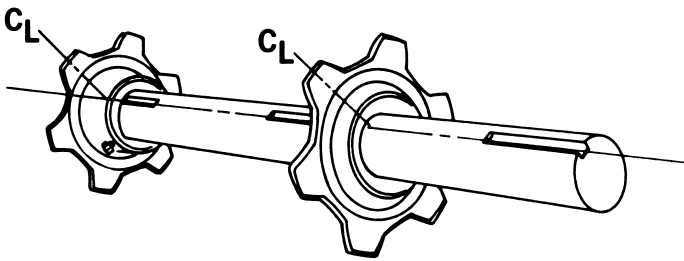


# Sprockets

## Sprockets Keyed In Line

Key driving sprockets on a double-strand chain conveyor or elevator on the head shaft and with the teeth of one sprocket directly in line with teeth of the other. Order "keyed-in-line" and "matched in pairs" to obtain this feature. Key one foot shaft sprocket on its shaft so that the shaft will turn in its bearings. Allow the other sprocket to turn freely, holding it in position by means of set collars. The sprocket can then position itself automatically if uneven wear takes place in the chain strands (Figure 1).

**Figure 1**



## Sprocket Size

Use the largest diameter conveyor sprocket that space and economics permit. This minimizes chain speed variations and pulsations and reduces wear to the chain and sprocket.

## Sprocket Terminology

### Chain Interaction

Schedule replacement of sprockets and/or chain by assessing the chain-sprocket interaction. If the chain enters and exits smoothly without hanging up or snapping into place, replacement is not necessary. If a chain starts to hang up on the sprocket, reverse or replace the sprocket before damaging chain overload conditions can develop.

### Reversible

If the sprockets are symmetrical from side to side they can be reversed. Almost all sprockets are reversible.

### New Chain

New or reversed sprockets are required with any new chain. New sprockets will ensure proper chain interaction and will also provide maximum wear performance.

## Visual Observation

Carefully observe the wear patterns on chains and sprockets. Wear patterns that are smooth and even indicate good chain-sprocket interaction; unbalanced or severe wear indicates that the system needs maintenance.

## Attachment Clearance

Be sure that any attachment in the area between, above, or below the sidebars will not interfere with the sprocket.

## Relief Pocket

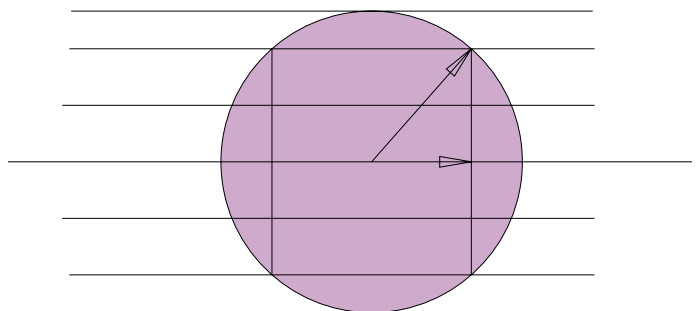
In applications where material build-up may occur, the bottom of the tooth pocket is beveled on the side to allow the material to "squeeze" out.

## Chordal Action

A sprocket is a collection of chords, or straight segments, that approximate a circle. With more teeth the chords approximate a circle better; with fewer teeth the chords do not approximate a circle as well.

