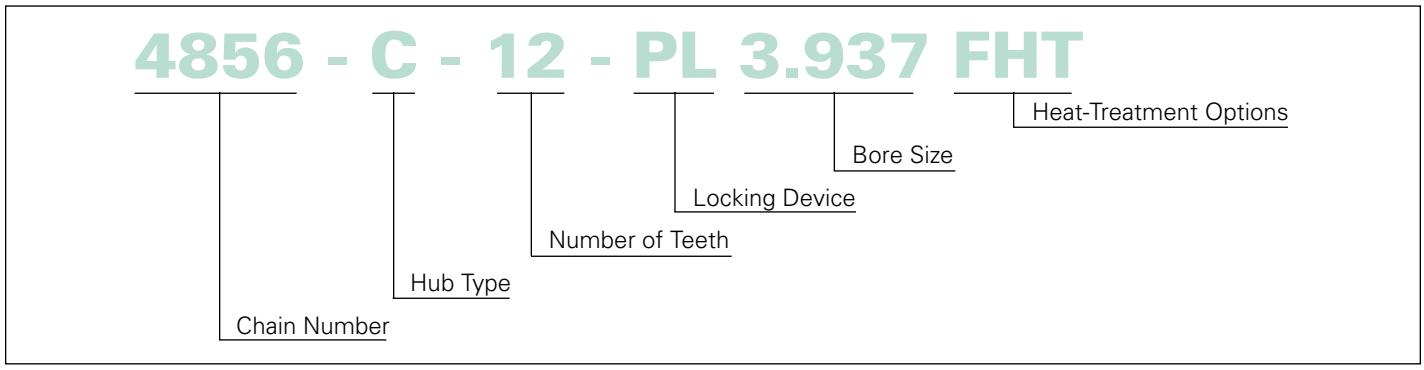
# Sprocket Selection Guidelines

**Table 1 — Information Necessary to Order Sprockets**

| | |
|---|---|
| 1. Chain Size | Number, type, or drawing number of the chain to be used on the sprocket.<br>(The suitability of a sprocket depends on specific chain dimensions: chain pitch, rollers, bushing diameter, inside width of chain or roller face.) |
| 2. Teeth | The number of actual teeth on the sprocket.<br>If applicable, the number of working teeth, mid-pitch relief, or gap-toothed construction should be specified. This is necessary when driving conveyors with special through-rods or attachments which will interfere with the engagement. Special outer diameters are sometimes required to clear attachments. |
| 3. Material | a. Steel Plate welded hub, plain or with flame hardened teeth<br>b. Cast Iron, plain, or hard rim<br>c. Cast Steel, plain or with flame hardened teeth<br>d. Special materials such as stainless steel, bronze, etc.<br>State preference and alternate if acceptable |
| 4. Hub Type | <table><tr><th>Plate Only</th><th>Hub One Side</th><th>Hub Both Sides</th><th>Offset Hubs on Both Sides</th></tr><tr><td>Type A</td><td>Type B</td><td>Type C</td><td>Type C Offset</td></tr></table><br>Shear Pin Hubs: Type A is entirely self-contained with sprocket bored for running fit over flanged hub.<br>Type B has sprocket bored for running fit over shaft.<br>Material: Steel plate welded hub. |
| 5. Exact Diameter of Shaft Bore | Show special tolerances; keyway size; keyway location when required. If not a standard keyway, specify: straight, tapered, square or flat and dimensions. |
| 6. Set Screws | If not a standard, specify type. If more than one is required or special position indicate the number and location. |
| 7. Hub Dimensions | These measurements are usually manufacturer's standard. However, for special orders, outside diameter and through length should be specified. For Type C Offset sprockets specify the length from the centerline of the chain to each side and the total through length. |

To make ordering as easy as possible, Table 1 shows the general information you need to provide. On your order form, indicate the Sprocket Order No. This number is composed of the chain number, the hub type, the number of teeth, the locking device (if any is required), and the bore size. An example is shown below.

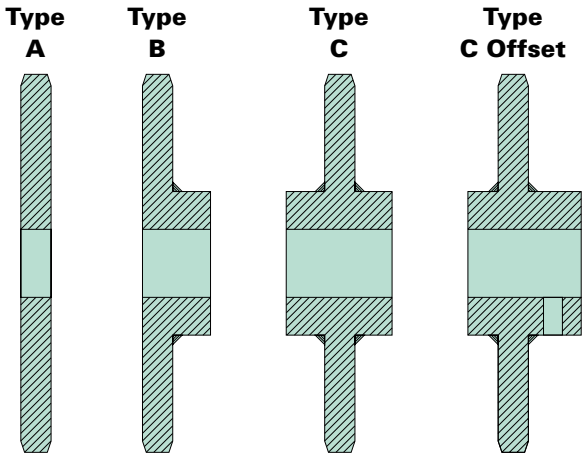
**Sprocket Order Number**




**Chain Number** indicates the type and size of chain which is to run on the sprocket.

**Hub Type** indicates the core of the sprocket. Each type is designed for a specific need.

- Type A does not have a hub as part of the sprocket wheel. The wheel must be mounted on a flange, hub, or other holding device.
- Type B has the hub extending on one side from the wheel. This type is usually found on small and intermediate size sprockets.
- Type C has the hub equal distance on both sides of the wheel. Type C is the most common and is generally found on large-diameter sprockets.
- Type C Offset indicates a two-sided hub that is slightly off center.




