



Drive Chains

ENGINEERING CLASS DRIVE CHAIN

Keep Your Operation Moving with Union Chain

Union Drive Chains are designed to exceed the listed ultimate strength ratings. These ratings are very significant. Chains with greater ultimate strength have higher actual yield and greater fatigue strength. With Union chains, you get extra reserve strength to withstand high shock loads.

Precision Manufacturing Means Greater Fatigue Strength

Union Engineering Class Drive Chains are built to withstand the most rugged conditions. We use the latest manufacturing and heat-treating techniques to manufacture every component. Each component is carefully machined to close tolerances to ensure precise pitch control for smooth sprocket/chain interaction. That means longer service life for chain and sprockets.

Add the Power of Alloy

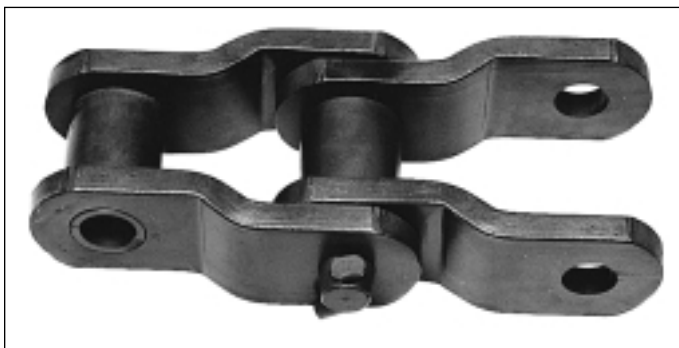
When parts require extra hardness, we use alloy steel to make the components. This provides more uniform core strength, which is particularly important for heavy duty applications. Every Union Drive Chain with an ultimate strength rating higher than 112,000 pounds is made entirely of alloy steel. All Union Drive Chains are furnished with alloy steel pins.

Reduce Maintenance Costs and Downtime

Union Drive Chains stand up to the toughest environments for hour after hour of uninterrupted service.

- Optimum strength
- Fatigue resistant
- Pre-tested
- Alloy steel parts
- Press fit construction
- Accurate pitch control

Your equipment is on the line. Count on Union Chain.



Quality Components

High-Strength Sidebars

Sidebars for Union Drive Chains with an ultimate strength rating higher than 112,000 pounds are manufactured from alloy steel and are through-hardened. This adds strength and extends the service life of the chain. In addition, our advanced manufacturing techniques ensure accurate hole size and precise pitch control, distributing the load equally and providing smooth sprocket interaction.



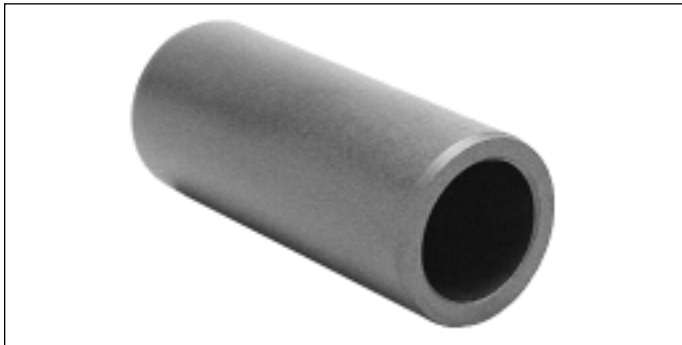
Alloy Steel Induction Hardened Pins

All Drive Chain pins are made from alloy steel and are through-hardened for toughness and strength. In addition, chains designed for heavy duty power shovel applications have ground bearing surfaces and full round induction hardening. This provides the best combination of high yield strength and superior wear resistance.



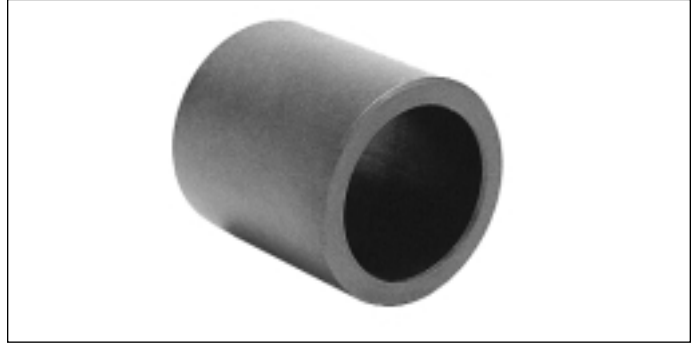
Precision Machined Bushings

Bushings for Drive Chain are precision machined to provide smooth bearing surfaces—that means less resistance on-line. They are through-hardened or case hardened to meet your application. The result is smooth riding bushings that last.



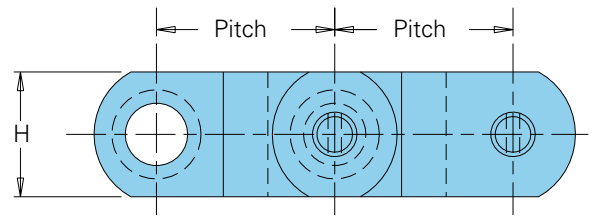
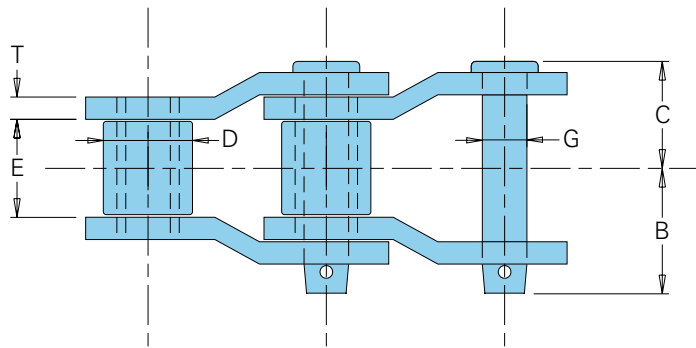
Shock-Resistant Rollers

Our rollers are made from a high quality material for use when critical tolerances and superior finish are required. Then they are through-hardened to withstand high shock loads. For chains with high ultimate strength ratings, rollers are typically made from alloy steel.

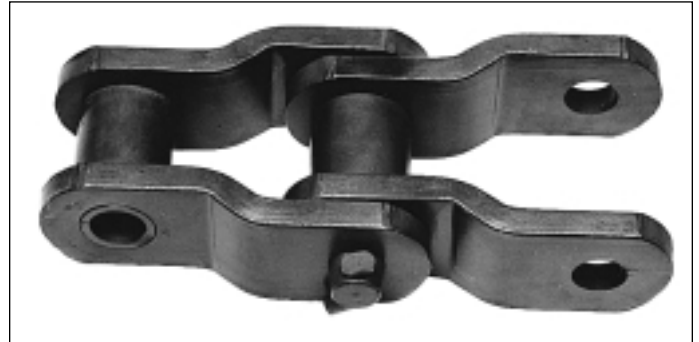
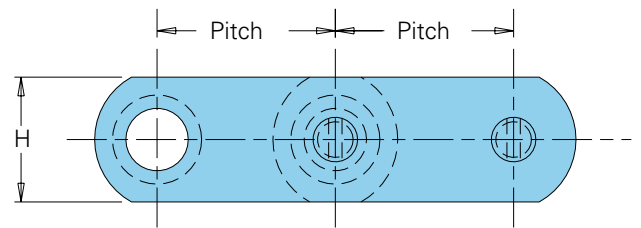
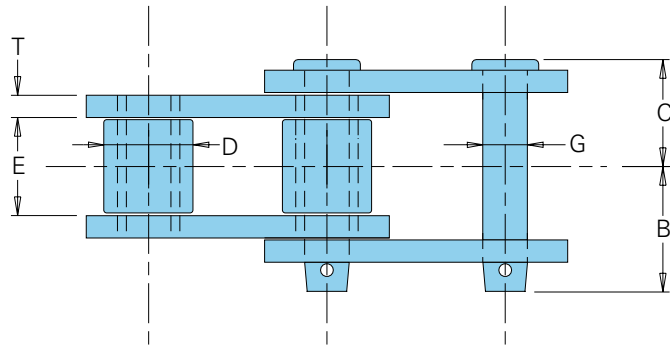


Drive Chain

offset sidebar style



straight sidebar style



Drive Chain Specifications

All dimensions are in inches unless otherwise indicated.