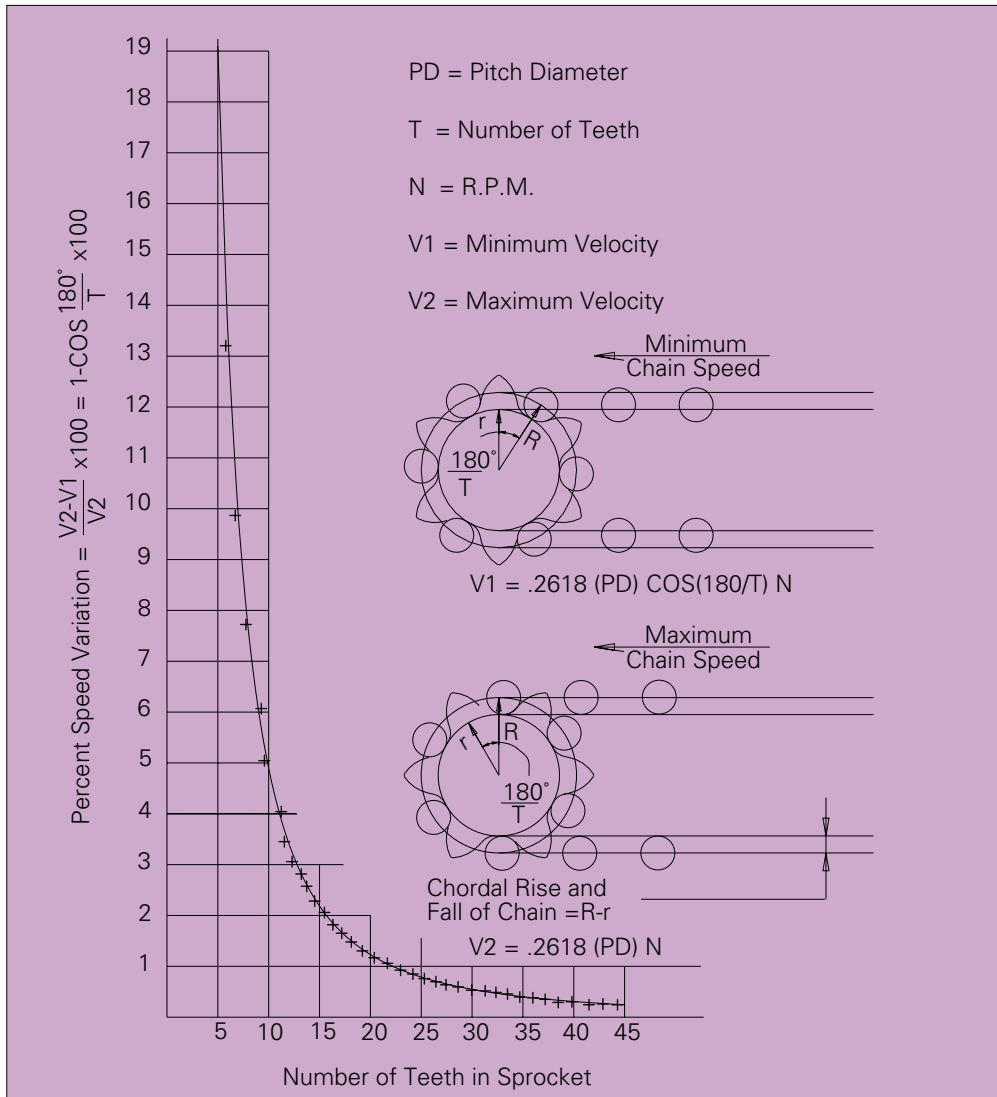
The lineal output from a chordal form is not constant. The square in a circle shown in Figure 2 represents a four-tooth sprocket. Note that the distance from the center to the corner is different than from the center to the middle of the side. The corner would be the equivalent of the chain joint center; the side would be equivalent to the chain centerline at mid-pitch.

**Figure 2**



The resulting velocity variations are a function of the number of teeth, as shown in Figure 3. Due to these variations, care should be taken in considering sprockets with less than 12 teeth.

**Figure 3 — Variations in Chain Speed Due to Chordal Action**

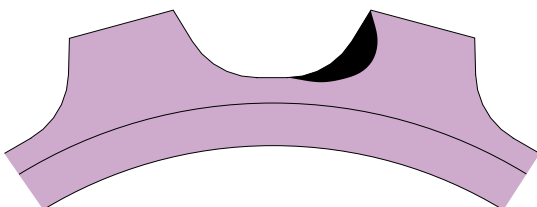


**Sprocket Life**

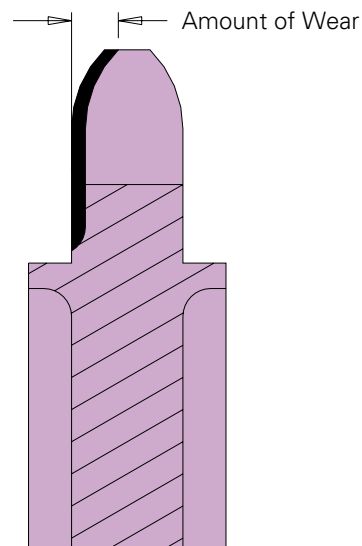
When sprockets are worn, the chain tends to cling to the sprockets or vibrate. The amount of allowable wear depends on the conveyor type and chain size. Wear to a depth of 0.12" (3 mm) to 0.24" (6 mm) is usually a sign that the existing sprocket should be replaced, illustrated in Figure 4.

If the sprocket teeth are worn, the alignment may be incorrect. Proper axial alignment of the sprockets will help reduce or even eliminate wear of sprocket teeth, illustrated in Figure 5.

**Figure 4 — Sprocket Wear**



**Figure 5 — Sprocket Tooth Wear**





# UNION CHAIN DIVISION - ENGINEERING INFORMATION - SPROCKETS

## Density of Materials

The weights represent, in many cases, the weights of materials as settled or packed in bins, while lower weights should

generally be figured for materials as slightly agitated or fluffed by handling in elevators, screw conveyors, etc.

