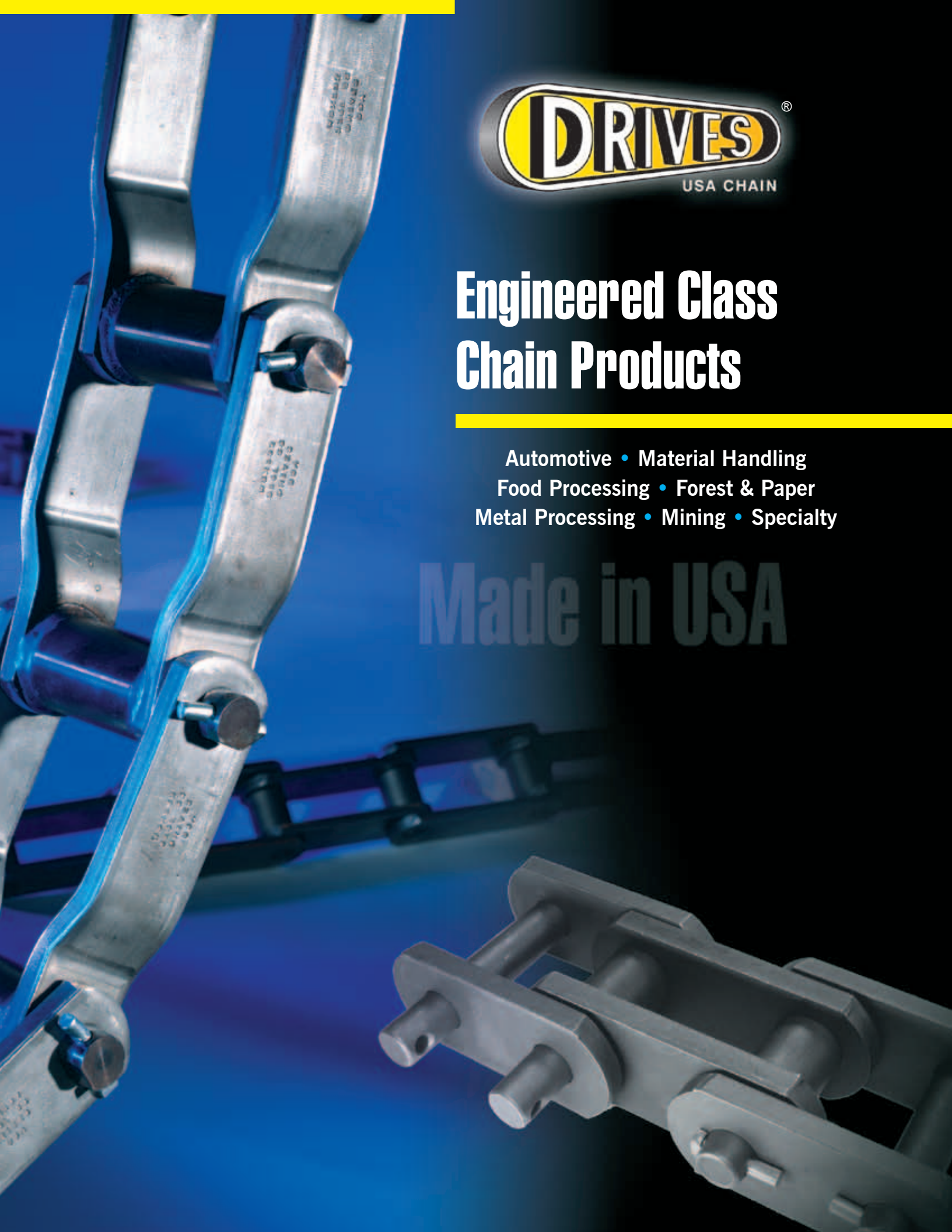




Engineered Class Chain Products

Automotive • Material Handling
Food Processing • Forest & Paper
Metal Processing • Mining • Specialty

Made in USA





Engineered Class Chains

Section	Subject	Pages
	Introduction	2-3
1	Automotive Industry	4
	Caterpillar Drive Chain	5
2	Material Handling	6
	Reclaimer Chain	7
	Roller Conveyor Chain	8
	Stainless Steel Bushed Chain	8
	Welded Steel WSX Chain	9
3	Food Processing	10
	Proofer Oven Chain	11
	Specialty Drive & Conveyor Chain	11
	Baking Oven Chain	12
4	Forest and Paper	13
	81X Series Chain	14-15
	81X Series Attachments	16-19
	Kiln Chains	20-21
5	Metal Processing	22
	E-Series	23
	Metal Pin Transfer Chain	24
6	Mining	25
	Feeder Breaker Chain	26
	Tram Drive Chain	27
7	Sugar Mill Chain	28
	Roller Conveyor Plain Chain	29
	Main Cane Carrier Chain	30
	Bagasse Carrier Chain	30
	Harvester Chain	31
8	Specialty Drive Chain	32
	Extended Life CHP® Series	33
9	Offset Sidebar Drive Chain	34
	Offset Sidebar 3100 Series Chain	34
	Drive Chain	35
10	Engineering Information	36
	Selection Guide	37-42
	Material Characteristics	43-46
	Engineering Conversions	47
11	General Information	48
	Standard Terms & Conditions of Sale	48
	Company Philosophy	49
	ISO 9001 Registered	50
	Sales Offices/Service Centers	51

Engineered Class Chains

Industry Applications

1 Automotive Industry	4
Caterpillar Drive Chain	5
• 160/348, 160/458, 160/678	
2 Material Handling	6
Carbon Chain	7
Stack Reclaimer Chain	7
• D-1240 (315mm)	
• D-1201-1202	
Standard Roller Conveyor Chain	8
• 3162, 89R	
Stainless Steel Chain	
• Steel Bushed - 188SS, 102B SS	8
• D188H with Roller	9
• Welded Stainless Steel Chain - WSX124, WSX132	9
3 Food Processing	10
Proofer Chain - D20002	11
Specialty Drive & Conveyor Chain - 16B	11
Oven Chain - D3625, D5125	12
4 Forest & Paper Industry	13
Timber Processing Chain	
• 81X, 81XHT, 81XH, 81XHH	14-15
• 3939	15
81X Attachments	16-19
Wall Board Chain	
• 81X KD, 81XH KD, 3000H KD	20-21
5 Metal Processing	22
Accumulator Chain	
• C60E, C80E, C100E, C120E, C140E, C160E	23
Transfer Chains	
• 3162 TP	24
6 Mining	25
Feeder Breaker Chain	
• 3x4, 4x4	26
Tram Chain	
• D2, D64S	27
7 Sugar Mill Chain	28
Roller Conveyor Plain Chain	
• 95R, US-196R, 607R, 96R, 96RX, 614R, 2184R, 2184RX	29
Main Cane Carrier Chain - K2 Attachments	
• 96R, 96RX, 2178RX, 2198RX, 9063RXX, 12230, 1203	30
Bagasse Carrier Chain - A-42 Attachments	
• 53R, 95R, 614R, 2184RX	30
Harvester Chain	
• HP200	31
8 Extended Life CHP® Series Chain	32
Specialty Drive Chain	
• 40-240, C2040, C2050, C2060H, C2080H	33
9 Engineered Steel Drive Chain	34
3100 Series	34
Drive Chain	35

Types of Chain

Caterpillar Drive Chain



WSX132



102B



81XHH



Product specifications subject to change without notice.