**Number of Teeth** is determined by the chain pitch and size.

**Locking Device** is an important consideration. Two set screws and a single keyway are standard on every sprocket, unless you specify something else. Set screws are placed over key and at 90° to the key. The standard keyway and set screw sizes are shown in Table 2. Tolerances for straight and tapered keyways are width +.002-.000; depth +.010-.000. Specify POWER-LOCK® (PL) for extra holding power or keyway and set screw (KW & SS) for standard holding.

**Bore Size** (in inches) is indicated in the Sprocket Tables and furnished to the tolerances shown in Table 3. Bore sizes larger than listed may be supplied, if requested. Specify plain bores, if required, when ordering. If only the bore size is given, sprockets are automatically keywayed and set screws are installed. If you wish to bore your own sprockets, a discount is available. Make sure to indicate the size you are going to bore to so the proper sized hub can be installed.

**Heat-Treatment Options.** Specify FHT for flame-hardened teeth or N for non-heat-treated.

**Table 2 — Standard Keyways and Set Screws**

All dimensions are in inches unless otherwise specified.

| Diameter of Shaft | Keyseat | | Diameter of Set Screw |
|---|---|---|---|
| | Width | Depth | |
| 1/2–9/16 | 1/8 | 1/16 | 1/8 |
| 5/8–7/8 | 3/16 | 3/32 | 3/10 |
| 15/16–1 1/4 | 1/4 | 1/8 | 1/4 |
| 1 5/16–1 3/8 | 5/16 | 5/32 | 5/16 |
| 1 7/16–1 3/4 | 3/8 | 3/16 | 3/8 |
| 1 13/16–2 1/4 | 1/2 | 1/4 | 1/2 |
| 2 5/16–2 3/4 | 5/8 | 5/16 | 5/8 |
| 2 13/16–3 1/4 | 3/4 | 3/8 | 5/8 |
| 3 5/16–3 3/4 | 7/8 | 7/16 | 3/4 |
| 3 13/16–4 1/2 | 1 | 1/2 | 3/4 |
| 4 9/16–5 1/2 | 1 1/4 | 5/8 | 7/8 |

**Table 3 — Tolerances for Boring Sprockets**

| Diameter of Shaft | Tolerances | |
|---|---|---|
| 1" Diameter and under | Nominal | plus .001" |
| Over 1" to 2" | Nominal | plus .002" |
| Over 2" to 3" | Nominal | plus .003" |
| Over 3" to 4" | Nominal | plus .004" |
| 4" and over | Nominal | plus .005" |

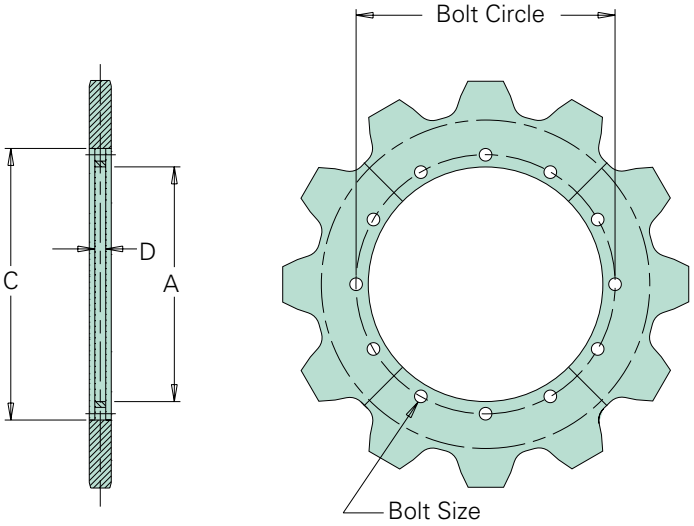
## Sprocket Specifications

Union Sprockets are carefully designed and manufactured to provide exceptional service in all applications. Each sprocket has certain variable construction characteristics that can be tailored to your specific operation. Union Sprockets can be furnished with a variety of special features. Standard and special features are shown in Table 4. It is important to identify any special requirements when placing your order.

## Types of Sprockets Available

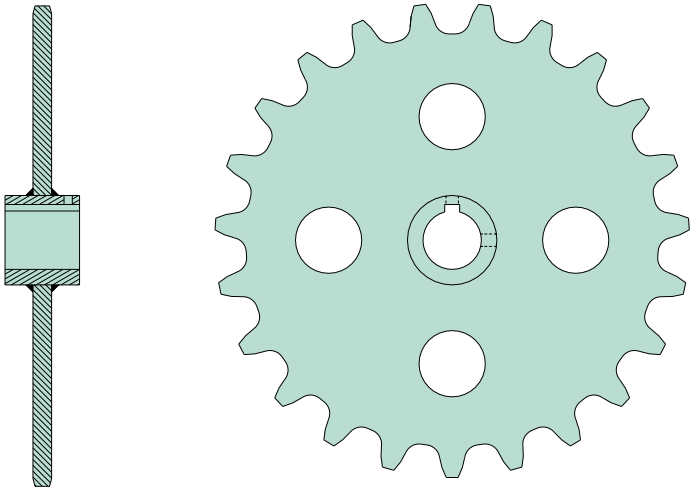
Union offers a wide variety of sprocket styles to meet your operational needs.