| Material                                      | Avg. Wgt. of One Cu. ft. (lbs.) | Angle of Repose | Material  | Avg. Wgt. of One Cu. ft. (lbs.) | Angle of Repose |
|---|---------------------------------|-----------------|---|---------------------------------|-----------------|
| Alcohol, proof spirit                         | 58                              |                 | Coke, Refiners  | 35-40                           |                 |
| Aluminum, cast, pure                          | 160                             |                 | Coke, loose, good quality   | 23-32                           | 30-45           |
| Anthracite, broken, loose                     | 55                              | 27              | Concrete, conglomerate, with Portland cement                                  | 143-150                         |                 |
| Asbestos                                      | 175                             |                 | Concrete, gravel, with Portland cement  | 150                             |                 |
| Ash, American White, dry (wood)               | 47                              |                 | Concrete, loose, unrammed, weights 5 to 25% lighter, varying with consistency |                                 |                 |
| Ashes of soft coal, solidly packed            | 40                              | 40              | Copper, cast  | 542                             |                 |
| Asphaltum                                     | 87                              |                 | Copper, rolled  | 555                             |                 |
| Barytes                                       | 180                             |                 | Corn, shelled   | 45                              |                 |
| Batch, Glass                                  | 90                              |                 | Corn, meal  | 40                              |                 |
| Beans   | 48                              |                 | Cork, dry   | 15                              |                 |
| Benzine                                       | 50                              |                 | Cotton seed   | 25                              |                 |
| Bauxite, Crushed                              | 80                              |                 | Cotton seed cake, cracked   | 41                              |                 |
| Brass (copper and zinc), cast                 | 519                             |                 | Cotton seed hulls   | 12                              |                 |
| Brick, best pressed                           | 134                             |                 | Cotton seed meal  | 35                              |                 |
| Brick, common and hard                        | 112-125                         |                 | Cullet  | 80-120                          |                 |
| Brick, fire                                   | 144                             |                 | Cypress   | 38                              |                 |
| Brickwork, cement                             | 112                             |                 | Earth, common load, perfectly dry, loose                                      | 72-80                           | 30-45           |
| Bronze, copper 8, tin 1 (gun metal)           | 552                             |                 | Earth, common load, perfectly dry, shaken                                     | 82-92                           | 30-45           |
| Cedar   | 24                              |                 | Elm, perfectly dry  | 42                              |                 |
| Cement, Portland, per barrel, net, 376 pounds | 100                             |                 | Feldspar, powdered  | 75                              |                 |
| Cement, Portland, standard proportioning      | 100                             |                 | Fir   | 35                              |                 |
| Chalk   | 156                             |                 | Fir, Eastern  | 25                              |                 |
| Char  | 45                              |                 | Flax seed   | 45                              |                 |
| Charcoal of pines and oaks                    | 20-38                           |                 | Flour, 196 pounds per barrel, net   | 35-40                           |                 |
| Cherry, perfectly dry                         | 44                              |                 | Fuller's earth  | 35-45                           |                 |
| Chestnut wood, dry                            | 38                              |                 | Glass   | 163                             |                 |
| Cinder, blast furnace                         | 57                              |                 | Granite, solid  | 166                             |                 |
| Cinders (coal, ashes and clinkers)            | 40                              | 25-40           | Granite, broken   | 96                              |                 |
| Clay, dry, in lump, loose                     | 75                              | 25-45           | Gravel  | 100                             | 30-40           |
| Clinker, cement                               | 80-95                           |                 | Gypsum, under 1" crushed  | 80-100                          |                 |
| Coal, bituminous, solid                       | 84                              |                 | Gypsum, powdered  | 60-80                           |                 |
| Coal bituminous, broken, of any size, piled   | 44-52                           | 35              | Hay, baled  | 24                              |                 |
| Coal, Steam                                   | 50                              |                 | Hemlock, perfectly dry  | 25                              |                 |