Chain No.	Pitch	Sty. ¹	ANSI No.	Pin						Roller		Sidebar			Bushing		Stocked Lengths		Avg. Ult. Stgth. (lbs.)	Max. Work Load (lbs.)	Approx. Wgt. (lbs./ft.)
				Pin End to CL	Pin Head to CL	In-side Wdth.	Dia.	Sty. ²	Matl. ³	Dia.	Matl. ³	Hgt.	Th.	Matl. ³	Dia.	Matl. ³	Pitches	Feet			
				B	C	E	G			D		H	T								
US-2065	2.000	O		1.66	1.44	1.27	.59	K	AHT	1.13	AHT	1.63	.31	AHT	.81	ACH	60	10.00	65,000	4,000	7.6
RO-3140	1.750	O		1.34	1.12	1.00	.48	K	AHT	1.00	AHT	1.70	.22	AHT	.70	ACH	69	10.00	52,800	2,500	5.2
RO-3160	2.000	O		1.53	1.31	1.25	.54	K	AHT	1.13	AHT	1.94	.25	AHT	.80	ACH	60	10.00	67,300	3,450	6.7
RO-3180	2.250	O		1.72	1.47	1.43	.69	K	AHT	1.41	AHT	2.13	.28	AHT	1.00	CHT	53	10.00	80,000	4,800	9.6
RO-25H	2.500	O		1.95	1.70	1.50	.65	K	AHTIH	1.25	AHT	1.63	.38	AHT	.91	ACH	48	10.00	87,000	4,900	9.2
520RX	2.563	O		1.44	1.22	1.06	.50	A	CHT	1.13	CHT	1.25	.25	CHT	.75	CCH	47	10.00	25,000	2,800	4.8
US-882	2.609	O		1.44	1.25	1.13	.44	K	CHT	.88	AHT	1.13	.25	CHT	.64	CCH	46	10.00	26,000	2,500	3.6
US-3011	3.067	O	2512	2.13	1.72	1.56	.75	K	AHTIH	1.63	AHT	2.25	.38	AHT	1.13	ACH	39	10.00	110,000	6,100	12.0
US-1030	3.075	O		1.88	1.56	1.50	.63	K	AHT	1.25	AHT	1.50	.31	HC	.91	ACH	39	10.00	28,000	4,650	7.0
US-1031	3.075	O		1.88	1.59	1.50	.63	K	AHT	1.25	AHT	1.50	.31	CHT	.91	ACH	39	10.00	48,000	4,650	7.0
US-3075	3.075	O		2.00	1.68	1.50	.65	K	AHT	1.25	AHT	1.75	.38	AHT	.91	ACH	39	10.00	75,000	5,100	9.6
US-3514	3.500	O	2814	2.34	1.97	1.50	.88	K	AHT	1.75	AHT	2.25	.50	AHT	1.25	ACH	34	9.90	140,000	7,700	16.1
US-1241	4.063	O		2.59	2.19	1.94	.88	K	AHTIH	1.75	AHT	2.25	.50	CHT	1.25	CCH	30	10.20	112,000	9,000	16.3
US-1242	4.063	O		2.56	2.19	1.94	.88	K	AHTIH	1.75	AHT	2.25	.50	AHT	1.25	ACH	30	10.20	140,000	9,000	16.1
US-1245	4.073	O	3315	2.75	2.38	1.94	.94	K	AHTIH	1.78	AHT	2.38	.56	AHT	1.31	ACH	30	10.20	170,000	10,100	18.0
US-4121	4.090	O		2.75	2.38	1.94	1.00	K	AHTIH	1.88	AHT	2.75	.56	AHT	1.49	AHT	30	10.20	210,000	10,700	13.6
US-4122	4.090	O		2.75	2.38	1.94	1.00	K	AHTIH	2.00	AHT	2.75	.56	AHT	1.49	AHT	30	10.20	210,000	10,700	14.0
US-4522	4.500	O	3618	2.88	2.44	2.06	1.10	K	AHTIH	2.25	AHT	3.00	.56	AHT	1.62	AHT	27	10.10	220,000	12,300	25.4
US-5031	5.000	O	4020	3.38	3.06	2.75	1.25	K	AHTIH	2.50	AHT	3.50	.63	AHT	1.75	AHT	24	10.00	310,000	17,500	34.0
US-5035	5.000	O		3.50	3.06	2.56	1.38	K	AHTIH	2.50	AHT	3.50	.75	AHT	1.88	AHT	24	10.00	350,000	19,600	38.1
US-5542	5.500	O		3.88	3.40	3.00	1.50	K	AHTIH	3.00	AHT	4.00	.75	AHT	2.00	AHT	62	28.40	420,000	23,600	49.1
US-5738	5.750	O		3.69	3.31	3.00	1.50	K	AHTIH	3.00	AHT	4.00	.69	AHT	2.00	AHT	21	10.10	380,000	23,000	46.0
US-6042	6.000	O	4824	3.88	3.40	3.00	1.50	K	AHTIH	3.00	AHT	4.00	.75	AHT	2.00	AHT	20	10.00	420,000	23,600	45.0
US-6066	6.000	O		3.88	3.38	3.00	1.75	K	AHTIH	—	—	4.75	.75	AHT	3.00	AHT	57	28.50	600,000	27,600	51.7
US-64S	2.500	S		2.00	1.69	1.50	.88	K	AHT	1.56	AHT	2.13	.38	AHT	1.19	ACH	48	10.00	125,000	6,900	13.1
344SXX	3.000	S		2.75	2.38	1.94	.94	K	AHTIH	1.78	AHT	2.38	.56	AHT	1.31	AHT	40	10.00	170,000	10,050	22.0
US-4031	4.000	S		3.38	2.91	2.75	1.25	K	AHTIH	2.50	AHT	3.50	.63	AHT	1.75	AHT	30	10.00	310,000	17,500	40.0
US-1353	4.090	S		3.13	2.69	2.25	1.31	K	AHTIH	2.63	AHT	3.50	.63	AHT	1.88	ACH	30	10.20	210,000	16,000	37.6
US-5042	5.000	S		3.88	3.40	3.00	1.50	K	AHTIH	3.00	AHT	4.00	.75	AHT	2.00	AHT	24	10.00	420,000	23,600	53.0
US-6566	6.500	S		4.38	3.95	3.25	1.75	K	AHTIH	3.50	AHT	6.00	.88	AHT	2.44	AHT	36	19.50	600,000	30,600	71.1
US-7080	7.000	S		4.19	3.81	3.25	2.13	K	AHTIH	4.50	AHT	6.00	.88	AHT	3.13	AHT	24	14.00	800,000	37,150	89.6

 Indicates this chain is normally stocked. All others are made-to-order.