Some products shown proprietary.

Automotive industry

Drives Engineering Class Chain



■ Caterpillar Drive Chains are used to serve the automotive industry by driving drop forged chain conveyors. Drives USA Caterpillar Drive Chains provide high fatigue life and are designed to perform flawlessly with forged rivetless chains.

Automotive Industry

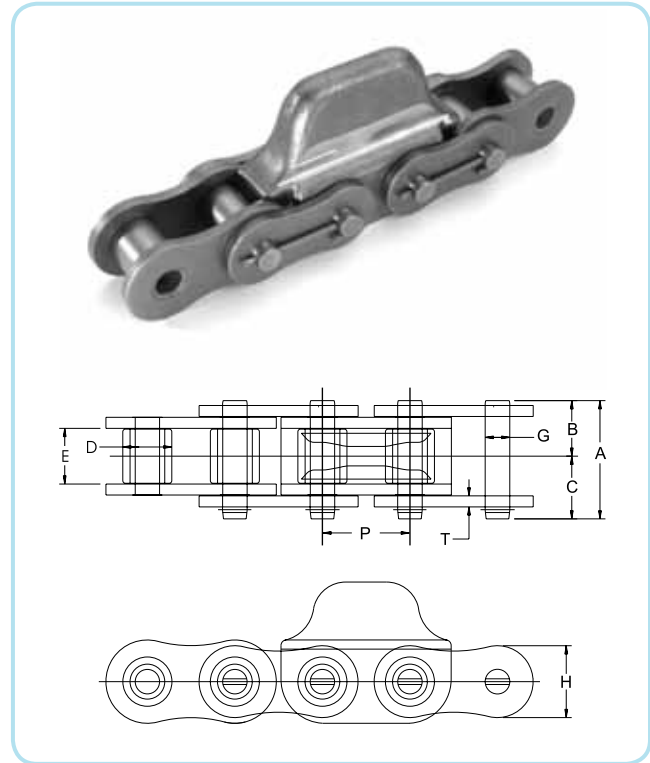
Caterpillar Drive Chain

Caterpillar Drive Chains are essential in driving drop forged chain conveyors. Drives USA Caterpillar Drive Chains provide high fatigue life and are designed to perform flawlessly with forged rivetless chains.

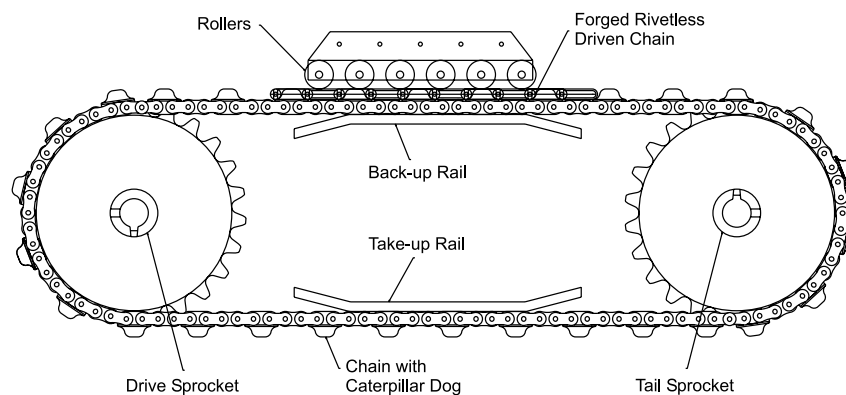
Drives USA Caterpillar Drive Chains feature all ballized plates to ensure maximum bearing area for optimum press fits. This improves fatigue life and working loads. We use wide waist link plates with maximized ball heights to improve stress distribution that also increases fatigue strength and reduces vibration.

The use of through hardened pins that are micro ground and shotpeened provides maximum pin to bushing surface contact for extended wear and protection from any unpredictable overload. Hardened hook cotters* are used to resist shearing and hold their place in the most rigorous of applications.

Our one-piece forged drive dog is induction hardened in the chain contact bearing area for wear resistance. The balance of the drive dog is through hardened for strength and durability. The entire assembly is designed to operate in combination with the drop forged rivetless chain.



Caterpillar Drive Chain Detail



Drives	Pitch	Chain Width				Diameter		Sidebars		Drive Dog Pitch Spacing	Average Ultimate Strength	Approx. Weight
		Overall	Pin Head to CL	Pin End to CL	Inside Width	Roller	Pin	Thickness	Height			
Chain No.	P	A	B	C	E	D	G	T	H	Lbs.	Lb./Ft.	
160/348	2.000	2.723	1.269	1.454	1.250	1.126	0.563	0.250	1.899	3 or 6	58,000	8.3
160/458	2.000	2.723	1.269	1.454	1.250	1.126	0.563	0.250	1.899	4 or 6	58,000	8.3 or 10.0
160/678	2.000	2.723	1.269	1.454	1.250	1.126	0.563	0.250	1.899	6	58,000	9.8

Note: Special hardened hook cotter key standard.

Material handling

Drives Engineering Class Chain



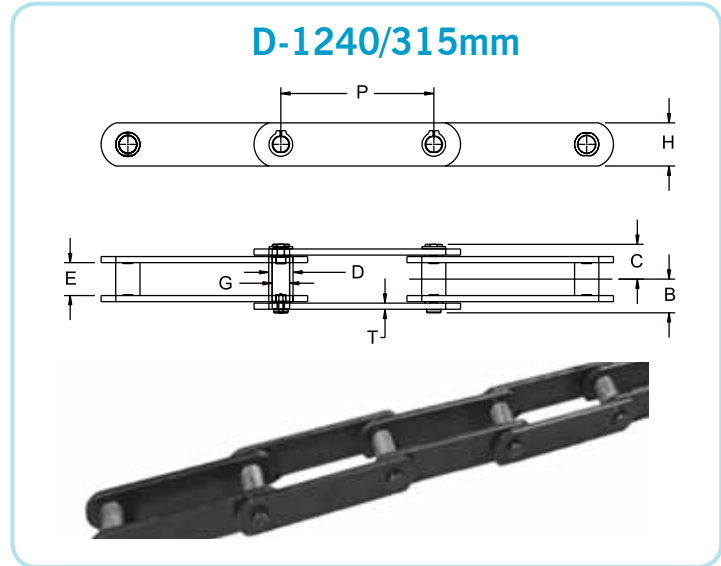
Drives material handling chains are commonly found where heavy industrial processes require the transfer of large storage piles of bulk material.