| Coke, Breeze                                  | 25-34                           |                 |   |                                 |                 |

**Density of Materials** (continued)

| Material                             | Avg. Wgt. of One Cu. ft. (lbs.) | Angle of Repose | Material   | Avg. Wgt. of One Cu. ft. (lbs.) | Angle of Repose |
|--------------------------------------|---------------------------------|-----------------|--|---------------------------------|-----------------|
| Hides, green, 85 pounds each         | —                               |                 | Pine, Yellow Northern, perfectly dry                             | 34                              |                 |
| Hickory, perfectly dry               | 50                              |                 | Poplar, dry  | 32                              |                 |
| Ice                                  | 56                              |                 | Quartz   | 90-100                          |                 |
| Iron, cast                           | 446                             |                 | Salt, coarse   | 45                              |                 |
| Iron, wrought                        | 480                             |                 | Salt, dry, fines   | 80                              |                 |
| Lead, commercial                     | 709.6                           |                 | Sand, damp   | 117-130                         |                 |
| Lignumvitae (dry)                    | 41-83                           |                 | Sand, dry  | 90-110                          |                 |
| Limestone, loose                     | 96                              |                 | Sandstone, quarried and piled                                    | 86                              |                 |
| Limestone and Marble                 | 105                             |                 | Sawdust  | 13                              |                 |
| Lime, quick                          | 95                              |                 | Shales   | 92                              |                 |
| Lime, quick, ground, well shaken     | 64                              |                 | Slag   | 160 -180                        |                 |
| Lime, hydrated                       | 20-45                           |                 | Slag, furnace, granulated  | 53                              |                 |
| Locust, dry                          | 46                              |                 | Slate  | 175                             |                 |
| Magnesium                            | 109                             |                 | Slurry, cement   | 90                              |                 |
| Mahogany                             | 56                              |                 | Soda   | 42                              |                 |
| Mahogany Honduras                    | 35                              |                 | Soda ash   | 32-67                           |                 |
| Manganese                            | 500                             |                 | Spruce, dry  | 25                              |                 |
| Maple, dry                           | 44                              |                 | Steel  | 486.5                           |                 |
| Marble, crushed                      | 90                              |                 | Straw, baled   | 24                              |                 |
| Marl                                 | 79                              |                 | Sugar, refined   | 55                              |                 |
| Oak, live, perfectly dry, .88-1.02   | 72                              |                 | Sulphur  | 125                             |                 |
| Oak, white, perfectly dry            | 50                              |                 | Tar  | 62.4                            |                 |
| Oats                                 | 26                              |                 | Tin, cast, 7.2   | 455                             |                 |
| Oil, linseed                         | 59                              |                 | Trap rock, crushed   | 97-107                          |                 |
| Oil, petroleum                       | 51                              |                 | Turpentine, 300 pounds per barrel                                | —                               |                 |
| Oil, olive and whale                 | 58                              |                 | Walnut, Black, perfectly dry                                     | 41                              |                 |
| Ore, zinc, crushed                   | 160                             |                 | Water, pure rain, distilled, at 32 degrees F.,<br>Bar. 30 inches | 62.417                          |                 |
| Ore, soft iron                       | 150                             | 35              | Water, sea   | 64.08                           |                 |
| Oxide, Iron Sponge                   | 28-50                           |                 | Wheat  | 48                              |                 |
| Phosphate acid                       | 62                              |                 | Zinc or Spelter, cast  | 428                             |                 |
| Phosphate Pebble                     | 100                             |                 |  |                                 |                 |
| Phosphate rock                       | 85                              |                 |  |                                 |                 |
| Pine, white, perfectly dry           | 32                              |                 |  |                                 |                 |
| Pine, Yellow Southern, perfectly dry | 41                              |                 |  |                                 |                 |