¹Style: O= offset sidebar; S= straight sidebar

²Pin style: K = Full round; A = Double flat.

³Material: HC = High carbon; CHT = Carbon heat-treated; AHT = Alloy heat-treated; AHTIH = Alloy heat-treated and induction hardened; CCH = Carbon case hardened; ACH = Alloy case hardened.

To locate compatible sprockets for your chain, refer to the Product Cross-Reference in Section D.

Note: Dimensions are subject to change. Contact Union Chain to obtain certified prints for design and construction.



SELECTION GUIDELINES

There are two methods to determine the right drive chain for your application: Standard and Working Load. To determine the suggested chain, follow Steps 1-10 of the **Standard Selection Procedure** on pages A-5 through A-7. An example procedure is shown on page A-15.

Each selection procedure is intended to be used for Engineering Class Drive Chain (ASME/ANSI Standard B29.10).

STANDARD SELECTION PROCEDURE

Step 1: Determine Class of Driven Load

From the Application Classifications Table 1 determine the class of the driven load: uniform load, moderate shock, heavy shock.

Table 1 — Application Classifications

Application	Load Class ¹	Application	Load Class ¹	Application	Load Class ¹	Application	Load Class ¹
Agitators		Conveyors – Uniformly Loaded or Fed (Continued)		Dry Dock Cranes (Continued)		Laundry Washers	
Pure Liquids	U	Oven	U	Rotating (Swing or Slew)	M	Reversing	M
Liquids and Solids	M	Screw	U	Tracking (Drive Wheels)	H	Laundry Tumblers	M
Liquids – Variable Density	M			Elevators		Line Shafts	
Blowers		Conveyors – Heavy Duty Not Uniformly Fed		Bucket – Uniform Load	U	Driving Processing Equipment .	M
Centrifugal	U	Apron	M	Bucket – Heavy Load	M	Light	U
Lobe	M	Assembly	M	Bucket – Cont. Centrifugal Discharge	U	Other Line Shafts	U
Vane	U	Belt	M	Escalators	U	Lumber Industry	
Brewing and Distilling		Bucket	M	Freight	M	Barkers – Hydraulic, Mechanical	M
Bottling Machinery	U	Chain	M	Gravity Discharge	U	Burner Conveyor	M
Brew Kettles – Cont. Duty	U	Flight	M	Man Lifts	H	Chain Saw and Drag Saw	H
Cookers – Cont. Duty	U	Live Roll	M	Passenger	H	Chain Transfer	H
Mash Tubs – Cont. Duty	U	Oven	M	Fans		Craneway Transfer	H
Scale Hopper, Freq. Starts	M	Reciprocating	H	Centrifugal	U	De-barking Drum	H
Can Filling Machines	U	Screw	M	Cooling Towers – Induced Draft .	U	Edger Feed	M
Cane Knives	M	Shaker	H	Cooling Towers – Forced Draft .	U	Gang Feed	M
Car Dumpers	H	Cranes		Induced Draft	M	Green Chain	M
Car Pullers	M	Main Hoists	U	Large (Mine, etc.)	M	Live Rolls	H
Clarifiers	U	Bridge Travel	M	Large (Industrial)	M	Log Deck	H
Classifiers	M	Trolley Travel	M	Light (Small Diameter)	U	Log Haul – Incline	H
Clay Working Machinery		Crusher		Feeders		Log Haul – Well Type	H
Brick Press	H	Ore	H	Apron	M	Log Turning Device	H
Briquette Machine	H	Stone	H	Belt	M	Main Log Conveyor	H
Clay Working Machinery	M	Sugar	M	Disc	U	Off Bearing Rolls	M
Pub Mill	M	Dredges		Reciprocating	H	Planer Feed Chains	M
Compressors		Cable Reels	M	Screw	M	Planer Floor Chains	M
Centrifugal	U	Conveyors		Food Industry		Planer Tilting Hoist	M
Lobe	M	Cutter Head Drives	H	Beet Slicer	M	Re-saw Merry-go-round Conveyor	M
Reciprocating, Multi-Cylinder .	M	Jig Drives	H	Cereal Cooker	U	Roll Cases	H
Reciprocating, Single-Cylinder .	H	Maneuvering Winches	M	Dough Mixer	M	Slab Conveyor	H
Conveyors – Uniformly Loaded or Fed		Pumps	M	Meat Grinders	M	Small Waste Conveyor – Belt .	U
Apron	U	Screen Drive	H	Generators (Not Welding)	U	Small Waste Conveyor – Chain	M
Assembly	U	Stackers	M	Hammer Mills	H	Sorting Table	M
Belt	U	Utility Winches	M	Hoists		Tipple Hoist Conveyor	M
Bucket	U	Dry Dock Cranes		Heavy Duty	H	Tipple Hoist Drive	M
Chain	U	Main Hoist, Auxiliary Hoist, Boom (Luffing)	U	Medium Duty	M	Transfer Conveyors	M
Flight	U			Skip Hoist	M		

¹U = Uniform load; M = Moderate shock; H = Heavy shock.

Required Information for Drive Selection

- Type of input horsepower (electric motor, internal combustion engine, etc.).
- Type of equipment to be driven.
- Horsepower to be transmitted.
- Full load speed of the fastest running shaft (RPM).
- Desired speed of the slow speed shaft (RPM).

Note: If speeds are variable, determine maximum and minimum speed and HP to be transmitted at each speed.

- Diameters of the driving and driven shafts.
- Center to center distance of shafts.

Note: If this dimension is adjustable, determine amount of adjustment.

- Position of drive and space limitations, if any.
- Proposed method of lubrication.
- Conditions of drive. Drives with more than two sprockets, idlers, or unusual conditions such as severely abrasive or corrosive atmosphere, extremely high or low temperatures, severely fluctuating loads, frequent stops and starts, etc., require special consideration. It is advisable to consult Union engineers for selections of this nature.

Table 1 — Application Classifications (Continued)