Material Handling

Stacker Reclaimers

Stacker Reclaimers are used when heavy industrial processes require the transfer of large storage piles of bulk material. Reclaimer chain and flight assemblies function like scraper conveyors with flight blades that push material toward a belt feeding system. The reclaimer conveyor's chain, with digging flights, is supported by rails and structure which span over or across the pile being reclaimed for transfer to other plant locations.

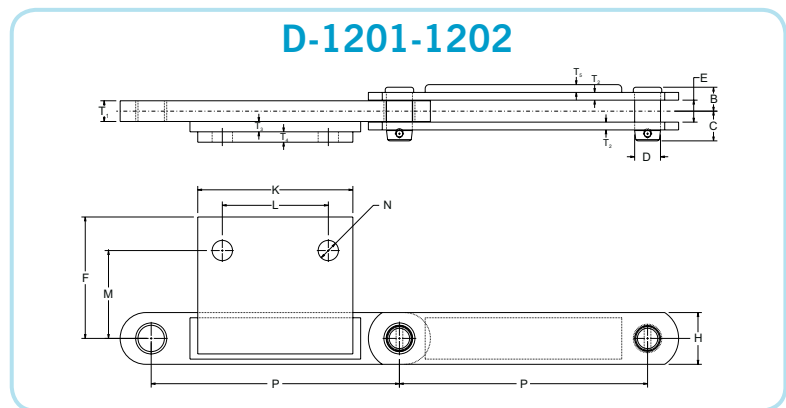
Drives stacker chains have maximum bearing areas, high hardness and case depths to provide the best performance.



Reclaimer Chains

Drives	Pitch	Inside Width	Pin	Bushing	Sidebar		Pin Head to CL	Pin End to CL	Maximum Recommended Working Load	Weight Per Foot
Chain No.	P	E	G	D	T	H	C	B	Lb.	Lb.
D-1240	12.400	2.660	1.410	1.970	0.500	3.500	2.780	2.750	18,062	17.940

Reclaimer Chains



Drives	Pitch	Inside Width	Pin	Sidebar			Pin End to CL	Pin Head to CL	Average Tensile Strength	Weight Per Foot
Chain No.	P	E	D	H	T ₁	T ₂	B	C	Lb.	Lb.
D-1201	12.000	1.062	1.250	2.500	1.000	0.380	1.160	1.440	108,000	12.740
D-1202	12.000	1.562	1.500	3.000	1.500	0.500	1.590	1.910	170,000	19.430

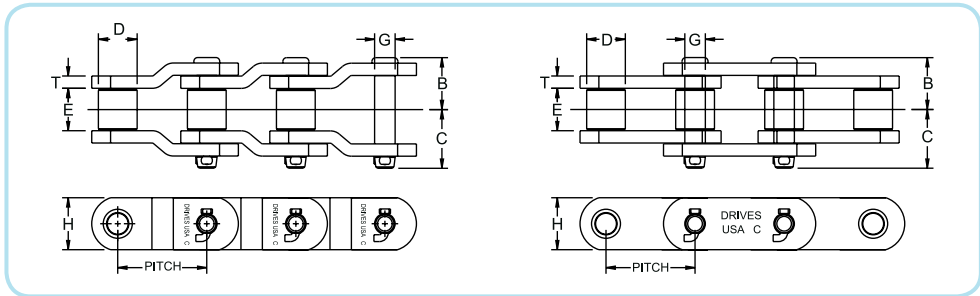
D-1201-1202 Attachments

Chain No.	Pitch	Dimensions							
	P	T ₃	T ₄	T ₅	M	F	K	L	N
D-1201	12.000	0.500	0.500	0.380	4.250	5.875	7.500	5.125	0.980
D-1202	12.000	0.630	0.500	0.500	4.250	5.875	7.500	5.125	0.980

Note: Reclaimer chains are manufactured on a made-to-order basis with minimum order quantities. Contact Drives for additional information.

Material Handling

Standard Roller Conveyor Chains



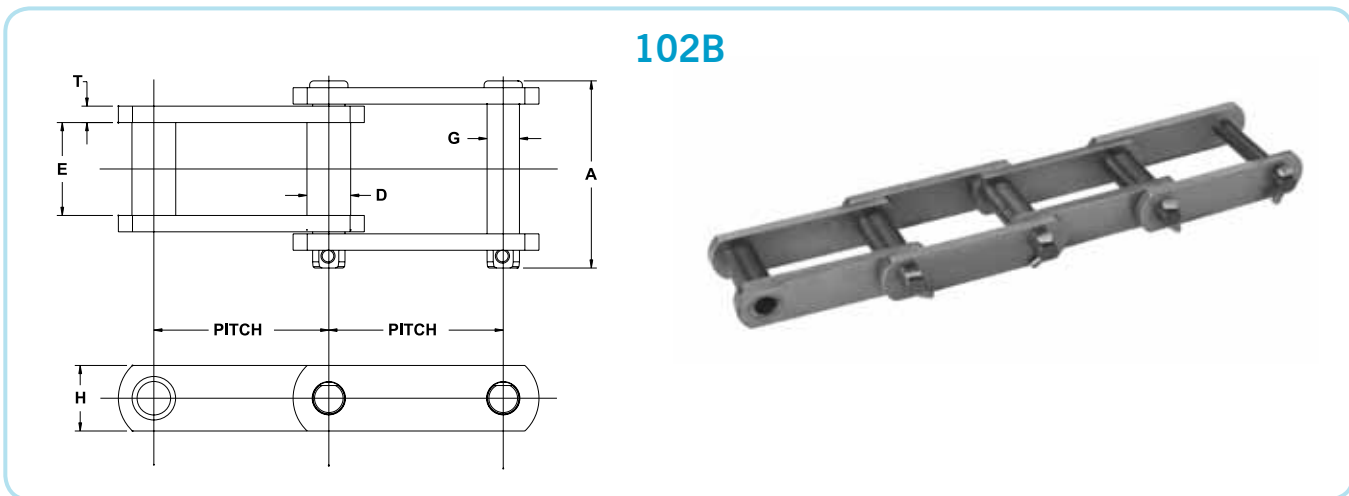
Drives	Pitch	Inside Width	Pin		Roller		Sidebar			Overall Width	Average Tensile Strength	Maximum Recommended Working Load	Weight Per Foot
Chain No.	P	E	G	Properties	D	Properties	T	H	Properties	A	Lb.	Lb.	Lb.
3162	3.000	1.250	0.562	CTH	2.250	ATH	0.250	1.500	CTH	2.870	47,000	3,445	7.420
88R	4.000	0.875	0.625	AHTIH	2.000	ACH	0.250	1.500	CHT	2.468	25,140	3,000	6.054
89R	4.000	1.312	0.625	CTH	2.250	CTH	0.375	1.500	HC	3.470	28,000	4,500	10.600
378R	1.654	1.000	0.437	AHT	0.875	AHT	0.187	1.125	HC	2.280	13000	2,100	3.700
378RX	1.654	1.000	0.437	AHT	0.875	AHT	0.187	1.125	CHT	2.280	20,000	2,100	3.700
53R	3.000	1.000	0.437	AHT	1.500	CCH	0.187	1.125	HC	2.280	13,000	2,100	3.900
12230*	12.000	4.100	1.500	AHT	3.500	AHT	0.625	4.000	AHT	7.600	280,000	36,300	39.200

CTH = Carbon Steel thru hardened
 HC = Carbon Steel not heat treated
 ATH = Alloy Steel thru hardened

Note: Standard Roller Conveyor chains are manufactured on a made-to-order basis with minimum order quantities.