### Segmental Rim Sprockets




Segmental Rim Sprockets are designed to save time and money. They eliminate costly downtime during installation and adjustment. The segmented rim is bolted to a solid or split body. That means bodies or entire sprockets may be replaced without removing shaft or bearings, saving maintenance time and money.

### Lightening Hole Sprockets



Reduce the weight of a large sprocket and facilitate handling with lightening holes. These are indicated on the appropriate Sprocket Tables when provided.

### Split Construction

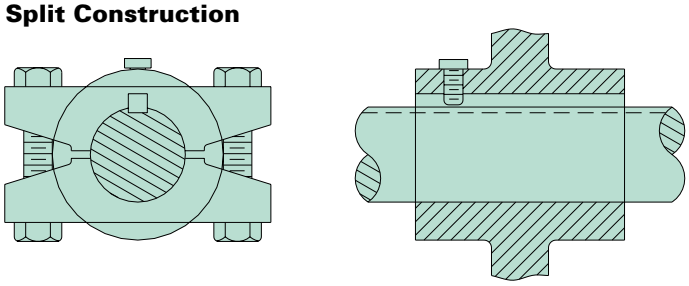
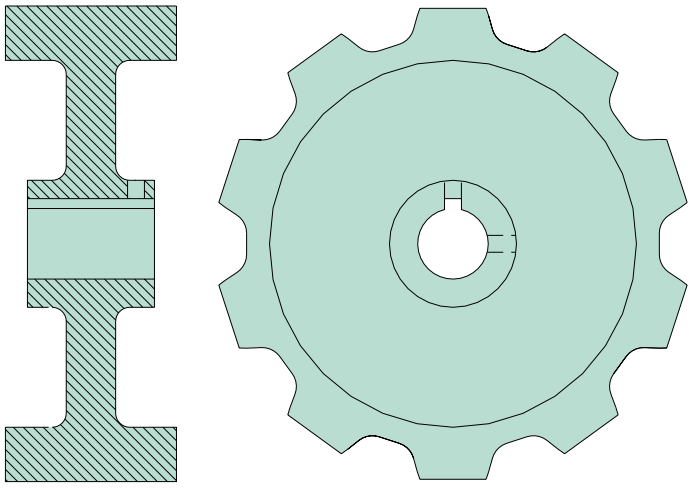


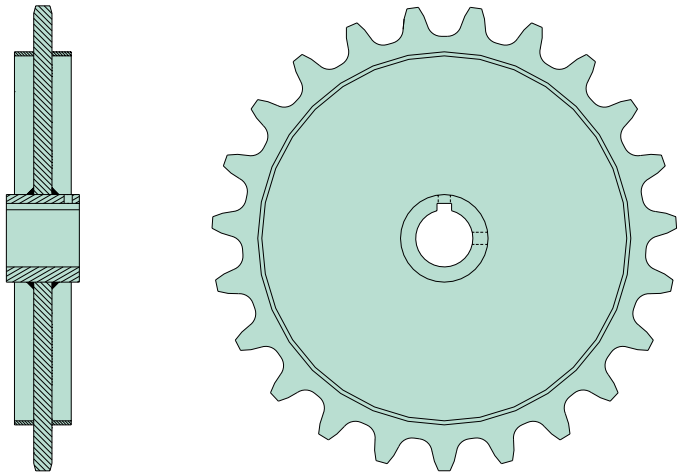
Plate Center Sprockets with split construction make it easier to mount or remove a sprocket from the shaft without disturbing either the shaft or the bearings. Split construction may also provide extra holding power, depending on your application. Split wheels are fabricated, machined, and then split so the sprocket forms a solid construction when bolted together. Rim lugs are used when the diameter or the wheel makes them necessary. Because wheels are fabricated in one piece and then split, it is necessary to specify the bore size required.

### Wide Flange Sprockets



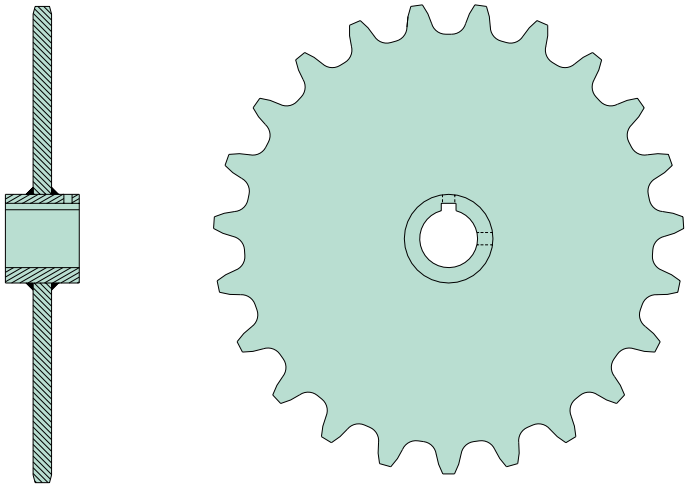
These sprockets are used in welded steel drag conveyors, and are made of special cast alloys that resist abrasion. Although they are not listed in this catalog, they are available on a made-to-order basis. Call for more specific information.