Application	Load Class ¹	Application	Load Class ¹	Application	Load Class ¹	Application	Load Class ¹
Lumber Industry (Continued)		Mixers		Printing PressesU		Sewage Disposal Equipment (Continued)	
Transfer RollsM		Concrete Mixers – Cont.M		Pullers		Slow or Rapid MixersM	
Tray DriveM		Concrete Mixers – IntermittentM		Barge HaulH		ThickenersM	
Trimmer FeedM		Constant DensityU		Pumps		Vacuum FiltersM	
Waste ConveyorM		Variable DensityM		CentrifugalU		Screens	
Machine Tools		Oil Industry		ProportioningM		Air WashingU	
Bending RollM		ChillersM		Reciprocating – Single Acting,M		Rotary – Stone or GravelM	
Punch Press – Gear DrivenH		Oil Well PumpingH		Reciprocating – Double Acting,M		Traveling Water IntakeU	
Notching Press – Belt DrivenH		Paraffin Filter PressM		Two or more CylindersM		Slab PushersM	
Plate PlanersH		Rotary KilnsM		Reciprocating – Single Acting,M		Steering GearH	
Tapping MachineH		Paper Mills		One or Two CylindersM		StokersU	
Other Machine Tools –		Agitators (Mixers)M		Reciprocating – Double Acting,M		Sugar Industry	
Main DrivesM		Barker – Auxiliaries – HydraulicM		Single CylinderM		Cane KnivesM	
Other Machine Tools –		Barker – MechanicalM		Reciprocating –		CrushersM	
Auxiliary DrivesU		Barking DrumH		Rotary – Gear TypeU		MillsH	
Metal Mills		Beater and PulperM		Rotary – Lobe, VaneU		Textile Industry	
Draw Bench Carriage		BleacherU		Rubber and Plastics Industries		BatchersM	
and Main DriveM		CalendarsM		CrackersH		CalendarsM	
Pinch, Dryer and Scrubber		Calendars – SuperH		Laboratory EquipmentM		CardsM	
Rolls, ReversingH		Converting Machine,		Mixing MillsH		Dry CansM	
SlittersM		Except Cutters, PlatersM		RefinersM		DryersM	
Table Conveyors – Non-		ConveyorsU		Rubber CalendarsM		Dyeing MachineryM	
Reversing Group DrivesM		CouchM		Rubber Mill (Two on Line)M		Knitting MachinesM	
Table Conveyors – Non-		Cutters – PlatersH		Rubber Mill (Three on Line)M		LoomsM	
Reversing Individual DrivesH		CylindersM		SheeterM		ManglesM	
Table Conveyors – ReversingH		DryersM		Tire Building MachinesM		NappersM	
Wire Drawing and		Felt StretcherM		Tire and Tube Press OpenersM		PadsM	
Flattening MachineM		JordansH		Tubers and StrainersM		Range DrivesM	
Wire Winding MachineM		Log HaulH		Warming MillsM		SlashersM	
Mills, Rotary Type		PressesU		Sand MullerM		SoapersM	
BallM		Pulp Machine ReelM		Sewage Disposal Equipment		SpinnersM	
Cement KilnsM		Stock ChestsM		Bar ScreensU		Tenter FramesM	
Dryers and CoolersM		Suction RollU		Chemical FeedersU		WashersM	
KilnsM		Washers and ThickenersM		CollectorsU		WindersM	
PebbleM		WindersU		Dewatering ScrewsM		WindlessM	
Rod, Plane and Wedge BarM				Scum BreakersM			
Tumbling BarrelsH							

¹U = Uniform load; M = Moderate shock; H = Heavy shock.



Step 2: Select Service Factor

From the Service Factors Table 2 below, select the number under the type of input power and opposite the class of driven load that most closely relates to the application.

Table 2 — Service Factors

Type of Driven Load	Type of Input Power		
	Internal Combustion Engine with Hydraulic Drive	Electric Motor or Turbine	Internal Combustion Engine with Mechanical Drive
Uniform	1.0	1.0	1.2
Moderate Shock	1.2	1.3	1.4
Heavy Shock	1.4	1.5	1.7

Step 3: Calculate Design Horsepower

Design Horsepower = HP x Service Factor.

The Design Horsepower equals the Horsepower to be transmitted multiplied by the Service Factor selected in Step 2.

Step 4: Select Chain Pitch

Use the Quick Selection Chart (page A-10), to find chain pitch, as follows:

- Locate the design horsepower from Step 4 on the vertical axis.
- Locate the RPM of the small sprocket on the horizontal axis.
- The intersection of the two lines (design horsepower and RPM) will be in an area designated with the suggested chain pitch. If the intersection is near the borderline of the pitch area, the pitches on both sides of the line should be evaluated to obtain the most suitable selection.
- If the chain is not listed in the Quick Selection Chart, go to the Working Load Selection Guidelines.

Step 5: Select Number of Teeth in Small Sprocket

Horsepower Table Ratings for single strand chains are given on pages A-11 ~ A-14 for each chain pitch. Turn to the page giving the chain pitch obtained in Step 4 and select the number of teeth in the small sprocket:

- Read down the column in the Horsepower Ratings Table under the RPM of the small sprocket until the requested HP Table Rating is located. Read across the table to the first column (Number of Teeth Small Sprocket). This is the smallest number of teeth to specify for this application.
- Note the lubrication type specification in the table for this chain. This type of lubrication must be used to obtain reasonable service life.

Step 6: Determine Number of Teeth in Large Sprocket

$$N = \frac{rn}{R}$$

The number of teeth in the large sprocket equals the RPM of the small sprocket times the number of teeth in the small sprocket divided by the RPM of the large sprocket. Note: Hardened teeth are suggested for sprockets with less than 15 teeth, speeds greater than 600 RPM, ratios over 4:1, or in heavy loading or abrasive environments.

Step 7: Determine Suggested Minimum Center Distance; C = Chain Pitches

$$C = \frac{2N + n}{6}$$

This formula is to be used as a guide to MINIMUM center distances only. The final selection may vary slightly to suit clearance dimensions.

Step 8: Check Final Drive Design

Be sure that the sprockets and chain will fit into the available space.

Step 9: Specify Sprockets

Specify the sprockets selected. See Sprocket section in this catalog. Also, refer to Section C for standard keyway and set screw dimensions.

Step 10: Calculate Chain Length

To order the proper length of chain, use the following calculation:

$$\text{Chain Length in Pitches} = \frac{S}{2} + 2C + \frac{K}{C}$$

- Add number of teeth in small sprocket and number of teeth in large sprocket to obtain S.
- Subtract number of teeth in small sprocket from number of teeth in large sprocket to obtain value D. Find D in Table 3, and note corresponding value K.
- Divide center distance in inches by pitch of chain, obtaining C.
- Using these values, solve the formula above.

$$\text{Chain Length in Feet} = \frac{\text{Length in Pitches} \times \text{Pitch in Inches}}{12}$$

A chain cannot contain a fractional part of a pitch. If the chain length obtained contains a fractional part of a pitch, use the next higher whole number.