* Offset style.

Bucket Elevator Chain



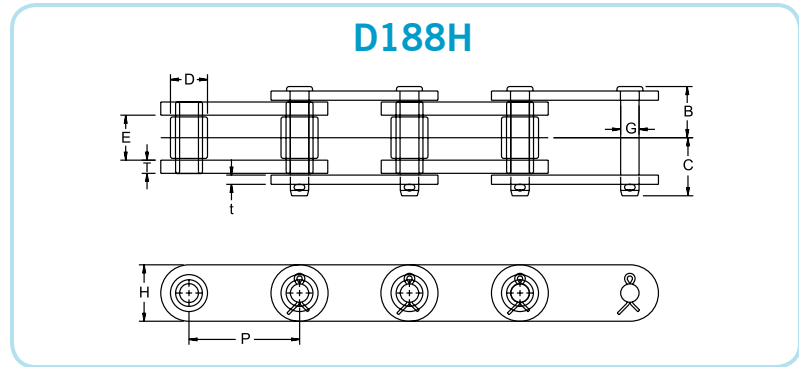
Stainless Steel Bushed Chain

Drives	Pitch	Inside Width	Pin		Bushing		Sidebar			Overall Width	Maximum Recommended Working Load	Weight Per Foot
Chain No.	P	E	G	Properties	D	Properties	T	H	Properties	A	Lb.	Lb.
188SS	2.609	1.062	0.500	17-4PH	0.880	17-4PH	0.250	1.125	300SS	2.690	1,664	3.600
102BSS	4.000	2.130	0.625	17-4PH	1.000	17-4PH	0.375	1.500	300SS	4.310	3,834	6.900

Note: Steel bushed chains are made-to-order with minimum order quantities. Contact Drives for available specialty stainless steel materials and specifications.

Material Handling

D188H with Roller



Drives	Pitch	Inside Width	Pin	Roller	Sidebar			Pin Head to CL	Pin End to CL	Maximum Recommended Working Load	Weight Per Foot
Chain No.	P	E	G	D	t	T	H	B	C	Lb.	Lb.
D188H w/roller	2.609	1.060	0.430	0.870	0.220	0.310	1.330	1.200	1.380	2,527	3.910

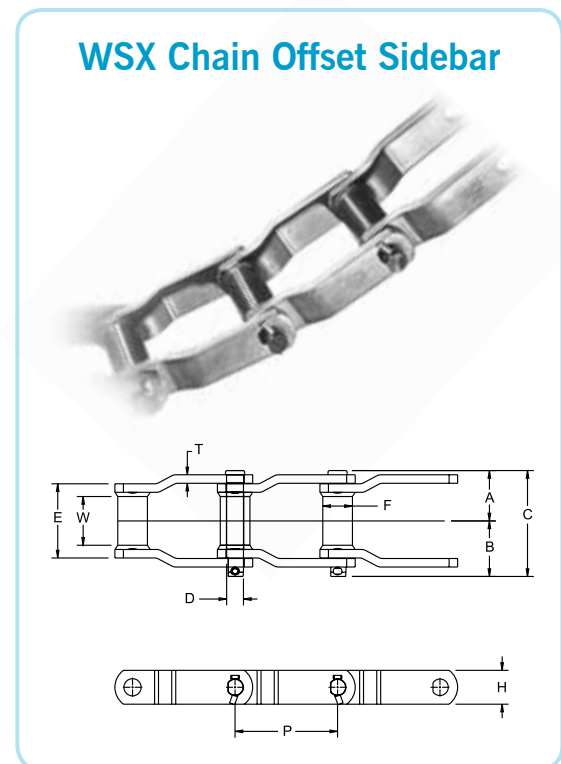
Welded Stainless Steel WSX Chain

Drives produces the WSX Stainless Steel series chains for horizontal, incline and vertical conveying applications that operate in a corrosive environment. The side bars and barrel are manufactured from 300 series stainless steel material for optimum corrosion resistance. The pins are manufactured from 17-4PH (Precipitation Hardened) stainless steel. This special pin material provides corrosion resistance and a hard surface to maximize the wear life of the chain.

Note:

- Chain numbers WSX124, WSXH124 and WSX132 are made-to-order in stainless steel with riveted or cottered construction with minimum order quantities.
- These stainless steel chains can also be provided with electroless nickel plated pins for less corrosive environments. Contact Drives Engineering for application information.

* All chains may be ordered with straight sidebars designated WCSX.



Welded Stainless Steel WSX Chain

Drives	Pitch	Dimensions in Inches									Maximum Recommended Working Load		
		Chain No.	P	A	B	C	D	E	H	T		W	F
WSX124*	4.000	WSX124*	4.000	2.030	2.220	4.250	0.750	2.750	1.500	0.380	1.630	1.250	4,400
WSXH124*	4.063	WSXH124*	4.063	2.280	2.470	4.750	1.000	3.000	2.000	0.500	1.630	1.750	9,330
WSX132*	6.050	WSX132*	6.050	3.000	3.250	6.250	1.000	4.380	2.000	0.500	2.880	1.750	6,390
WSX157*	6.050	WSX157*	6.050	3.525	3.663	7.188	1.125	4.825	2.500	0.750	3.000	1.750	10,200

Food

Drives Engineering Class Chain

processing



Chains used in food processing are subjected to very diverse conditions depending on the application. Often these chains will carry a heavy load, be exposed to high temperatures or they will be subjected to frequent wash downs. Drives chains are proven to outperform in any combination of these conditions.

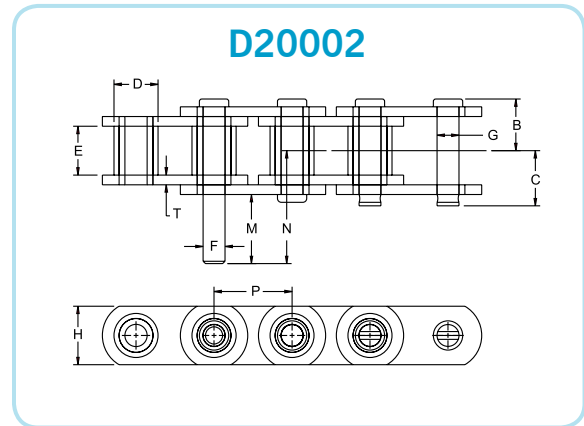
Food Processing

Proofer Chain

Drives chains are designed from special high temperature alloy steel. Component heat treatment and clearances are selected to improve wear life and minimize the risk of stiff joints. Consult Drives Engineering for additional application information.