### Chain Saver Sprockets



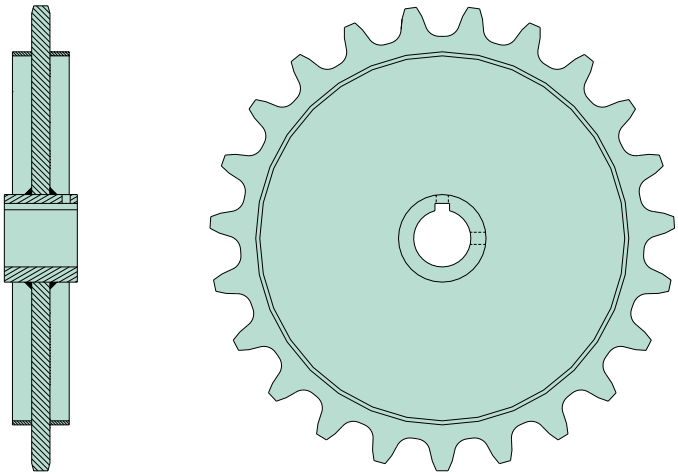
The special flange construction on the rim of Chain Saver Sprockets extends the life of the chain. Chain sidebars rest on the flange as the chain wraps around the sprocket. This keeps the chain on the true pitch line and distributes wear over a greater contact area.

### Hunting Tooth Sprockets



The special construction of Hunting Tooth Sprockets makes them last twice as long as regular sprockets. Hunting Tooth Sprockets have an odd number of teeth and are half the pitch of the chain. Every time the sprocket makes a revolution, the chain engages with one set of teeth, ahead of the previously engaged set. Each tooth makes contact with the chain only half as many times as it would on a regular sprocket, extending the useful life of the sprocket two times that of regular sprockets.

### Hunting Tooth Chain Saver Sprockets



Hunting Tooth Chain Saver Sprockets combine the special construction of Hunting Tooth Sprockets with Chain Saver Sprockets for super long wear. The chain engages one set of teeth with each rotation, and the special flange construction adds extra support, keeping the chain on true pitch and distributing wear over a greater contact area.

## Other Factors

When ordering sprockets, there are some additional factors to consider.

### Hub Length

Standard hub lengths are shown in the Sprocket Tables in this catalog. We offer longer hubs on a made-to-order basis.

### Overload Protection

Shear Pin Hubs and Shock Relay are used as safety devices to protect machinery from overload.

The Shear Pin Hub is keyed to the shaft and connected to the loose wheel by a pin, which will transmit only the normal power requirements plus a predetermined overload. If this overload is exceeded, the pin shears, stopping the line. Normally a shear pin rated at slightly more than twice the torque requirements is the proper size to use. We offer two types of Shear Pin Hubs.

- Style 1 is the most popular because it is smaller and more compact than Style 2. The wheel is mounted on the flange hub and held in place by a collar.
- Style 2 is larger than Style 1 and costs less. It consists of a loose wheel and the flange hub. Place a bearing or set collar against the free side of the wheel.

The Shock Relay is an "electronic Shear Pin Hub." Set the overload protection you want for your operation, and this sensitive electronic monitor stops the line before damage

**Table 4 — Features of Standard and Special Sprockets**

| Feature | Standard | Special[1] |
|---|---|---|
| Sprocket Type | Falls within sizes listed in the catalog, including segmental rims and W720S hunting tooth. | Any type other than listed which may have special features such as special lightening holes, mud relief, chain saver hub, etc. |
| Split Construction | Not available as standard | All Split Sprockets [D (detachable)] |
| Hub Type | A, B, C, C Offset | Hub Bodies<br>Shear Pin Hubs<br>Bronze Bushed |
| Key Seating | Standard keyway as specified by the table standard keys and setscrews (Table 2) | Extra Keyseats<br>Keyseating in special locations<br>Keyseating in line |
| Set Screws | One pair furnished standard sizes | More than one pair or non-standard sizes |
| Boring | Up to and including the maximum bore size listed in the catalog sprocket tables for a given hub size (Table 3) | Plain bore for close tolerance<br>Over size bores (larger hub) |
| Machine Faced Hubs | Not available as standard | Facing to exacting tolerance on L.T.B. |
| Hub Lengths | Length as listed | Longer than standard |

[1]Unless you specify special sprocket features, we'll quote to our standard.

can occur. After the problem is corrected, the Shock Relay can be re-set at the touch of a button, increasing efficiency and reducing downtime.

### Traction Wheels

Traction Wheels are available in a wide range of sizes and types to fit most chains. They are usually used as drivers only. They are not generally used at the tail shaft or boot.

### Tooth Hardness

Union sprockets are designed to last. Each sprocket meets—or exceeds—the stringent hardness parameters shown in Table 5. When ordering, indicate the type of application to make sure you get the right product for your operation.

**Table 5 — Sprocket Tooth Hardness**

| Application | Tooth Hardness (Rc Minimum) |
|---|---|
| Drive | 35 |
| Conveyor | 35 |
| Elevator, Cement or Clinker Ash | 57 |

## TO DETERMINE ENGINEERING CLASS SPROCKETS

### Step 1: Calculate Pitch Diameter

To obtain pitch diameter of a sprocket, multiply the constant for the number of teeth (Table 6) by the chain pitch.