# UNION CHAIN DIVISION - ENGINEERING INFORMATION - SPROCKETS

## Properties of Steels—Strength of Materials

| Relation of Hardness to Strength of Steel. Approximate relation of various hardnesses due to influence of size, composition, and heat treatment |                                |                          |              |  |                           |  |             |                                |                                  |               |  |                           |  |
|---|--------------------------------|--------------------------|--------------|--|---------------------------|--|-------------|--------------------------------|----------------------------------|---------------|--|---------------------------|--|
| Brinell   |                                | Rockwell                 |              |  |                           | Brinell                                |             | Rockwell                       |                                  |               |  |                           |  |
| Dia. in Mm.   | 3,000-Kg. Hardness Load Number | C-Scale, Diamond Pyramid |              | B-Scale, 100-Kg. Load 1/16 In. Dia. Ball | Shore Sclero-Scope Number | Tensile Stgth., 1,000 Lbs. per Sq. In. | Dia. in Mm. | 3,000 Kg. Load Hardness Number | C-Scale, Vickers (Firth Diamond) |               | B-Scale, 100-Kg. Load 1/16 In. Dia. Ball | Shore Sclero-scope Number | Tensile Stgth., 1,000 Lbs. per Sq. In. |
|   |                                | No. 50 Hardness Kg. Load | Diamond Cone |  |                           |  |             |                                | 120-Deg. Load                    | 120-Deg. Load |  |                           |  |
| 2.25  | *745                           | 1,050                    | 68           |  | 100                       | 368                                    | 3.85        | 248                            | 261                              | 24            | 101                                      | 37                        | 122                                    |
| 2.30  | *710                           | 780                      | 63           |  | 87                        | 350                                    | 3.90        | 241                            | 253                              | 23            | 100                                      | 36                        | 118                                    |
| 2.35  | *682                           | 737                      | 62           |  | 84                        | 340                                    | 3.95        | 235                            | 247                              | 22            | 99                                       | 35                        | 115                                    |
| 2.40  | *653                           | 697                      | 60           |  | 81                        | 330                                    | 4.00        | 229                            | 241                              | 21            | 98                                       | 34                        | 111                                    |
| 2.45  | *627                           | 667                      | 59           |  | 79                        | 323                                    | 4.05        | 223                            | 234                              | 19            | 97                                       | 33                        | 108                                    |
| 2.50  | *601                           | 640                      | 57           |  | 77                        | 309                                    | 4.10        | 217                            | 228                              | 18            | 96                                       | 33                        | 105                                    |
| 2.55  | *578                           | 615                      | 56           |  | 75                        | 297                                    | 4.15        | 212                            | 222                              | 16            | 96                                       | 32                        | 102                                    |
| 2.60  | *555                           | 591                      | 55           | 120                                      | 73                        | 285                                    | 4.20        | 207                            | 218                              | 15            | 95                                       | 32                        | 100                                    |
| 2.65  | *534                           | 569                      | 54           | 119                                      | 71                        | 274                                    | 4.25        | 201                            | 212                              | 14            | 94                                       | 31                        | 98                                     |
| 2.70  | *514                           | 547                      | 53           | 119                                      | 70                        | 263                                    | 4.30        | 197                            | 207                              | 13            | 93                                       | 30                        | 95                                     |
| 2.75  | 495                            | 539                      | 52           | 117                                      | 69                        | 259                                    | 4.35        | 192                            | 202                              | 12            | 92                                       | 29                        | 93                                     |
| 2.80  | 477                            | 516                      | 50           | 117                                      | 67                        | 247                                    | 4.40        | 187                            | 196                              | 10            | 91                                       | 28                        | 90                                     |
| 2.85  | 461                            | 495                      | 49           | 116                                      | 65                        | 237                                    | 4.45        | 183                            | 192                              | 9             | 90                                       | 28                        | 89                                     |
| 2.90  | 444                            | 474                      | 47           | 115                                      | 63                        | 226                                    | 4.50        | 179                            | 188                              | 8             | 89                                       | 27                        | 87                                     |
| 2.95  | 429                            | 455                      | 46           | 115                                      | 61                        | 217                                    | 4.55        | 174                            | 182                              | 6             | 88                                       | 26                        | 85                                     |
| 3.00  | 415                            | 440                      | 45           | 114                                      | 59                        | 210                                    | 4.60        | 170                            | 178                              | 5             | 87                                       | 26                        | 83                                     |
| 3.05  | 401                            | 425                      | 43           | 113                                      | 58                        | 202                                    | 4.65        | 167                            | 175                              | 4             | 86                                       | 25                        | 81                                     |
| 3.10  | 388                            | 410                      | 42           | 112                                      | 56                        | 195                                    | 4.70        | 163                            | 171                              | 3             | 85                                       | 25                        | 79                                     |
| 3.15  | 375                            | 396                      | 40           | 112                                      | 54                        | 188                                    | 4.80        | 156                            | 163                              | 1             | 83                                       | 24                        | 76                                     |
| 3.20  | 363                            | 383                      | 39           | 110                                      | 52                        | 182                                    | 4.90        | 149                            | 156                              |               | 81                                       | 23                        | 73                                     |
| 3.25  | 352                            | 372                      | 38           | 110                                      | 51                        | 176                                    | 5.00        | 143                            | 150                              |               | 79                                       | 22                        | 71                                     |
| 3.30  | 341                            | 360                      | 37           | 109                                      | 50                        | 170                                    | 5.10        | 137                            | 143                              |               | 76                                       | 21                        | 67                                     |
| 3.35  | 331                            | 350                      | 36           | 109                                      | 48                        | 166                                    | 5.20        | 131                            | 137                              |               | 74                                       | 20                        | 65                                     |
| 3.40  | 321                            | 339                      | 34           | 108                                      | 47                        | 160                                    | 5.30        | 126                            | 132                              |               | 72                                       | 20                        | 63                                     |
| 3.45  | 311                            | 328                      | 33           | 108                                      | 46                        | 155                                    | 5.40        | 121                            | 127                              |               | 70                                       | 19                        | 60                                     |
| 3.50  | 302                            | 319                      | 32           | 107                                      | 45                        | 150                                    | 5.50        | 116                            | 122                              |               | 68                                       | 18                        | 58                                     |
| 3.55  | 293                            | 309                      | 31           | 106                                      | 43                        | 145                                    | 5.60        | 111                            | 117                              |               | 66                                       | 15                        | 56                                     |
| 3.60  | 285                            | 301                      | 30           | 106                                      | 42                        | 141                                    | 5.70        | 107                            | 107                              |               | 64                                       |                           | 55                                     |
| 3.65  | 277                            | 292                      | 29           | 105                                      | 41                        | 137                                    | 5.80        | 103                            | 103                              |               | 61                                       |                           | 53                                     |
| 3.70  | 269                            | 284                      | 28           | 104                                      | 40                        | 133                                    | 5.90        | 99                             | 99                               |               | 59                                       |                           | 51                                     |
| 3.75  | 262                            | 276                      | 27           | 103                                      | 39                        | 129                                    | 6.00        | 95                             | 95                               |               | 56                                       |                           | 49                                     |
| 3.80  | 255                            | 269                      | 25           | 102                                      | 38                        | 126                                    |             |                                |                                  |               |  |                           |  |

\*Tungsten carbide ball  
(ASTM-SAE-ASM Joint Committee)