Proofer Chain Attachments

Drives	Pitch	Dimensions		
Chain No.	P	F	M	N
D20002	2.000	0.570	1.750	2.910

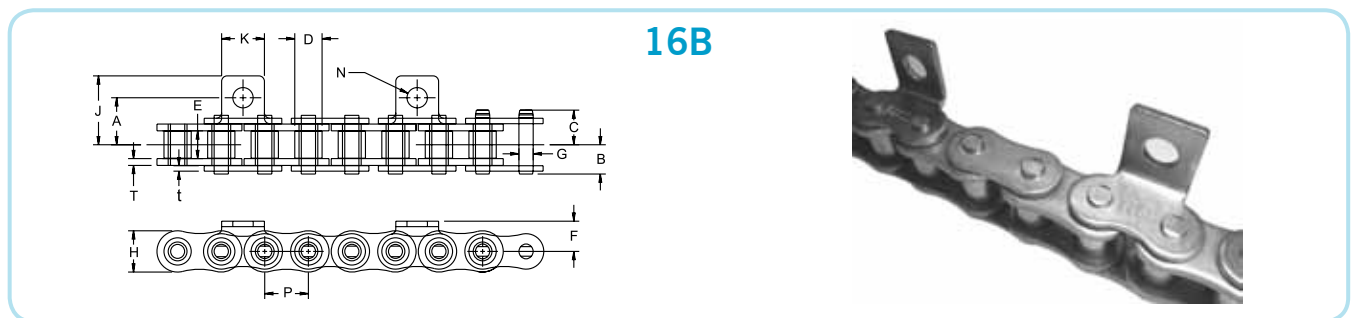


Proofer Chain

Drives	Pitch	Inside Width	Pin	Roller	Sidebar		Pin Head to CL	Pin End to CL	Average Tensile Strength	Maximum Recommended Working Load	Weight Per Foot
Chain No.	P	E	G	D	T	H	B	C	Lb.	Lb.	Lb.
D20002	2.000	1.250	0.560	1.130	0.250	1.500	1.310	1.500	21,000	3,500	6.200

Specialty Drive & Conveyor Chain

Stainless Steel



16B

Drives	Pin Link Pitch	Inside Width	Pin	Roller	Sidebar			Pin Head to CL	Pin End to CL	Maximum Recommended Working Load	Weight Per Foot
Chain No.	P	E	G	D	T	t	H	B	C	Lb.	Lb.
16B	1.000	0.670	0.326	0.625	0.156	0.125	0.945	0.700	0.830	455	2.000

16B Attachments

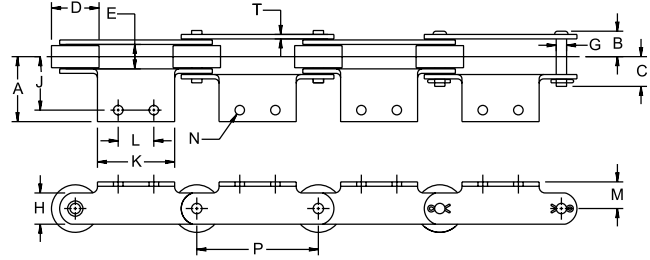
Att. No.	Chain No.	Pitch	Dimensions				
		P	A	J	K	F	N
BA1	16B	1.000	1.120	1.680	0.980	0.720	0.470

Note: Some chain products or attachments shown proprietary.

Food Processing

Oven Chain

Drives oven chains are comprised of specially designed 300 series sidebars with 17-4PH (Precipitation Hardened) pin, bushing and roller. The combination of material, in conjunction with increased clearances, allows these chains to handle the high temperatures and corrosive environment of an oven.



Drives	Pitch	Inside Width	Pin	Roller	Sidebar	Pin Head to CL	Pin End to CL	Maximum Recommended Working Load	Weight Per Foot
Chain No.	P	E	G	D	T H	B	C	Lb.	Lb.
D3625	3.625	1.030	0.440	1.750	0.190 1.310	1.080	1.250	1,318	5.420
D4375	4.375	1.030	0.440	2.000	0.190 1.310	1.080	1.250	1,300	5.050
D5125 w/1.75" Roller	5.125	1.030	0.440	1.750	0.190 1.310	1.080	1.250	1,318	4.800
D5125 w/2.00" Roller	5.125	1.030	0.440	2.000	0.190 1.310	1.080	1.250	1,318	5.350

Oven Chain Attachments

Drives	Pitch	Dimensions					
Chain No.	P	A	J	K	L	M	N
D3625	3.625	1.930	1.380	3.000	1.500	1.130	0.400
D4375	4.375	1.030	0.440	2.000	0.190	1.310	0.400
D5125 w/ 1.75" Roller	5.125	2.740	2.250	3.250	1.500	1.130	0.400
D5125 w/2.00" Roller	5.125	2.740	2.250	3.250	1.500	1.130	0.400

Forest and paper industry

Drives Engineering Class Chain

■ Drives produces industry leading Engineered Class Conveyor chains for the forest and paper industry. These tough applications require chains that are built to the strictest quality standards ever established. Drives advanced engineering knowledge and experience assures maximum strength and performance while setting the standard for quality in this industry.



Forest and Paper Industry

81X Chain

- Manufactured with premium quality alloy steels.
- Heat treated and tempered for extended service life.

Solid Rollers

- Smoother engagement with sprockets.
- Rollers rotate freely reducing pulsation in conveyors.

Curled Bushings

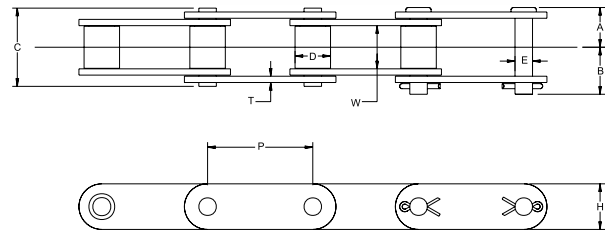
- Drives new computer controlled curling equipment provides the most concentric bushing in the market.
- These bushings allow for minimum initial wear.

Extended Life CHP® Series

- 81X chain is available in our Extended Life CHP® Series.

NOTE: Please consult Drives Engineering for availability of other Engineered Class chains in our Extended Life CHP® Series.

81X Chain



2.609" Pitch

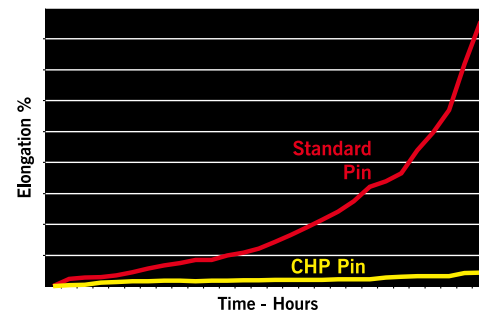
Drives	Pitch	Dimensions in Inches									Approx. Links in 10 Ft.	Weight Per Foot	Average Ultimate Strength	Maximum Recommended Working Load
Chain No.	P	C	D	E	H	W	T	A	B	Links	Lb.	Lb.	Lb.	
81X	2.609	1.930	0.906	0.437	1.125	1.060	0.155	0.975	1.160	46	2.500	24,000	3,000	

Extended Life CHP® Chain

CHP hard chrome plated pins possess standard steel's metallurgical properties for toughness and strength while delivering an extremely hard wear resistant pin surface with a 1/3 reduction in the coefficient of friction compared to steel on steel. CHP chain pins resist wear longer than standard heat treated pins, even in dry and abrasive environments.