**Table 6 — Sprocket Pitch Diameter Constants**

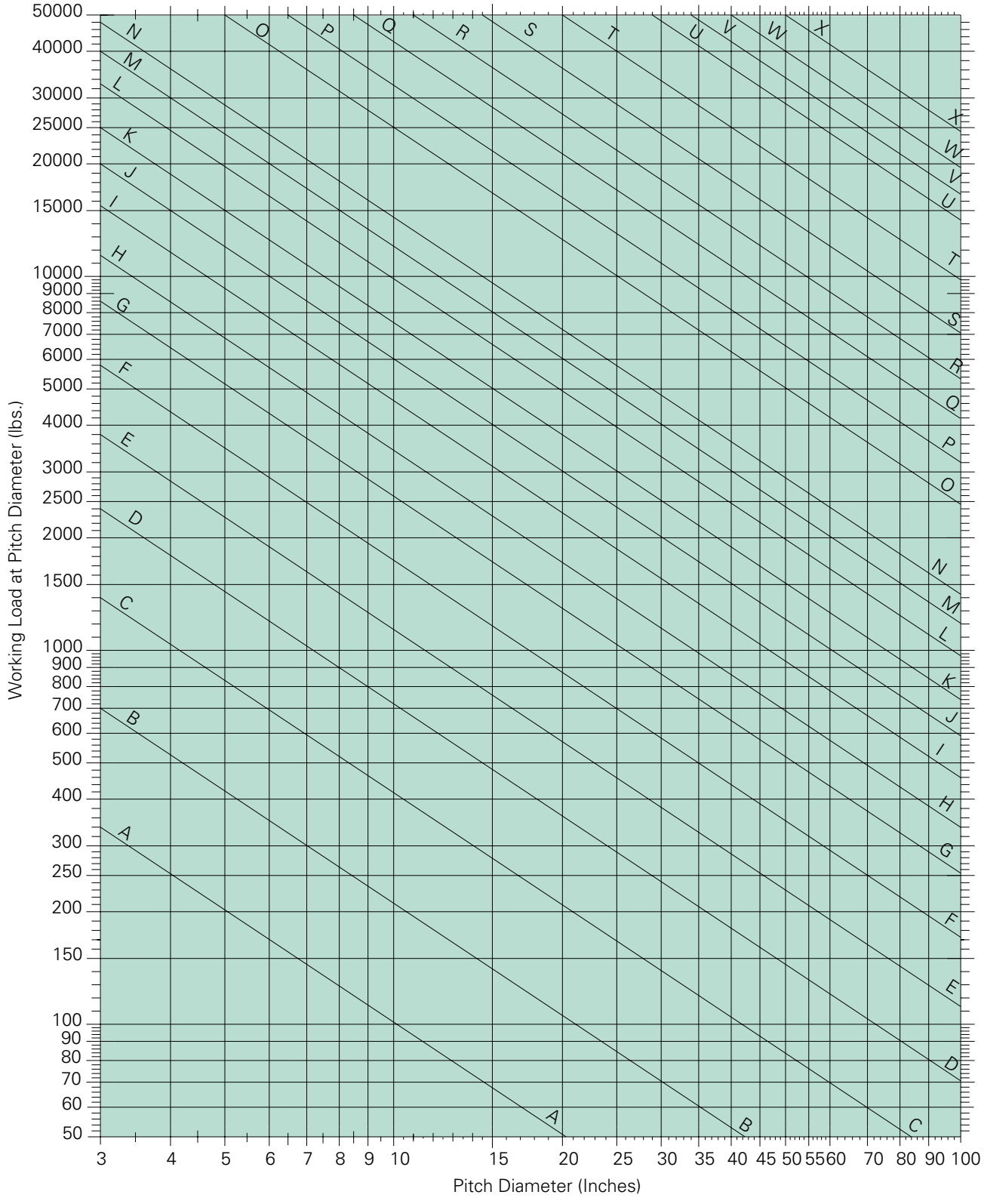
To obtain pitch diameter of a sprocket, multiply the constant for the number of teeth from the table by the chain pitch.

