

**Offset Section:** For a Roller Chain, a factory-assembled section, made up of a roller link and an offset link. Offset sections are used to connect strands of chain having an odd number of pitches.

**Overchaining:** A drive is overchained when it incorporates a chain of substantially higher rating than that indicated by normal selection procedures to have been necessary.

## P

**Pin Oven Chain:** A chain used to convey cans through a drying oven. Typically 60 chain with an extended pin every 7th pitch is used.

**Pitch:** See Chain Pitch; Pitch Diameter.

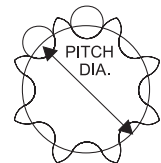
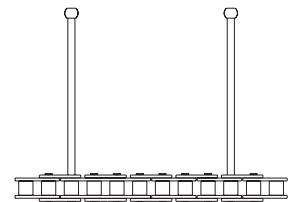
**Pitch Diameter:** The diameter of the sprocket pitch circle.

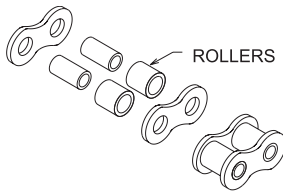
**Press Fit:** Standard designed interference fit between side plate pitch hole and pin/bushing.

**Prestressing Dynamic:** Dynamic prestressing is the process of subjecting chain to a load as it is articulated or wrapped around multiple sprockets. Dynamic prestressing is done to seat the chain components and to reduce initial (break in) elongation in chain drives.

**Prestressing Static:** Static prestressing is the process of subjecting chain to a load at a minimum of 20% of the ultimate strength. The chain is pulled in a straight line. Static is done to seat the chain components and to minimize the variation in strand lengths of attachment chain used in pairs.

**Pulsation:** Fluctuations of a cyclic nature in load or speed. (see cordal action)





## R

**Rollers:** The component on the chain which engages the sprocket. The roller allows the chain to roll into the sprocket. The roller rotates on the bushing.

**Root Diameter:** The theoretical bottom diameter of a sprocket, equal to the pitch diameter minus the chain roller or barrel diameter. (see Bottom Diameter)

**Run-in:** The initial period of operation of any mechanism, during which the component parts seat themselves.

## S

**Scoring:** Marring or scratching of pin or bushing caused by metallic debris being picked up in the contact surfaces on one of the parts.

**Seating Curve:** A specific term for the pocket curve of a Roller Chain sprocket.

**Seizing:** Stiffening (or "freezing") of a chain joint as a result of roughness and high friction caused by galling. This occurs between the pin & bushing and/or link plates.

**Semi-Press Fit (Tap Fit):** Min. interference fit between side plate and pin.

**Service Factor:** A factor by which the specified horsepower of working load of a chain is multiplied to compensate for operating conditions.

**Sheave:** A grooved wheel or pulley. Typically used with leaf chain to change its direction.

**Shot Peening:** Process which is used on the side plates to improve fatigue strength.

**Sidebar:** Another name for Link Plate.

**Side Bow Chain:** See Curve Chain.

**Simplex Roller Chain:** Single strand chain (80).  
(Single Strand)

**Sinter Bushing:** Bushing made from powdered metal and then oil impregnated.

**Skip Tooth:** A sprocket designed such that the chain engages only every other tooth on the sprocket. Typically used with staggered pitch chain.

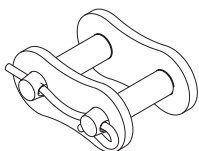
**Slip Fit:** No interference fit between side plate and pin.

**Slip Stick :** Slip stick occurs when the motor drives continually, sprocket rotates, but the chain moves ahead by stopping and starting at intervals. This could be caused by the following:

- a) Fluctuations in the coefficient of friction between bushing and rollers (i.e. rotating, sticking, rotating, sticking)
- b) Insufficient chain hardness on conveyor lines
- c) Insufficient drive equipment or frame hardness

**Special Hook Cotter:** The retaining pin for cotter-style chain and connecting links.

**Staggered Pitch Chain:** A chain with alternate links of differing pitches, one usually being considerably greater than the other.



## T

**Tensile Strength:** See Ultimate Strength

**Tension Linkage:** A chain application primarily transmitting motion back and forth or up and down at low speeds. Typical example is a forklift reciprocating system.

**T-head/T-pin:** The retaining pin for cotter-style chain and connecting links.

**Tight Joint:** See stiff joint

**Top Roller Chain:** Chain which has a roller on top to allow for accumulation of product on top of chain while the chain is moving.

**Torque:** Torsional force, expressed in inch-pounds in chain calculations, which is the product of chain pull and one-half the sprocket pitch diameter.

**Transverse Clearance:** Clearance between roller link plate and pin link plate.

**Transverse Pitch:** The lateral distance between the centerlines of each strand of multiple strand chain, or between the tooth profiles on a sprocket for a multiple strand chain.

**Triplex Roller Chain:** Triple strand chain (80-3).  
(Triple Strand)

## U

**Ultimate Strength:** The Ultimate Strength of a chain is the single maximum load that breaks the chain. Typically specified as either average or minimum.

**Underchaining:** A drive is underchained when it incorporates a chain of substantially lower rating than that indicated to be needed from normal selection procedures.

## W

**Working Load:** An allowable recommended chain load used on conveyors, drives with nonstandard chains, or other application of lower relative speed.

**Wrench Chain:** Wrench chains are leaf chains with pins extending beyond both sides of the chain. It serves as a tension linkage for holding pipe securely in pipe wrenches. The extended pins permit this chain to support a load not in line with the chain without danger of pulling the link plates off the pins. The pins are used to lock on a mechanism to accommodate various pipe sizes.

## Y

**Yield Strength:** The elastic limit or yield strength of a chain is the load that causes permanent elongation of the chain.