- The chain bushing has a baked on dry film lubricant. This gives the chain joint a lubricating film in the bearing area.
- Outstanding wear and shock load performance at the same temperature ranges as standard carbon steel chain.
- No reduction in working loads or operating speeds.
- Exceptional pin wear resistance, in conjunction with the dry film lubricant on the bushing, reduces chain elongation and can increase wear life up to 3X over conventional premium chains under like conditions.

Elongation vs. Time



Forest and Paper Industry - Timber Processing Chains

81XH, 81XHT, 81XHH Chain

Heavier Sidebars

- 23% more bearing surface for conveying product.
- Increased sidebar thickness on the roller link plate allows for welding to the inner link plate.

Through Hardened Pins

- 10% higher fatigue resistance and 20% higher shock load than chains with Case Hardened pins.

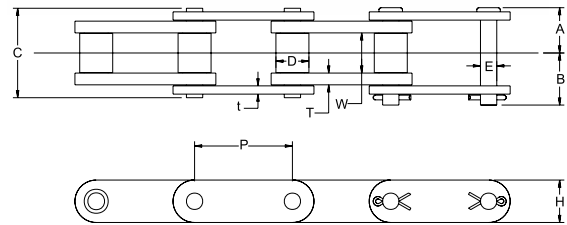
Solid Rollers

- Smoother engagement with sprockets.
- Rollers rotate freely reducing pulsation in conveyors.

Solid Bushings

- 30% higher crush strength than curled bushings.

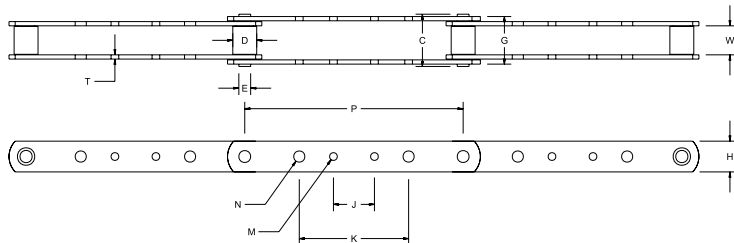
81XH, 81XHT AND 81XHH



2.609" Pitch

Drives	Pitch	Dimensions in Inches											Approx. Links in 10 Ft.	Weight Per Foot	Average Ultimate Strength	Maximum Recommended Working Load
Chain No.	P	C	D	E	H	W	T	t	A	B	Links	Lb.	Lb.	Lb.		
81XH	2.609	2.365	0.906	0.437	1.332	1.060	0.310	0.220	1.196	1.381	46	4.120	42,000	3,700		
81XHT	2.609	2.250	0.906	0.437	1.125	1.060	0.220	0.220	1.196	1.381	46	3.800	34,000	3,700		
81XHH	2.609	2.553	0.906	0.437	1.332	1.060	0.310	0.310	1.289	1.474	46	4.600	42,000	3,700		
61X	1.654	2.553	0.906	0.437	1.332	1.060	0.310	0.310	1.289	1.474	46	4.600	42,000	3,700		

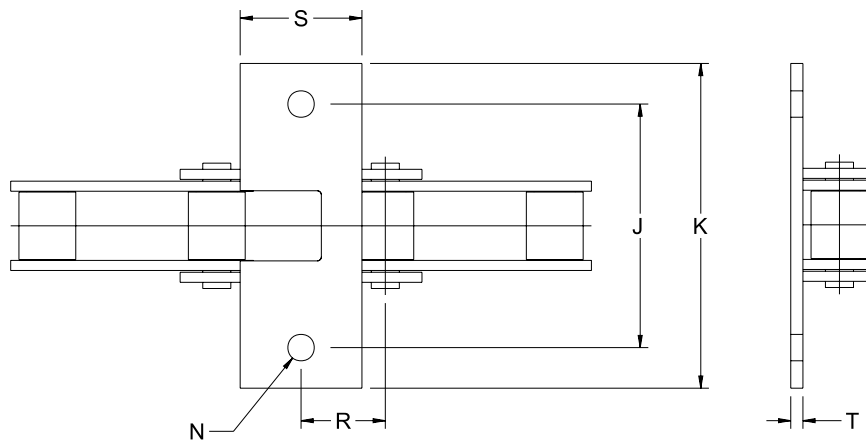
3939 (8.000 Pitch)



Drives	Pitch	Dimensions in Inches											Approx. Links in 10 Ft.	Weight Per Foot	Average Ultimate Strength	Maximum Recommended Working Load
Chain No.	P	C	D	E	G	H	J	K	M	N	W	T	Links	Lb.	Lb.	Lb.
3939-B4	8.000	1.930	0.906	0.432	1.740	1.125	1.500	4.000	0.281	0.281	1.060	0.155	15	1.550	24,000	3,000
3939-B23	8.000	1.930	0.906	0.432	1.740	1.125	--	3.625	--	0.406	1.060	0.155	15	1.550	24,000	3,000
3939-B24	8.000	1.930	0.906	0.432	1.740	1.125	--	4.000	--	0.281	1.060	0.155	15	1.550	24,000	3,000
3939-B40	8.000	1.930	0.906	0.432	1.740	1.125	--	4.000	--	0.406	1.060	0.155	15	1.550	24,000	3,000
3939-B43	8.000	1.930	0.906	0.432	1.740	1.125	2.000	3.625	0.343	0.406	1.060	0.155	15	1.550	24,000	3,000
3939-B44	8.000	1.930	0.906	0.432	1.740	1.125	1.500	4.000	0.281	0.406	1.060	0.155	15	1.550	24,000	3,000

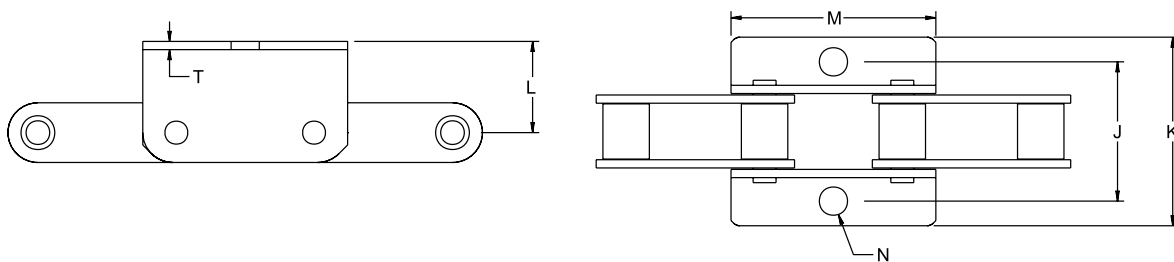
Forest and Paper Industry - 81X Attachments