**Working Loads (Pounds)**

| Horse-power | Linear Speed in Feet per Minute |         |         |         |        |        |        |        |        |        |        |        |        |
|-------------|---------------------------------|---------|---------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|             | 12 1/2                          | 25      | 50      | 100     | 200    | 300    | 400    | 500    | 600    | 700    | 800    | 900    | 1,000  |
| 1/4         | 660                             | 330     | 165     | 83      | 42     | 28     | 21     | 17     | 14     | 12     | 11     | 9      | 8      |
| 1/2         | 1,320                           | 660     | 330     | 165     | 83     | 55     | 42     | 33     | 28     | 24     | 21     | 18     | 17     |
| 3/4         | 1,980                           | 990     | 495     | 248     | 124    | 83     | 62     | 50     | 41     | 36     | 31     | 27     | 25     |
| 1           | 2,640                           | 1,320   | 660     | 330     | 165    | 110    | 83     | 66     | 55     | 47     | 42     | 37     | 33     |
| 1-1/2       | 3,960                           | 1,980   | 990     | 495     | 248    | 165    | 124    | 99     | 83     | 71     | 62     | 55     | 50     |
| 2           | 5,280                           | 2,640   | 1,320   | 660     | 330    | 220    | 165    | 132    | 110    | 94     | 83     | 73     | 66     |
| 2-1/2       | 6,600                           | 3,300   | 1,650   | 825     | 413    | 275    | 206    | 165    | 137    | 118    | 103    | 92     | 83     |
| 3           | 7,920                           | 3,960   | 1,980   | 990     | 495    | 330    | 248    | 198    | 165    | 141    | 124    | 110    | 99     |
| 4           | 10,560                          | 5,280   | 2,640   | 1,320   | 660    | 440    | 330    | 264    | 220    | 189    | 165    | 147    | 132    |
| 5           | 13,200                          | 6,600   | 3,300   | 1,650   | 825    | 550    | 413    | 330    | 275    | 236    | 206    | 183    | 165    |
| 7-1/2       | 19,800                          | 9,900   | 4,950   | 2,475   | 1,238  | 825    | 619    | 495    | 413    | 354    | 310    | 275    | 248    |
| 10          | 26,400                          | 13,200  | 6,600   | 3,300   | 1,650  | 1,100  | 825    | 660    | 550    | 471    | 412    | 367    | 330    |
| 15          | 39,600                          | 19,800  | 9,900   | 4,950   | 2,475  | 1,650  | 1,238  | 990    | 825    | 707    | 619    | 550    | 495    |
| 20          | 52,800                          | 26,400  | 13,200  | 6,600   | 3,300  | 2,200  | 1,650  | 1,320  | 1,100  | 943    | 825    | 734    | 660    |
| 25          | 66,000                          | 33,000  | 16,500  | 8,250   | 4,125  | 2,750  | 2,063  | 1,650  | 1,375  | 1,178  | 1,031  | 917    | 825    |
| 30          | 79,200                          | 39,600  | 19,800  | 9,900   | 4,950  | 3,300  | 2,475  | 1,980  | 1,650  | 1,414  | 1,238  | 1,100  | 990    |
| 35          | 92,400                          | 46,200  | 23,100  | 11,550  | 5,775  | 3,850  | 2,888  | 2,310  | 1,925  | 1,650  | 1,444  | 1,283  | 1,155  |
| 40          | 105,600                         | 52,800  | 26,400  | 13,200  | 6,600  | 4,400  | 3,300  | 2,640  | 2,200  | 1,885  | 1,650  | 1,464  | 1,320  |
| 50          | 132,000                         | 66,000  | 33,000  | 16,500  | 8,250  | 5,500  | 4,125  | 3,300  | 2,750  | 2,357  | 2,062  | 1,833  | 1,650  |
| 60          | 158,400                         | 79,200  | 39,600  | 19,800  | 9,900  | 6,600  | 4,950  | 3,960  | 3,300  | 2,829  | 2,475  | 2,200  | 1,980  |
| 75          | 198,000                         | 99,000  | 49,500  | 24,750  | 12,390 | 8,250  | 6,195  | 4,950  | 4,125  | 3,536  | 3,098  | 2,750  | 2,475  |
| 100         | 264,000                         | 132,000 | 66,000  | 33,000  | 16,500 | 11,000 | 8,250  | 6,600  | 5,500  | 4,714  | 4,125  | 3,667  | 3,300  |
| 125         | 330,000                         | 165,000 | 82,500  | 41,250  | 20,625 | 13,750 | 10,313 | 8,250  | 6,875  | 5,893  | 5,157  | 4,583  | 4,125  |
| 150         | 396,000                         | 198,000 | 99,000  | 49,500  | 24,750 | 16,500 | 12,375 | 9,900  | 8,250  | 7,071  | 6,188  | 5,500  | 4,950  |
| 175         | 462,000                         | 231,000 | 115,500 | 57,750  | 28,875 | 19,250 | 14,438 | 11,550 | 9,625  | 8,250  | 7,219  | 6,417  | 5,775  |
| 200         | 528,000                         | 264,000 | 132,000 | 66,000  | 33,000 | 22,000 | 16,500 | 13,200 | 11,000 | 9,429  | 8,250  | 7,333  | 6,600  |
| 250         | 660,000                         | 330,000 | 165,000 | 82,500  | 41,250 | 27,500 | 20,625 | 16,500 | 13,750 | 11,786 | 10,313 | 9,167  | 8,250  |
| 300         | 792,000                         | 396,000 | 198,000 | 99,000  | 49,500 | 33,000 | 24,750 | 19,800 | 16,500 | 14,143 | 12,375 | 11,000 | 9,900  |
| 350         | 924,000                         | 462,000 | 231,000 | 115,000 | 57,750 | 38,500 | 28,875 | 23,100 | 19,250 | 16,500 | 14,438 | 12,833 | 11,500 |
| 400         | 1,056,000                       | 528,000 | 264,000 | 132,000 | 66,000 | 44,000 | 33,000 | 26,400 | 22,000 | 18,857 | 16,500 | 14,667 | 13,200 |