Glossary

N = Number of teeth in large sprocket

n = Number of teeth in small sprocket

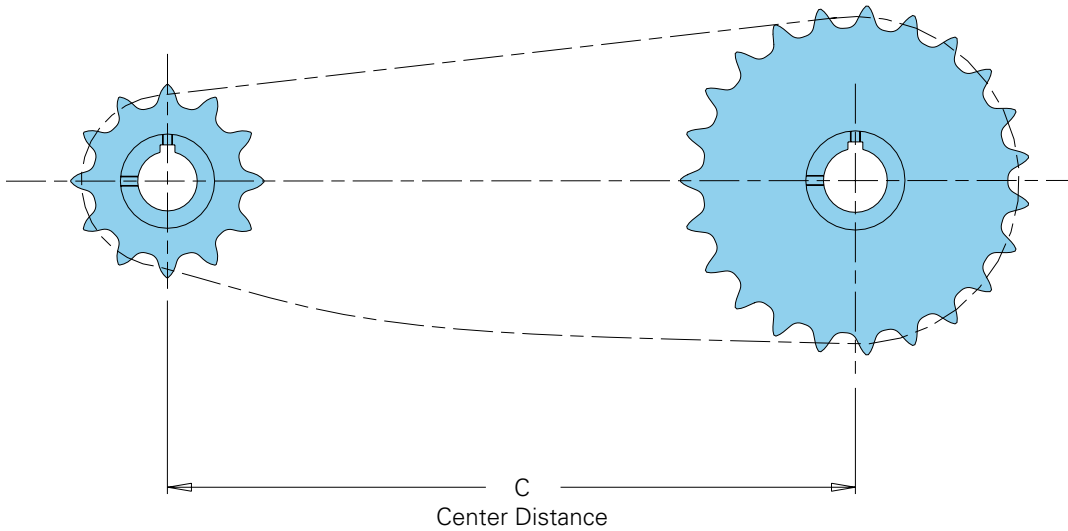
R = RPM large sprocket

r = RPM small sprocket

C = Shaft center distance in pitches

S = N + n

D = N - n

**Table 3 — K Values¹**

D	K	D	K	D	K	D	K	D	K	D	K
1	.03	32	25.94	63	100.54	94	223.82	125	395.79	156	616.44
2	.10	33	27.58	64	103.75	95	228.61	126	402.14	157	624.37
3	.23	34	29.28	65	107.02	96	233.44	127	408.55	158	632.35
4	.41	35	31.03	66	110.34	97	238.33	128	415.01	159	640.38
5	.63	36	32.83	67	113.71	98	243.27	129	421.52	160	648.46
6	.91	37	34.68	68	117.13	99	248.26	130	428.08	161	656.59
7	1.24	38	36.58	69	120.60	100	253.30	131	434.69	162	664.77
8	1.62	39	38.53	70	124.12	101	258.39	132	441.36	163	673.00
9	2.05	40	40.53	71	127.69	102	263.54	133	448.07	164	681.28
10	2.53	41	42.58	72	131.31	103	268.73	134	454.83	165	689.62
11	3.06	42	44.68	73	134.99	104	273.97	135	461.64	166	698.00
12	3.65	43	46.84	74	138.71	105	279.27	136	468.51	167	706.44
13	4.28	44	49.04	75	142.48	106	284.67	137	475.42	168	714.92
14	4.96	45	51.29	76	146.31	107	290.01	138	482.39	169	723.46
15	5.70	46	53.60	77	150.18	108	295.45	139	489.41	170	732.05
16	6.48	47	55.95	78	154.11	109	300.95	140	496.47	171	740.68
17	7.32	48	58.36	79	158.09	110	306.50	141	503.59	172	749.37
18	8.21	49	60.82	80	162.11	111	312.09	142	510.76	173	758.11
19	9.14	50	63.33	81	166.19	112	317.74	143	517.98	174	766.90
20	10.13	51	65.88	82	170.32	113	323.44	144	525.25	175	775.74
21	11.17	52	68.49	83	174.50	114	329.19	145	532.57	176	784.63
22	12.26	53	71.15	84	178.73	115	334.99	146	539.94	177	793.57
23	13.40	54	73.86	85	183.01	116	340.84	147	547.36	178	802.57
24	14.59	55	76.62	86	187.34	117	346.75	148	554.83	179	811.61
25	15.83	56	79.44	87	191.73	118	352.70	149	562.36	180	820.70
26	17.12	57	82.30	88	196.16	119	358.70	150	569.93	181	829.85
27	18.47	58	85.21	89	200.64	120	364.76	151	577.56	182	839.04
28	19.86	59	88.17	90	205.18	121	370.86	152	585.23	183	848.29
29	21.30	60	91.19	91	209.76	122	377.02	153	592.96	184	857.58
30	22.80	61	94.25	92	214.40	123	383.22	154	600.73	185	866.93
31	24.34	62	97.37	93	219.08	124	389.48	155	608.56		

¹Used to calculate chain length. See Step 10 on page A-7.

Alternate Working Load Selection Guidelines

Selection of drive chains not listed in the Quick Selection Chart by the Working Load method:

To use a chain that is not listed in the Quick Selection Chart, the proper chain can be selected from the working load values given in the chain listings. The working load required can be determined from the following:

Working Load

$$\frac{(HP) \times (396,000) \times (E) \times (V)}{(CP) \times (T) \times (RPM)}$$

Where:

HP = Actual horsepower required. (Use motor HP if actual is not known.)

CP = Chain pitch (inches)

T = Number of teeth in smaller sprocket. (12T are suggested.)

RPM = Speed of smaller sprocket.

E = Speed factor (from Speed Correction Factors Table 11 on page A-50. A 12T sprocket is suggested.)

V = Service factor (obtain from Service Factors Table 10 on page A-50.)

This Working Load formula is not to be compared with the selection tables since the tables involve other considerations in addition to working load. **This formula is intended only to supplement the selection tables for those cases where a chain other than the ones listed in the selection procedure is required.**

When the Working Load has been determined, select a chain which has a rated working load equal to or greater than the working load value.

Calculation of Shaft Centers

Use the following formula to determine the approximate centers in pitches for chain lengths in pitches already determined. Consult Union Chain Division for fixed center drives.

$$C = \frac{L - \frac{N + n}{2} + \sqrt{\left(L - \frac{N + n}{2}\right)^2 - 8 \frac{(N - n)^2}{4 \pi^2}}}{4}$$

Where:

C = Shaft center distance in pitches.

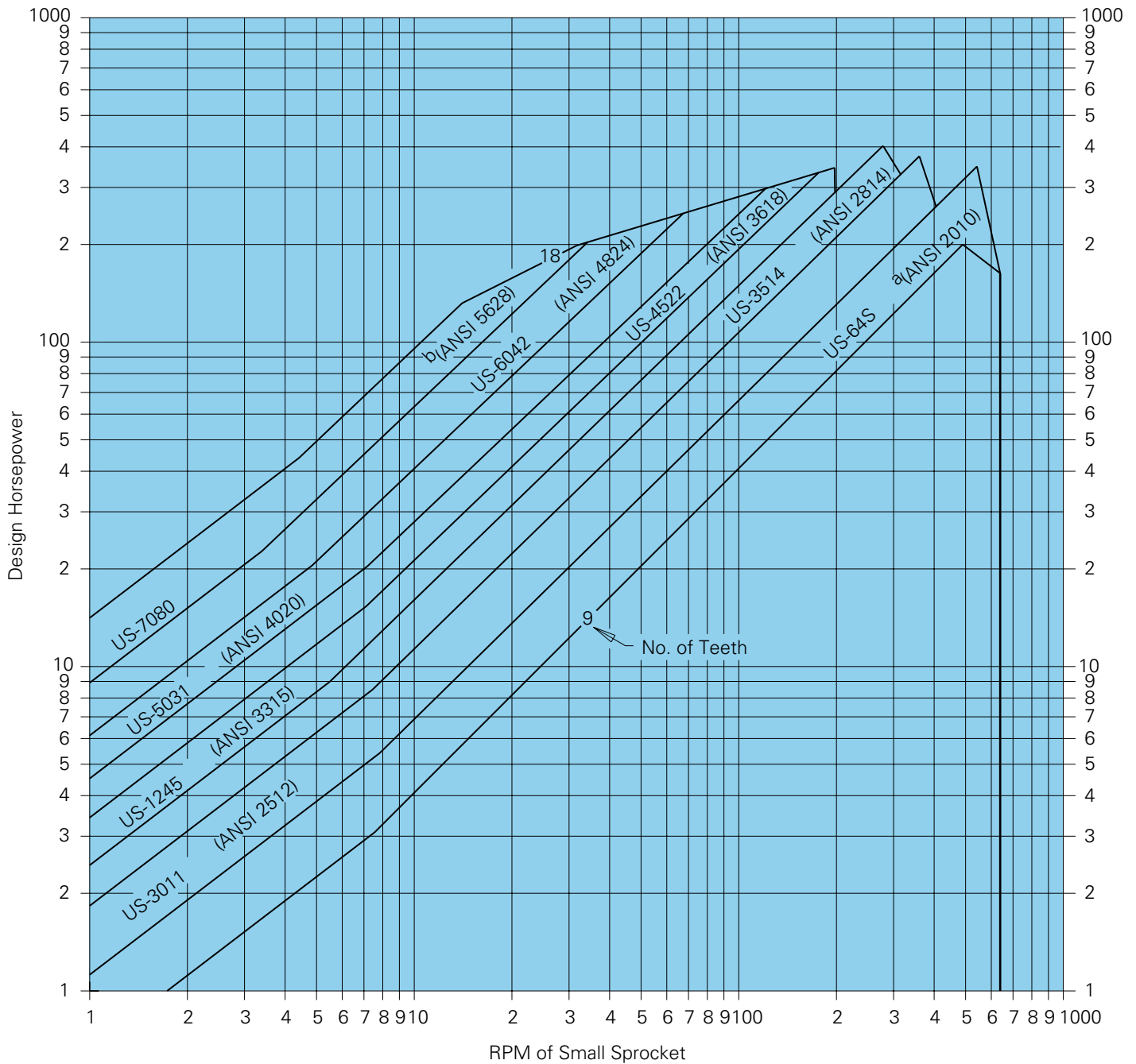
L = Length of chain in pitches.