K1C



Att. No.	Chain No.	Dimensions					
		J	K	N	R	S	T
K1C	81X	3.750	5.000	0.406	1.300	1.875	0.187

K3

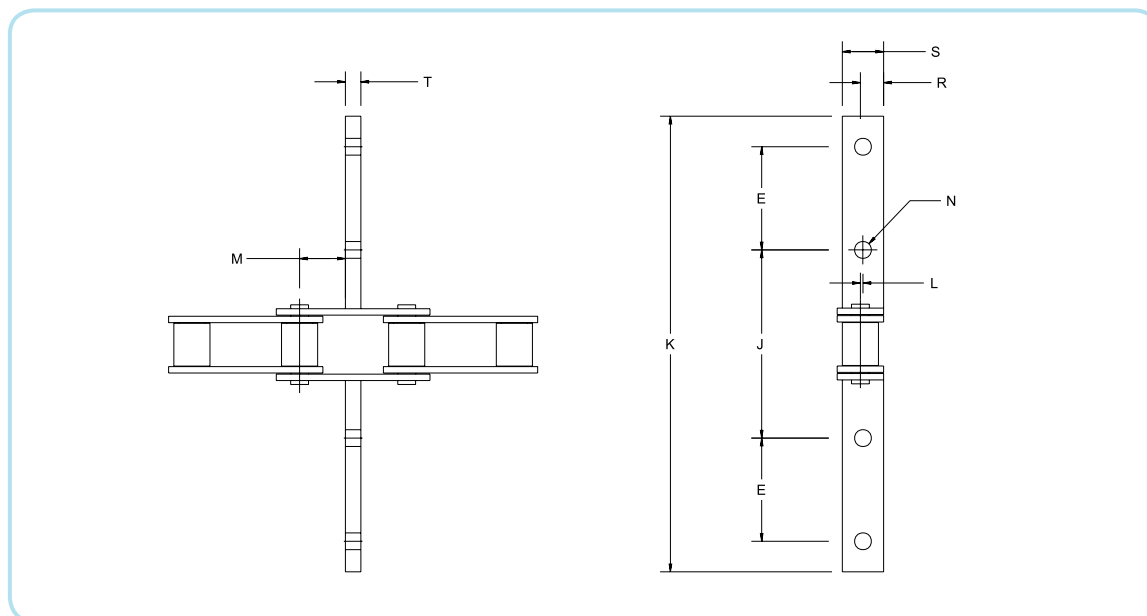


Att. No.	Chain No.	Dimensions					
		J	K	N	L	M	T
K3	81X	2.625	3.500	0.531	1.718	3.860	0.155

Forest and Paper Industry - 81X Attachments

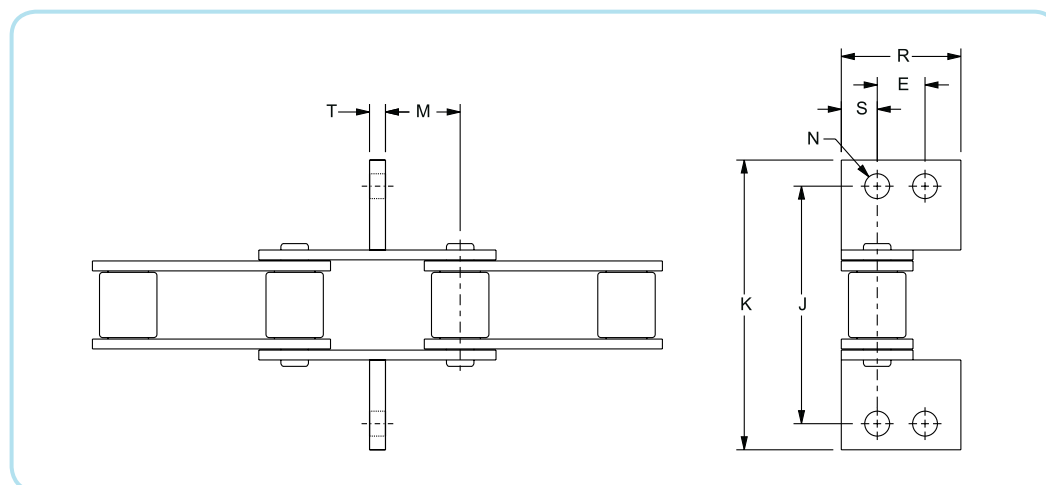
FS7, FG9, SF22

Made in
U.S.A.



Att. No.	Chain No.	Dimensions								
		J	K	E	N	S	R	L	T	M
FS7	81X	3.000	7.000	1.250	0.406	0.750	0.375	0.188	0.375	1.110
FG9	81X	3.500	7.250	1.250	0.343	1.125	0.563	--	0.250	1.187
SF22	81X	4.560	11.040	2.500	0.406	1.000	0.500	--	0.375	1.110

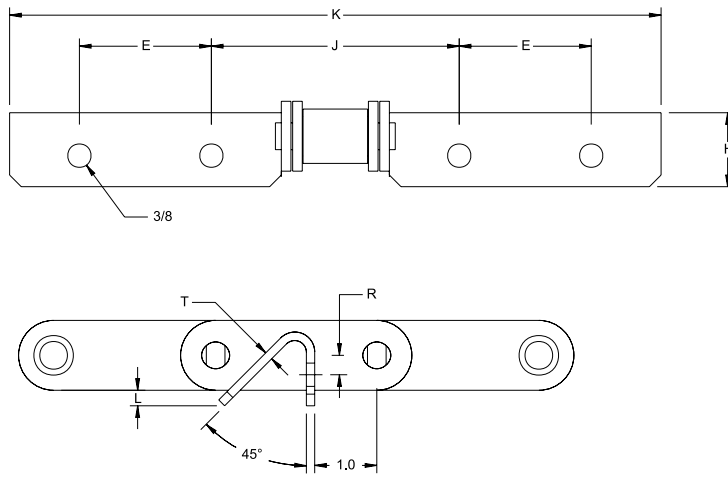
GT22



Att. No.	Chain No.	Dimensions							
		J	K	E	N	S	R	T	M
GT22	81X	3.750	4.562	0.750	0.375	0.562	1.875	0.250	1.170