| Number of Teeth | Constant | Number of Teeth | Constant | Number of Teeth | Constant | Number of Teeth | Constant | Number of Teeth | Constant |
|---|---|---|---|---|---|---|---|---|---|
| 6 | 2.000 | 35 | 11.156 | 64 | 20.380 | 93 | 29.608 | 122 | 38.837 |
| 7 | 2.305 | 36 | 11.474 | 65 | 20.698 | 94 | 29.927 | 123 | 39.156 |
| 8 | 2.613 | 37 | 11.792 | 66 | 21.016 | 95 | 30.245 | 124 | 39.475 |
| 9 | 2.924 | 38 | 12.110 | 67 | 21.335 | 96 | 30.563 | 125 | 39.794 |
| 10 | 3.236 | 39 | 12.428 | 68 | 21.653 | 97 | 30.882 | 126 | 40.112 |
| 11 | 3.550 | 40 | 12.746 | 69 | 21.971 | 98 | 31.200 | 127 | 40.430 |
| 12 | 3.864 | 41 | 13.064 | 70 | 22.289 | 99 | 31.518 | 128 | 40.748 |
| 13 | 4.179 | 42 | 13.382 | 71 | 22.607 | 100 | 31.836 | 129 | 41.066 |
| 14 | 4.494 | 43 | 13.700 | 72 | 22.926 | 101 | 32.154 | 130 | 41.384 |
| 15 | 4.810 | 44 | 14.018 | 73 | 23.244 | 102 | 32.473 | 131 | 41.702 |
| 16 | 5.126 | 45 | 14.336 | 74 | 23.562 | 103 | 32.791 | 132 | 42.020 |
| 17 | 5.442 | 46 | 14.654 | 75 | 23.880 | 104 | 33.109 | 133 | 42.338 |
| 18 | 5.759 | 47 | 14.972 | 76 | 24.198 | 105 | 33.427 | 134 | 42.656 |
| 19 | 6.076 | 48 | 15.290 | 77 | 24.517 | 106 | 33.746 | 135 | 42.975 |
| 20 | 6.393 | 49 | 15.608 | 78 | 24.835 | 107 | 34.064 | 136 | 43.293 |
| 21 | 6.710 | 50 | 15.926 | 79 | 25.153 | 108 | 34.382 | 137 | 43.611 |
| 22 | 7.027 | 51 | 15.244 | 80 | 25.471 | 109 | 34.701 | 138 | 43.930 |
| 23 | 7.344 | 52 | 16.562 | 81 | 25.790 | 110 | 35.019 | 139 | 44.249 |
| 24 | 7.661 | 53 | 16.880 | 82 | 26.108 | 111 | 35.337 | 140 | 44.567 |
| 25 | 7.979 | 54 | 17.198 | 83 | 26.426 | 112 | 35.655 | 141 | 44.885 |
| 26 | 8.296 | 55 | 17.517 | 84 | 26.744 | 113 | 35.974 | 142 | 45.203 |
| 27 | 8.614 | 56 | 17.835 | 85 | 27.063 | 114 | 36.292 | 143 | 45.521 |
| 28 | 8.932 | 57 | 18.153 | 86 | 27.381 | 115 | 36.610 | 144 | 45.840 |
| 29 | 9.249 | 58 | 18.471 | 87 | 27.699 | 116 | 36.929 | 145 | 48.158 |
| 30 | 9.567 | 59 | 18.789 | 88 | 28.017 | 117 | 37.247 | 146 | 46.477 |
| 31 | 9.885 | 60 | 19.107 | 89 | 28.336 | 118 | 37.565 | 147 | 46.796 |
| 32 | 10.202 | 61 | 19.426 | 90 | 28.654 | 119 | 37.883 | 148 | 47.114 |
| 33 | 10.520 | 62 | 19.744 | 91 | 28.972 | 120 | 38.201 | 149 | 47.432 |
| 34 | 10.838 | 63 | 20.062 | 92 | 29.290 | 121 | 38.519 | 150 | 47.750 |

**Step 2: Select Hub Class**

Using the Quick Selector Chart (Table 7), plot the pitch diameter of the sprocket obtained in Step 1. Then plot the working load of the chain. Suggested hub selection is found at the point of intersection.

**Table 7 — Quick Selection Chart**



### Step 3: Determine Length and Diameter of Hub

Using the information obtained in Step 2, plot the hub class on Table 8. Then plot the bore of the wheel. The point of intersection indicates the diameter of the hub. Length-through bore (L.T.B.) is found at the bottom of the appropriate hub diameter column. If you do not know the bore size, refer to Shaft Selection Procedure in the Engineering Section of this catalog.

**Table 8 — Hub Diameter Selection Table**

All dimensions are in inches unless otherwise specified.