N = Number of teeth in larger sprocket.

n = Number of teeth in smaller sprocket.

π = 3.1416.

Quick Selection Chart



a. This chain has straight sidebars. No. 2010 ANSI standard chain has been assigned. (US-64S does not run on 2010 (US-2570) sprockets.)

b. This chain has straight sidebars. No. 5628 ANSI standard chain has been assigned. (US-7080 does not run on 5628 (US-7060) sprockets.)

Lower line is for 9 tooth US-64S. Top line is for 18 tooth US-7080. Intermediate lines are approximate mid-points for sprocket tooth range shown in HP charts, pages A-11 ~ A-14. Where the horsepower-RPM intersection lands near a line, both chains on each side should be checked on the charts.

The horsepower ratings in the following pages apply to lubricated single strand Engineering Drive Chains operating on cut tooth sprockets.



UNION CHAIN DIVISION - DRIVE CHAINS

Horsepower Ratings US-64S

Heavy Duty Straight Sidebar Power Transmission Chain

2.500" Pitch

Teeth	Horsepower Capacity RPM													
	2	3	7	10	20	30	40	100	200	250	350	450	600	700
9	1.1	1.4	2.7	3.9	7.7	11.6	15.4	38.6	77.2	96.5	135.1	100.1	65.0	—
10	1.1	1.5	3.0	4.3	8.6	12.9	17.2	42.9	85.8	107.3	150.2	117.2	76.1	—
11	1.2	1.7	3.3	4.7	9.4	14.2	18.9	47.2	94.4	118.0	165.2	135.2	87.8	—
12	1.3	1.8	3.6	5.1	10.3	15.4	20.6	51.5	103.0	128.7	180.2	154.1	100.1	—
13	1.4	1.9	3.9	5.6	11.2	16.7	22.3	55.8	111.5	139.4	195.2	173.7	112.8	—
14	1.5	2.0	4.2	6.0	12.0	18.0	24.0	60.1	120.1	150.2	210.2	194.2	126.1	—
15	1.5	2.1	4.5	6.4	12.9	19.3	25.7	64.4	128.7	160.9	225.2	215.3	139.9	—
16	1.6	2.2	4.8	6.9	13.7	20.6	27.5	68.6	137.3	171.6	240.3	237.2	154.1	—
17	1.7	2.3	5.1	7.3	14.6	21.9	29.2	72.9	145.9	182.3	255.3	259.8	168.8	—
18	1.8	2.4	5.4	7.7	15.4	23.2	30.9	77.2	154.5	193.1	270.3	283.1	183.9	—
19	1.9	2.5	5.7	8.2	16.3	24.5	32.6	81.5	163.0	203.8	285.3	307.0	—	—
20	1.9	2.6	6.0	8.6	17.2	25.7	34.3	85.8	171.6	214.5	300.3	331.5	—	—
21	2.0	2.7	6.3	9.0	18.0	27.0	36.0	90.1	180.2	225.2	315.3	356.7	—	—
22	2.1	2.8	6.6	9.4	18.9	28.3	37.8	94.4	188.8	236.0	330.4	382.5	—	—
23	2.1	3.0	6.9	9.9	19.7	29.6	39.5	98.7	197.4	246.7	345.4	405.3	—	—
24	2.2	3.1	7.2	10.3	20.6	30.9	41.2	103.0	205.9	257.4	360.4	414.4	—	—
Manual Lubrication						Oil Bath			Oil Stream Lubrication					

Horsepower Ratings US-3011

Heavy Duty Offset Sidebar Power Transmission Chain

3.067" Pitch

Teeth	Horsepower Capacity RPM													
	1	3	6	10	20	40	100	150	200	250	300	350	400	450
9	1.0	2.4	4.0	6.4	12.7	25.5	63.7	95.6	127.4	159.3	191.1	171.8	140.6	—
10	1.1	2.6	4.3	7.1	14.2	28.3	70.8	106.2	141.6	177.0	212.4	198.9	164.7	—
11	1.2	2.7	4.7	7.8	15.6	31.1	77.9	116.8	155.7	194.7	231.3	215.5	190.0	—
12	1.3	2.9	5.1	8.5	17.0	34.0	85.0	127.4	169.9	212.4	248.6	231.5	216.5	—
13	1.4	3.1	5.5	9.2	18.4	36.8	92.0	138.0	184.1	230.1	265.3	247.0	232.3	—
14	1.4	3.3	5.9	9.9	19.8	39.6	99.1	148.7	198.2	247.8	281.4	262.1	246.4	—
15	1.5	3.5	6.4	10.6	21.2	42.5	106.2	159.3	212.4	265.5	296.9	276.6	260.0	—
16	1.6	3.7	6.8	11.3	22.7	45.3	113.3	169.9	226.5	283.2	312.0	290.6	273.2	—
17	1.7	3.8	7.2	12.0	24.1	48.1	120.3	180.5	240.7	300.9	326.5	304.1	285.9	—
18	1.7	4.0	7.6	12.7	25.5	51.0	127.4	191.1	245.9	318.6	340.5	317.1	—	—
19	1.8	4.2	8.1	13.5	26.9	53.8	134.5	201.8	269.0	336.3	354.0	329.7	—	—
20	1.9	4.3	8.5	14.2	28.3	56.6	141.6	212.4	283.2	354.0	367.1	341.9	—	—
21	1.9	4.5	8.9	14.9	29.7	59.5	148.7	233.0	297.3	371.7	379.6	353.6	—	—
22	2.0	4.7	9.3	15.6	31.1	62.3	155.7	233.6	311.5	389.4	391.7	364.8	—	—
23	2.1	4.9	9.8	16.3	32.6	65.1	162.8	244.2	325.6	407.1	403.4	375.7	—	—
24	2.2	5.1	10.2	17.0	34.0	68.0	169.9	254.9	339.8	424.8	414.6	386.1	—	—
Manual Lubrication						Oil Bath			Oil Stream Lubrication					

For continuous operation in the highlighted area, some galling of the live bearing surfaces of the chain joints may be expected even though lubrication is as suggested.