# UNION CHAIN DIVISION - ENGINEERING INFORMATION - SPROCKETS

## Torque Values (Inch Pounds)

| RPM    | Horsepower |         |         |         |         |         |         |         |         |         |
|--------|------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
|        | 1/8        | 1/4     | 1/2     | 3/4     | 1       | 1 1/2   | 2       | 2 1/2   | 3       | 5       |
| 0.10   | 78,871     | 157,562 | 315,125 | 472,687 |         |         |         |         |         |         |
| 0.20   | 39,390     | 78,781  | 157,562 | 236,343 | 315,125 | 472,687 |         |         |         |         |
| 0.30   | 26,260     | 52,520  | 105,040 | 157,562 | 210,083 | 315,125 | 420,166 |         |         |         |
| 0.40   | 19,695     | 39,390  | 78,781  | 118,171 | 157,562 | 236,343 | 315,125 | 393,906 | 472,682 |         |
| 0.50   | 15,756     | 31,512  | 63,025  | 94,537  | 126,050 | 189,075 | 252,100 | 315,125 | 378,150 |         |
| 0.60   | 13,130     | 26,260  | 52,520  | 78,781  | 105,040 | 157,562 | 210,083 | 262,604 | 315,125 |         |
| 0.70   | 11,254     | 22,508  | 45,017  | 67,526  | 90,035  | 135,053 | 180,071 | 225,089 | 270,107 | 450,178 |
| 0.80   | 9,847      | 19,695  | 39,390  | 59,085  | 78,781  | 118,171 | 157,562 | 196,953 | 236,343 | 393,906 |
| 0.90   | 8,753      | 17,507  | 35,013  | 52,520  | 70,027  | 105,041 | 140,055 | 175,069 | 210,083 | 350,138 |
| 1.00   | 7,878      | 15,756  | 31,512  | 47,268  | 63,025  | 94,537  | 126,050 | 157,562 | 189,075 | 315,125 |
| 1.25   | 6,302      | 12,605  | 25,210  | 37,815  | 50,420  | 75,630  | 100,840 | 126,050 | 151,260 | 252,100 |
| 1.50   | 5,252      | 10,504  | 21,008  | 31,512  | 42,016  | 63,025  | 84,033  | 105,041 | 126,050 | 210,083 |
| 1.75   | 4,501      | 9,003   | 18,006  | 27,010  | 36,014  | 54,021  | 72,028  | 90,035  | 108,042 | 180,071 |
| 2.00   | 3,929      | 7,878   | 15,756  | 23,634  | 31,512  | 47,268  | 63,025  | 78,781  | 94,537  | 157,562 |
| 2.50   | 3,151      | 6,302   | 12,604  | 18,907  | 25,210  | 37,815  | 50,420  | 63,025  | 76,630  | 126,050 |
| 3.00   | 2,626      | 5,252   | 10,504  | 15,756  | 21,008  | 31,512  | 42,016  | 52,520  | 63,025  | 105,041 |
| 4.00   | 1,969      | 3,939   | 7,878   | 11,817  | 15,756  | 23,634  | 31,512  | 39,406  | 47,268  | 78,781  |
| 5.00   | 1,575      | 3,151   | 6,302   | 9,453   | 12,605  | 18,907  | 25,210  | 31,512  | 37,815  | 63,025  |
| 6.00   | 1,313      | 2,626   | 5,252   | 7,878   | 10,504  | 15,756  | 21,008  | 26,260  | 31,512  | 52,520  |
| 7.00   | 1,125      | 2,250   | 4,501   | 6,752   | 9,003   | 13,505  | 18,007  | 22,508  | 27,010  | 45,017  |
| 8.00   | 984        | 1,969   | 3,939   | 5,908   | 7,878   | 11,817  | 15,756  | 19,695  | 23,634  | 39,390  |
| 9.00   | 875        | 1,750   | 3,501   | 5,252   | 7,002   | 10,504  | 14,005  | 17,506  | 21,008  | 35,013  |
| 10.00  | 787        | 1,575   | 3,151   | 4,726   | 6,302   | 9,453   | 12,605  | 15,756  | 18,907  | 31,512  |
| 12.00  | 656        | 1,313   | 2,626   | 3,939   | 5,252   | 7,878   | 10,504  | 13,130  | 15,756  | 26,260  |
| 14.00  | 562        | 1,125   | 2,250   | 3,376   | 4,501   | 6,752   | 9,003   | 11,254  | 13,505  | 22,508  |
| 16.00  | 492        | 984     | 1,969   | 2,954   | 3,939   | 5,908   | 7,878   | 9,847   | 11,817  | 19,695  |
| 18.00  | 437        | 874     | 1,750   | 2,626   | 3,501   | 5,252   | 7,002   | 8,753   | 10,504  | 17,506  |
| 20.00  | 393        | 787     | 1,575   | 2,363   | 3,151   | 4,826   | 6,302   | 7,878   | 9,453   | 15,756  |
| 25.00  | 315        | 630     | 1,260   | 1,890   | 2,521   | 3,781   | 5,042   | 6,302   | 7,563   | 12,605  |
| 30.00  | 262        | 525     | 1,050   | 1,575   | 2,100   | 3,151   | 4,201   | 5,232   | 6,302   | 10,504  |
| 40.00  | 197        | 394     | 787     | 1,181   | 1,575   | 2,363   | 3,151   | 3,940   | 4,726   | 7,878   |
| 50.00  | 157        | 315     | 630     | 945     | 1,260   | 1,890   | 2,521   | 3,151   | 3,781   | 6,302   |
| 60.00  | 131        | 262     | 525     | 787     | 1,050   | 1,575   | 2,100   | 2,626   | 3,151   | 5,252   |
| 70.00  | 112        | 225     | 450     | 675     | 900     | 1,350   | 1,800   | 2,250   | 2,701   | 4,501   |
| 80.00  | 98         | 196     | 393     | 590     | 787     | 1,181   | 1,575   | 1,969   | 2,363   | 3,939   |
| 90.00  | 87         | 175     | 350     | 525     | 700     | 1,050   | 1,400   | 1,750   | 2,100   | 3,501   |
| 100.00 | 78         | 157     | 315     | 472     | 630     | 945     | 1,260   | 1,575   | 1,890   | 3,151   |