| Standard Hub Diameters for Steel Sprockets | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bore of Wheel | Sq. Key Size | Set Screw Size | Allowable Torque in Inch Pounds and Hub Class | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Minimum Hubs for Loose or Set-Screwed Sprockets | |
| | | | 500 | 1,000 | 2,000 | 3,500 | 5,600 | 8,500 | 12,500 | 17,000 | 23,000 | 30,000 | 38,000 | 47,000 | 60,000 | 70,000 | 100,000 | 140,000 | 190,000 | 245,000 | 325,000 | 400,000 | 500,000 | 600,000 | 720,000 | 850,000 | 1,000,000 | 1,250,000 | | |
| | | | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | Dia. | Lgth. |
| | | | Diameter of Keyseated Hubs | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15/16 | 1/4 | 3/8 | 1 3/4 | 1 3/4 | | | | | | | | | | | | | | | | | | | | | | | | | 1 3/4 | Length is determined same as for Key-seated Sprockets |
| 1 3/16 | 1/4 | 3/8 | 2 | 2 | 2 | | | | | | | | | | | | | | | | | | | | | | | | 2 | |
| 1 7/16 | 3/8 | 3/8 | 2 1/4 | 2 1/4 | 2 1/2 | 2 3/4 | | | | | | | | | | | | | | | | | | | | | | | 2 1/4 | |
| 1 11/16 | 3/8 | 3/8 | 2 3/4 | 2 3/4 | 2 3/4 | 3 | 3 | | | | | | | | | | | | | | | | | | | | | | 2 3/4 | |
| 1 15/16 | 1/2 | 1/2 | 3 | 3 | 3 | 3 1/4 | 3 1/4 | 3 1/4 | | | | | | | | | | | | | | | | | | | | | 3 | |
| 2 3/16 | 1/2 | 1/2 | 3 1/4 | 3 1/4 | 3 1/4 | 3 1/2 | 3 1/2 | 3 1/2 | 3 3/4 | | | | | | | | | | | | | | | | | | | | 3 1/4 | |
| 2 7/16 | 5/8 | 5/8 | 3 3/4 | 3 3/4 | 3 3/4 | 3 3/4 | 4 | 4 | 4 1/4 | 4 1/4 | | | | | | | | | | | | | | | | | | | 3 3/4 | |
| 2 11/16 | 5/8 | 5/8 | 4 1/4 | 4 1/4 | 4 1/4 | 4 1/4 | 4 1/4 | 4 1/4 | 4 1/2 | 4 1/2 | 4 1/2 | | | | | | | | | | | | | | | | | | 4 1/4 | |
| 2 15/16 | 3/4 | 5/8 | 4 1/2 | 4 1/2 | 4 1/2 | 4 1/2 | 4 1/2 | 4 3/4 | 4 3/4 | 4 3/4 | 5 | 5 | | | | | | | | | | | | | | | | | 4 1/2 | |
| 3 1/16 | 3/4 | 5/8 | 4 3/4 | 4 3/4 | 4 3/4 | 4 3/4 | 4 3/4 | 5 | 5 | 5 | 5 1/4 | 5 1/4 | 5 1/4 | | | | | | | | | | | | | | | | 4 3/4 | |
| 3 7/16 | 7/8 | 3/4 | 5 1/4 | 5 1/4 | 5 1/4 | 5 1/4 | 5 1/4 | 5 1/4 | 5 1/4 | 5 1/4 | 5 1/2 | 5 1/2 | 5 3/4 | 5 3/4 | | | | | | | | | | | | | | | 5 1/4 | |
| 3 11/16 | 7/8 | 3/4 | | | 5 1/2 | 5 1/2 | 5 1/2 | 5 1/2 | 5 1/2 | 5 1/2 | 5 3/4 | 5 3/4 | 6 | 6 | 6 | | | | | | | | | | | | | | 5 1/2 | |
| 3 15/16 | 1 | 3/4 | | | | 6 | 6 | 6 | 6 | 6 | 6 1/4 | 6 1/4 | 6 1/2 | 6 1/2 | 6 1/2 | 6 1/2 | | | | | | | | | | | | | 6 | |
| 4 7/16 | 1 | 3/4 | | | | | 6 1/2 | 6 1/2 | 6 1/2 | 6 1/2 | 6 3/4 | 6 3/4 | 7 | 7 | 7 | 7 | 7 | | | | | | | | | | | | 6 1/2 | |
| 4 15/16 | 1 1/4 | 7/8 | | | | | | 7 1/4 | 7 1/4 | 7 1/4 | 7 1/4 | 7 1/4 | 7 1/2 | 7 1/2 | 7 1/2 | 8 | 8 | 8 | | | | | | | | | | | 7 1/4 | |
| 5 7/16 | 1 1/4 | 7/8 | | | | | | | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 1/2 | 8 1/2 | 8 1/2 | 8 1/2 | 9 1/2 | | | | | | | | | 8 | |
| 5 15/16 | 1 1/2 | 1 | | | | | | | | 9 | 9 | 9 | 9 | 9 | 9 | 9 1/2 | 10 | 10 | 10 | 10 | | | | | | | | | 9 | |
| 6 1/2 | 1 1/2 | 1 | | | | | | | | | 9 1/2 | 9 1/2 | 9 1/2 | 9 1/2 | 9 1/2 | 10 | 10 1/2 | 10 1/2 | 10 1/2 | 10 1/2 | 10 | | | | | | | | 9 1/2 | |
| 7 | 1 1/2 | 1 | | | | | | | | | | 10 | 10 | 10 | 10 | 10 1/2 | 10 1/2 | 10 1/2 | 10 1/2 | 10 1/2 | 11 | | | | | | | | 10 | |
| 7 1/2 | 1 3/4 | 1 1/4 | | | | | | | | | | | 11 | 11 | 11 | 11 1/2 | 11 1/2 | 11 1/2 | 11 1/2 | 11 1/2 | 12 | 12 | | | | | | | 11 | |
| 8 | 1 3/4 | 1 1/4 | | | | | | | | | | | | 11 1/2 | 11 1/2 | 12 | 12 | 12 | 12 | 12 1/2 | 12 1/2 | 12 1/2 | 12 1/2 | 12 1/2 | 13 | | | | 11 1/2 | |
| 8 1/2 | 1 3/4 | 1 1/4 | | | | | | | | | | | | | 12 | 12 1/2 | 12 1/2 | 12 1/2 | 12 1/2 | 12 1/2 | 13 | 13 | 13 | 13 | 13 1/2 | | | | 12 | |
| 9 | 1 3/4 | 1 1/4 | | | | | | | | | | | | | | 13 | 13 | 13 | 13 | 13 | 13 1/2 | 13 1/2 | 13 1/2 | 13 1/2 | 14 | 14 | | | 13 | |
| 9 1/2 | 1 3/4 | 1 1/4 | | | | | | | | | | | | | | | 13 1/2 | 13 1/2 | 13 1/2 | 13 1/2 | 13 1/2 | 14 | 14 | 14 | 14 1/2 | 14 1/2 | 15 | | 13 1/2 | |
| 10 | 2 | 1 1/4 | | | | | | | | | | | | | | | | 14 1/2 | 14 1/2 | 14 1/2 | 14 1/2 | 15 | 15 | 15 | 15 1/2 | 15 1/2 | 16 | 16 | 14 1/2 | |
| Length Through Bore | | | [1] 1 1/4 | [1] 1 1/2 | 1 3/4 | 2 | 2 1/2 | 2 3/4 | 3 1/4 | 3 1/2 | 4 | 4 1/4 | 4 1/2 | 5 | 5 1/4 | 5 1/2 | 6 | 6 1/2 | 7 | 7 3/4 | 8 1/2 | 9 1/2 | 10 | 10 1/2 | 11 | 11 1/2 | 12 | 12 1/2 | | |