The ratings shown on these charts are based on chain which operates over machine cut tooth sprockets.

Horsepower Ratings US-3514**Heavy Duty Offset Sidebar Power Transmission Chain****3.500" Pitch**

Teeth	Horsepower Capacity RPM													
	1	3	6	10	20	35	80	100	125	150	200	250	300	325
9	1.4	3.3	5.5	8.8	17.6	30.8	52.8	88.1	110.1	132.1	176.1	178.7	170.8	—
10	1.5	3.5	6.0	9.8	19.6	34.2	58.7	97.8	122.3	146.8	195.7	196.1	187.4	—
11	1.6	3.8	6.5	10.8	21.5	37.7	64.6	107.6	134.5	161.4	215.2	213.0	203.6	—
12	1.8	4.1	7.0	11.7	23.5	41.1	70.4	117.4	146.8	176.1	234.8	229.5	219.4	—
13	1.9	4.3	7.6	12.7	25.4	44.5	76.3	127.2	159.0	190.8	254.4	245.6	234.7	—
14	2.0	4.6	8.2	13.7	27.4	47.9	82.2	137.0	171.2	205.5	273.9	261.2	249.6	—
15	2.1	4.8	8.8	14.7	29.4	51.4	88.1	146.8	183.4	220.1	292.1	276.3	264.1	—
16	2.2	5.1	9.4	15.7	31.3	54.8	93.9	156.5	195.7	234.8	307.7	291.1	278.2	—
17	2.3	5.3	10.0	16.6	33.3	58.2	99.8	166.3	207.9	249.5	322.8	305.5	—	—
18	2.4	5.5	10.6	17.6	35.2	61.6	105.7	176.1	220.1	264.2	337.6	319.4	—	—
19	2.5	5.8	11.2	18.6	37.2	65.1	111.5	185.9	232.4	278.8	351.9	333.0	—	—
20	2.6	6.0	11.7	19.6	39.1	68.5	117.4	195.7	244.6	293.5	365.8	346.1	—	—
21	2.7	6.2	12.3	20.5	41.1	71.9	123.3	205.5	256.8	308.2	379.3	358.9	—	—
	Manual Lubrication					Oil Bath				Oil Stream Lubrication				

Horsepower Ratings US-1245**Heavy Duty Offset Sidebar Power Transmission Chain****4.073" Pitch**

Teeth	Horsepower Capacity RPM													
	1	3	6	10	20	30	40	65	80	100	125	150	200	225
9	2.0	4.7	8.0	12.8	25.5	38.3	51.1	83.0	102.1	127.7	159.6	168.2	166.3	—
10	2.2	5.1	8.7	14.2	28.4	42.6	56.7	92.2	113.5	141.8	177.3	185.0	182.9	—
11	2.4	5.5	9.4	15.6	31.2	46.8	62.4	101.4	124.8	156.0	195.0	201.5	199.2	—
12	2.5	5.9	10.2	17.0	34.0	51.1	68.1	110.6	136.2	170.2	212.8	217.6	215.1	—
13	2.7	6.3	11.1	18.4	36.9	55.3	73.8	119.9	147.5	184.4	230.5	233.4	230.7	—
14	2.9	6.6	11.9	19.9	39.7	59.6	79.4	129.1	158.9	198.6	248.2	248.8	246.0	—
15	3.0	7.0	12.8	21.3	42.6	63.8	85.1	138.3	170.2	212.8	265.9	263.9	261.0	—
16	3.2	7.3	13.6	22.7	45.4	68.1	90.8	147.5	181.6	227.0	280.7	278.7	275.6	—
17	3.3	7.7	14.5	24.1	48.2	72.3	96.5	156.7	192.9	241.1	295.3	293.2	289.9	—
18	3.5	8.0	15.3	25.5	51.1	76.6	102.1	166.0	204.3	255.3	309.6	307.3	303.9	—
19	3.6	8.4	16.2	27.0	53.9	80.9	107.8	175.2	215.6	269.5	323.5	321.2	317.6	—
20	3.8	8.7	17.0	28.4	56.7	85.1	113.5	184.4	227.0	283.7	337.1	334.7	—	—
21	3.9	9.0	17.9	29.8	59.6	89.4	119.2	193.6	238.3	297.9	350.5	347.9	—	—
	Manual Lubrication					Oil Bath				Oil Stream Lubrication				

For continuous operation in the highlighted area, some galling of the live bearing surfaces of the chain joints may be expected even though lubrication is as suggested.

The ratings shown on these charts are based on chain which operates over machine cut tooth sprockets.



UNION CHAIN DIVISION - DRIVE CHAINS

A - ENGINEERING CLASS CHAINS

Horsepower Ratings US-4522

Heavy Duty Offset Sidebar Power Transmission Chain

4.500" Pitch

Teeth	Horsepower Capacity RPM													
	1	3	6	10	20	30	35	50	65	80	100	125	150	175
9	2.6	6.0	10.2	16.3	32.6	48.9	57.0	81.5	105.9	130.4	153.8	156.6	158.8	—
10	2.8	6.5	11.1	18.1	36.2	54.3	63.4	90.5	117.7	144.9	169.5	172.5	175.0	—
11	3.0	7.0	12.0	19.9	39.8	59.8	69.7	99.6	129.5	159.4	184.8	188.1	190.8	—
12	3.3	7.5	13.0	21.7	43.5	65.2	76.1	108.7	141.3	173.9	199.8	203.4	206.3	—
13	3.5	8.0	14.1	23.5	47.1	70.6	82.4	117.7	153.0	188.3	214.6	218.4	221.6	—
14	3.7	8.5	15.2	25.4	50.7	76.1	88.7	126.8	164.8	202.8	229.1	233.2	236.6	—
15	3.9	8.9	16.3	27.2	54.3	81.5	95.1	135.8	176.6	217.3	243.4	247.7	251.3	—
16	4.1	9.4	17.4	29.0	58.0	86.9	101.4	144.9	188.3	231.8	257.4	261.9	265.7	—
17	4.2	9.8	18.5	30.8	61.6	92.4	107.8	153.9	200.1	246.3	271.1	275.9	279.9	—
18	4.4	10.2	19.6	32.6	65.2	97.8	114.1	163.0	211.9	260.8	284.6	289.6	293.8	—
19	4.6	10.7	20.6	34.4	68.8	103.2	120.4	172.0	223.7	275.3	297.8	303.1	307.5	—
20	4.8	11.1	21.7	36.2	72.4	108.7	126.8	181.1	235.4	289.8	310.7	316.3	320.9	—
21	5.0	11.5	22.8	38.0	76.1	114.1	133.1	190.1	247.2	304.2	323.5	329.2	334.0	—
Manual Lubrication						Oil Bath				Oil Stream Lubrication				

Horsepower Ratings US-5031

Heavy Duty Offset Sidebar Power Transmission Chain

5.000" Pitch

Teeth	Horsepower Capacity RPM													
	.5	1	3	6	10	20	30	35	50	65	80	100	125	130
9	2.0	3.4	7.8	13.3	21.1	42.2	63.3	73.8	105.5	133.9	139.3	145.3	151.6	—
10	2.2	3.7	8.5	14.4	23.4	46.9	70.3	82.0	117.2	147.6	153.6	160.2	—	—
11	2.3	3.9	9.1	15.5	25.8	51.6	77.4	90.3	128.9	161.2	167.7	174.9	—	—
12	2.5	4.2	9.7	16.9	28.1	56.3	84.4	98.5	140.7	174.5	181.6	189.4	—	—
13	2.6	4.5	10.3	18.3	30.5	61.0	91.4	106.7	152.4	187.7	195.2	203.7	—	—
14	2.8	4.7	10.9	19.7	32.8	65.6	98.5	114.9	164.1	200.6	208.7	217.7	—	—
15	2.9	5.0	11.5	21.1	35.2	70.3	105.5	123.1	175.8	213.4	222.0	231.6	—	—
16	3.1	5.2	12.1	22.5	37.5	75.0	112.5	131.3	187.5	225.9	235.0	245.2	—	—
17	3.2	5.5	12.7	23.9	39.9	79.7	119.6	139.5	199.3	238.2	247.8	258.6	—	—
18	3.4	5.7	13.3	25.3	42.2	84.4	126.6	147.7	211.0	250.4	260.5	271.7	—	—
Manual Lubrication						Oil Bath				Oil Stream Lubrication				

For continuous operation in the highlighted area, some galling of the live bearing surfaces of the chain joints may be expected even though lubrication is as suggested.