**Torque Values (Inch Pounds) (Continued)**

| RPM    | Horsepower |         |         |         |         |         |         |         |         |         |
|--------|------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
|        | 7 1/2      | 10      | 15      | 20      | 25      | 30      | 35      | 40      | 50      | 75      |
| 1.00   | 472,687    |         |         |         |         |         |         |         |         |         |
| 1.25   | 878,150    |         |         |         |         |         |         |         |         |         |
| 1.50   | 815,125    | 420,166 |         |         |         |         |         |         |         |         |
| 1.75   | 270,107    | 360,142 |         |         |         |         |         |         |         |         |
| 2.00   | 236,343    | 315,125 | 472,687 |         |         |         |         |         |         |         |
| 2.50   | 189,075    | 252,100 | 378,150 |         |         |         |         |         |         |         |
| 3.00   | 157,562    | 210,083 | 315,125 | 420,166 |         |         |         |         |         |         |
| 4.00   | 118,171    | 157,562 | 236,343 | 315,125 | 393,906 | 472,687 |         |         |         |         |
| 5.00   | 94,537     | 126,050 | 189,075 | 252,100 | 315,125 | 378,150 | 441,175 |         |         |         |
| 6.00   | 78,781     | 105,041 | 157,562 | 210,083 | 262,604 | 315,125 | 367,645 | 420,166 |         |         |
| 7.00   | 67,526     | 90,035  | 135,053 | 180,071 | 225,089 | 270,107 | 315,125 | 360,143 | 450,178 |         |
| 8.00   | 59,058     | 78,781  | 118,171 | 157,562 | 196,953 | 236,343 | 275,734 | 315,125 | 393,906 |         |
| 9.00   | 52,520     | 70,027  | 105,041 | 140,055 | 175,069 | 210,083 | 245,097 | 280,111 | 350,138 |         |
| 10.00  | 47,268     | 63,025  | 94,537  | 126,050 | 157,562 | 189,075 | 220,587 | 252,100 | 315,125 | 472,687 |
| 12.00  | 39,390     | 52,520  | 78,781  | 105,041 | 131,302 | 157,562 | 183,823 | 210,083 | 262,604 | 393,906 |
| 14.00  | 33,733     | 45,017  | 67,526  | 90,035  | 112,544 | 135,053 | 157,562 | 180,071 | 225,089 | 337,633 |
| 16.00  | 29,543     | 39,390  | 39,058  | 78,781  | 98,476  | 118,172 | 137,867 | 157,562 | 196,953 | 295,429 |
| 18.00  | 26,260     | 35,013  | 52,520  | 70,027  | 87,534  | 105,041 | 122,548 | 140,055 | 175,069 | 262,604 |
| 20.00  | 23,634     | 31,512  | 47,268  | 63,025  | 78,781  | 94,537  | 110,293 | 126,050 | 157,562 | 236,343 |
| 25.00  | 18,907     | 25,210  | 37,815  | 50,420  | 63,025  | 75,630  | 88,235  | 100,840 | 126,050 | 189,075 |
| 30.00  | 15,756     | 21,008  | 31,512  | 42,016  | 52,520  | 63,025  | 73,529  | 84,033  | 105,041 | 157,562 |
| 40.00  | 11,817     | 15,756  | 23,634  | 31,512  | 39,390  | 47,268  | 55,146  | 63,025  | 78,781  | 118,172 |
| 50.00  | 9,453      | 12,605  | 18,907  | 25,210  | 31,512  | 37,815  | 44,117  | 50,420  | 63,025  | 94,537  |
| 60.00  | 7,878      | 10,504  | 15,756  | 21,008  | 26,260  | 31,512  | 36,764  | 42,016  | 52,520  | 78,781  |
| 70.00  | 6,752      | 9,003   | 13,505  | 18,007  | 22,508  | 27,010  | 31,512  | 36,014  | 45,017  | 67,526  |
| 80.00  | 5,908      | 7,878   | 11,817  | 15,756  | 19,695  | 23,634  | 27,573  | 31,512  | 39,390  | 59,086  |
| 90.00  | 5,252      | 7,002   | 10,504  | 14,005  | 17,506  | 21,008  | 24,509  | 28,011  | 35,013  | 52,520  |
| 100.00 | 4,726      | 6,302   | 9,453   | 12,605  | 15,756  | 18,907  | 22,058  | 25,210  | 31,512  | 47,268  |