Chain and sprockets are stronger than shafts

Chain and sprockets will not transmit full torque value of shaft

[1]Hubs on one side only.

All dimensions are inches.

### Notes

1. The diagonal solid block of figures on the Hub Diameter Selection Table (Table 8) represent a condition of balance between torque and keyway with bore sizes. When the hub class requirements and the bore size intersect in the blank space below and to the left of the solid block, it indicates that chain and sprocket will not transmit the full torque value of the keyed shaft. When the hub class and the bore size intersect above and to the right of the solid block, it indicates that chain and sprocket are stronger than the keyed shaft. The Hub Diameter Selection Table also serves as a design check on the shaft sizes as well.
2. For loose-fitting sprockets only (no keyway or set screw), the minimum hub diameter and length are shown at the right end of the shaft size row and at the bottom of the hub class columns.

## Other Considerations

When determining Engineering Class Sprockets, consider the following important points.

### Chain Interaction

The chain-sprocket interaction is the criterion upon which most users make their judgments about replacing sprockets. If the chain engages and disengages the sprocket smoothly without hanging up or snapping into place, most people will not replace it. If a chain does start to hang up on the sprocket, damaging chain overload conditions can develop rapidly. We suggest replacing sprockets before hang up develops.

### Reversible

Almost all sprockets are reversible. The key to being able to reverse sprockets is symmetry. If the sprockets are symmetrical from side to side, then they can be reversed. Reversing is not suggested in most circumstances, especially with those applications that wear the sprocket bottom diameter.

### New Chain

We suggest you order new sprockets when chain is replaced. New sprockets ensure proper chain interaction and also provide maximum wear performance.

### Attachment Clearance

Any time an attachment is in the area between, above, or below the sidebars, make sure the attachment does not interfere with sprocket action.

### Relief Pocket (Mud Relief)

In applications where material build up may be a problem, the bottom of the tooth pocket can be beveled on the side to allow the material to "squeeze" out. This reduction of contact area is not critical because the pressure on the bottom of the pocket is very light in horizontal conveyors. Other relief styles may be necessary for vertical conveyors.

### Advantages of Using Larger Sprockets

Choose the largest sprocket that will fit your application. Small sprockets cause greater shock and consequently more wear on both chain and sprockets. There are several reasons for this.

1. To engage small sprockets, chain must flex more which causes increased rotation of the pin in the bushing. Since this is one of the major causes of chain wear, this flexing action should be minimized.
2. Small sprockets with fewer teeth wear out much faster than sprockets with more teeth. More teeth provide an opportunity to distribute the wearing action.
3. Larger sprockets cause smoother operation because the greater number of teeth will pick up the load more frequently.

### Chordal Action

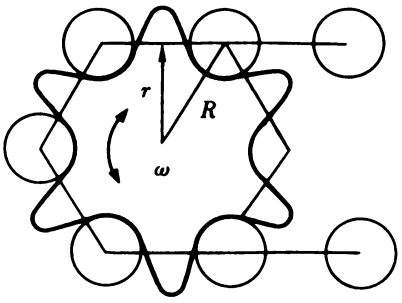
Chordal action is a very important concept in sprocket function. A sprocket is a collection of chords, or straight segments, that approximate a circle. The more teeth a sprocket has, the closer the chords are to a circle.

The problem with a chordal form is that the lineal output is not consistent. Since the sprocket is not a perfect circle, the distance from the shaft center to the chain center-line varies. As this distance varies, so does the lineal output (assuming a constant shaft rational speed).

A hexagon inscribed by a circle represents the 6-tooth sprocket shown below. You can see that the distance from the center to the corner is different than from the center to the middle of the side. The corner would be the equivalent to the chain joint center, and the side is equivalent to the chain centerline at mid-pitch.

**Minimum Chain Speed**

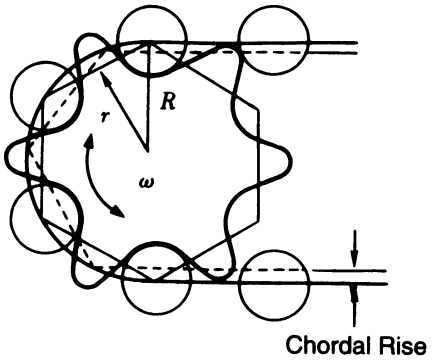
$V_{min} = r\omega$




$V_1$=.2618 (PD) COS (180/T) N

**Maximum Chain Speed**

$V_{max} = R\omega$




$V_2$=.2618 (PD) N

Where
$V_1$ and $V_2$ in fpm,
N in r.p.m.,
PD in pitch diameter, in inches.