The ratings shown on these charts are based on chain which operates over machine cut tooth sprockets.

Horsepower Ratings US-6042**Heavy Duty Offset Sidebar Power Transmission Chain****6.000" Pitch**

Teeth	Horsepower Capacity RPM													
	.5	1	3	6	10	20	30	35	40	45	50	60	70	75
9	3.1	5.3	12.2	20.7	33.0	66.0	96.1	101.5	106.3	110.8	115.0	122.6	129.0	—
10	3.4	5.7	13.2	22.4	36.6	73.3	106.2	112.1	117.5	122.5	127.1	135.5	—	—
11	3.6	6.2	14.2	24.2	40.3	80.6	116.1	122.6	128.5	133.9	139.0	148.2	—	—
12	3.9	6.6	15.2	26.4	44.0	87.9	126.0	133.0	139.4	145.3	150.8	160.8	—	—
13	4.1	7.0	16.2	28.6	47.6	95.3	135.7	143.2	150.1	156.5	162.4	173.2	—	—
14	4.4	7.4	17.1	30.8	51.3	102.6	145.3	153.4	160.8	167.6	173.9	185.4	—	—
15	4.6	7.8	18.0	33.0	55.0	109.9	154.8	163.4	171.3	178.5	185.3	197.5	—	—
16	4.8	8.2	18.9	35.2	58.6	177.3	164.2	173.3	181.6	189.3	196.5	209.5	—	—
17	5.1	8.6	19.8	37.4	62.3	124.6	173.4	183.1	191.9	200.0	207.6	221.3	—	—
18	5.3	9.0	20.7	39.6	66.0	131.9	182.6	192.7	202.0	210.6	218.5	233.0	—	—
Manual Lubrication										Oil Bath		Oil Stream Lubrication		

Horsepower Ratings US-7080**Heavy Duty Offset Sidebar Power Transmission Chain****7.000" Pitch**

Teeth	Horsepower Capacity RPM													
	.1	.5	1	2	4	6	10	15	20	25	30	35	40	45
9	1.3	4.6	7.7	13.1	22.2	30.2	48.1	67.1	76.7	85.0	92.5	99.4	105.7	—
10	1.4	4.9	8.4	14.2	24.0	32.7	53.5	74.2	84.8	94.0	102.3	109.9	—	—
11	1.6	5.3	9.0	15.2	25.9	35.3	58.8	81.2	92.8	103.0	112.0	120.3	—	—
12	1.7	5.7	9.6	16.3	27.6	38.5	64.2	88.2	100.8	111.8	121.7	130.7	—	—
13	1.8	6.0	10.2	17.3	29.4	41.7	69.5	95.1	108.7	120.6	131.2	140.9	—	—
14	1.9	6.4	10.8	18.3	31.1	44.9	74.8	102.0	116.5	129.2	140.6	151.1	—	—
15	2.0	6.7	11.4	19.3	32.7	48.1	80.2	108.8	124.3	137.8	150.0	161.1	—	—
16	2.1	7.1	12.0	20.3	34.4	51.3	85.5	115.5	132.0	146.4	159.3	171.1	—	—
17	2.2	7.4	12.5	21.2	36.4	54.5	90.9	122.2	139.6	154.8	168.5	180.9	—	—
18	2.3	7.7	13.1	22.2	38.5	57.7	96.2	128.8	147.1	163.2	177.5	190.7	—	—
Manual Lubrication														

For continuous operation in the highlighted area, some galling of the live bearing surfaces of the chain joints may be expected even though lubrication is as suggested.

The ratings shown on these charts are based on chain which operates over machine cut tooth sprockets.

Standard Selection Procedure Example

Engineering Class Drive Chain From Reducer to Apron Feeder Head Shaft

Select the proper Engineering Drive Chain to transmit power from a reducer to an apron feeder head shaft. The input power will be a 25 HP electric motor. The reducer output RPM will be 15 RPM and the head shaft RPM will be 5 RPM. Reducer shaft is 2 15/16" diameter. Head shaft is 3 15/16" diameter. The shaft centers should be minimum suggested.

Step 1: Determine Class of Driven Load

From Table 1 (Application Classifications), the load class for an apron feeder is M, representing moderate shock. (See Feeders, Apron.)

Step 2: Select Service Factor

From Table 2 (Service Factors), for electric motor and moderate shock is 1.3.

Step 3: Calculate Design Horsepower

Design horsepower equals the horsepower transmitted x service factor of $25 \times 1.3 = 32.5$.

Step 4: Select Chain Pitch

- From the Engineering Drive Chain Quick Selection Chart locate the vertical axis 32.5 design horsepower.
- Locate on the horizontal axis 15 RPM of the small sprocket.
- The intersection of the 32.5 design horsepower and 15 RPM of the small sprocket lines intersect in the area designating 4.5" pitch US-4522 Engineering Drive Chain as the appropriate selection.

Step 5: Select Number of Teeth in Small Sprocket

Interpolating the US-4522 rating table for 15 RPM, a 12-tooth sprocket will transmit 32.6 HP. **Hardened teeth suggested.** Required lubrication is Type I, manual.

Step 6: Determine Number of Teeth in Large Sprocket

$$\text{Number of teeth in large sprocket} = \frac{15 \times 12}{5} = 36$$

Step 7: Determine Suggested Minimum Center Distance

Approximate minimum center distance =

$$\frac{2(36) + 12}{6} = \frac{84}{6} = 14 \text{ Pitches}$$

Step 8: Check Final Drive Design

Check the final drive design.

Step 9: Specify Sprockets

12-Tooth Sprocket for US-4522 Chain. Hardened Steel, Type C Hub, 2 15/16" Diameter Bore, 3/4" x 3/8" KW, and 5/8" SS.

36 Tooth Sprocket for US-4522 Chain. Steel Type C Hub, 3 15/16" Diameter Bore, 1" x 1/2" KW, and 5/8" SS.

Step 10: Calculate Chain Length

$$\begin{aligned} \text{Chain length} &= \frac{S}{2} + 2C + \frac{K}{C} \\ &= \frac{36 + 12}{2} + 2(14) + \frac{14.6}{14} \\ &= 24 + 28 + 1 = 53 \text{ Pitches} \end{aligned}$$

Where:

$$S = N + n$$

C = Shaft center distance in pitches

K = Constant from Table 3, (page A-8)

NOTES