Forest and Paper Industry - 81X Attachments

SF1, SF1M1

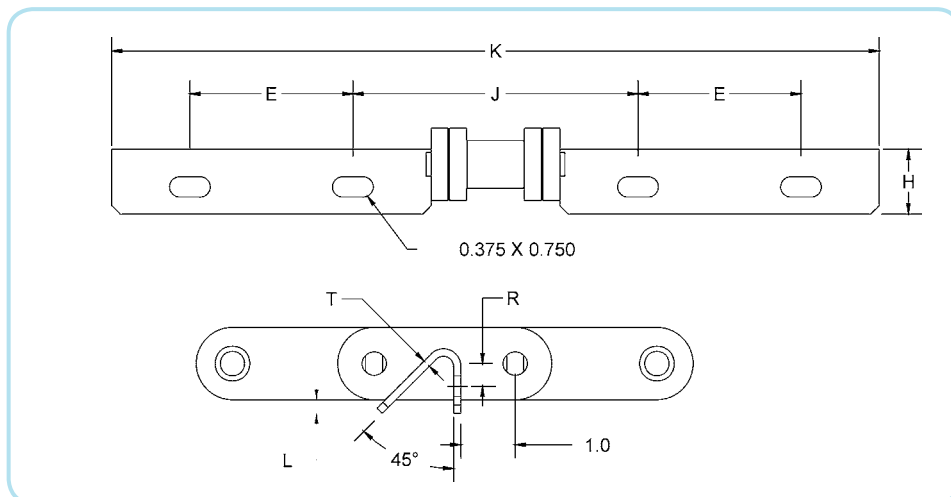


Att. No.	Chain No.	Dimensions						
		J	K	E	T	R	H	L
SF1	81X	3.990	10.49	2.125	0.134	0.313	1.191	0.250
SF1M1	81X	3.990	13.49	3.625	0.134	0.188	1.063	--

* Attachment available only on pin link.

Forest and Paper Industry - 81X Attachments

SF1, SF1A

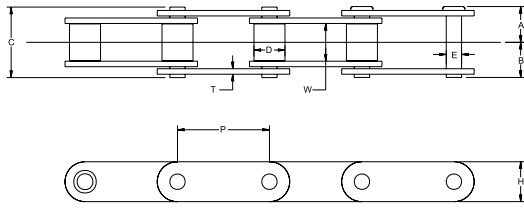


Att. No.	Chain No.	Dimensions						
		J	K	E	T	R	H	L
SF1	81XHH	5.250	14.128	3.000	0.134	0.416	1.191	0.250
SF1A	81X	5.250	14.125	3.000	0.134	0.313	1.191	0.250

* Attachment available only on pin link.

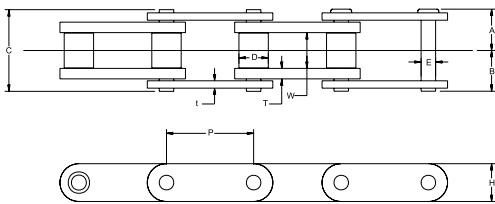
Forest and Paper Industry - Wall Board Processing Chains

81X KD



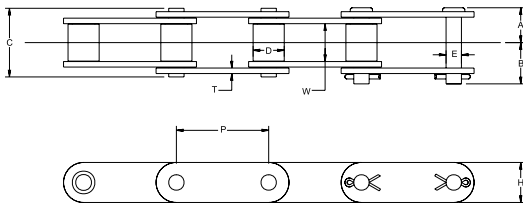
Drives	Pitch	Dimensions in Inches								Approx. Links in 10 Ft.	Weight Per Foot	Average Ultimate Strength	Maximum Recommended Working Load
Chain No.	P	C	D	E	H	W	T	A	B	Links	Lb.	Lb.	Lb.
81X KD	2.609	1.930	0.906	0.437	1.125	1.060	0.155	0.975	1.160	46	2.500	24,000	3,000

81XH KD



Drives	Pitch	Dimensions in Inches										Approx. Links in 10 Ft.	Weight Per Foot	Average Ultimate Strength	Maximum Recommended Working Load
Chain No.	P	C	D	E	H	W	T	t	A	B	Links	Lb.	Lb.	Lb.	
81XH KD	2.609	2.370	0.906	0.437	1.332	1.060	0.310	0.220	1.196	1.381	46	4.120	42,000	3,700	

378RX



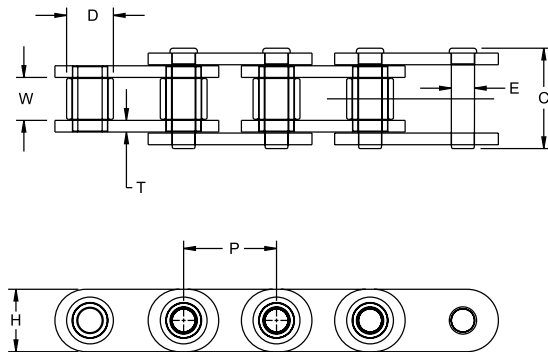
Drives	Pitch	Dimensions in Inches								Approx. Links in 10 Ft.	Weight Per Foot	Average Ultimate Strength	Maximum Recommended Working Load
Chain No.	P	C	D	E	H	W	T	A	B	Links	Lb.	Lb.	Lb.
378RX	2.609	2.060	0.875	0.437	1.125	1.000	0.187	1.030	1.310	46	3.700	20,000	2,100

Note: KD Series manufactured with increased clearance between sidebars to prevent stiff joints under elevated temperatures. Special "No-stain" lubricants available.

Forest and Paper Industry - Wall Board Processing Chains

3000H KD

Made in
U.S.A.



Drives	Pitch	Dimensions in Inches							Approx. Links in 10 Ft.	Weight Per Foot	Average Ultimate Strength	Maximum Recommended Working Load
Chain No.	P	C	D	E	H	W	T	t	Links	Lb.	Lb.	Lb.
3000H KD	3.000	3.220	1.500	0.750	2.000	1.312	0.375	--	40	10.700	70,000	7,100

Note: KD Series manufactured with increased clearance between sidebars to prevent stiff joints under elevated temperatures. Special "No-stain" lubricants available.

Technical Specification/ Performance

KD Series chains produced with the following features:

- 1) Minimum twist in each direction is 4° and the maximum difference in twist from one side to the other is 12°.
- 2) Minimum camber in each direction is 2" and the maximum difference in camber from one side to the other side is 4".
- 3) Special alloy pin material with nominal hardness at 45 HRC (guarantees superior strength in higher temperature operations with balance of 25% greater wear life performance) for wall-board/ dryer applications.

4) Alloy bushing material (guarantees superior strength, durability and wear life) for wallboard/dryer applications.

5) Nominal Lateral Plate Clearance at .06 inches (with increased pin length requirement) guarantees tolerance for heat expansion/contraction. Delivers non-binding chain operations in higher temperatures/ longer cycle wall board systems.

Installation/ Service Factors

- 1) J-style designed connectors can be specified for superior retention and service access.
- 2) 25 foot or 50 foot coils available, on pallets/ crates for efficient installation.
- 3) No hassle, non-return reels available
 - 200 foot for 81X or 81XKD
 - 125 foot for 81XH, 81XHT, 81XH KD
- 4) Steel returnable reels available
 - 600 foot for 81X or 81XKD
 - 500 foot for 81XH, 81XHT, 81XH KD

Metal

Drives Engineering Class Chain

processing

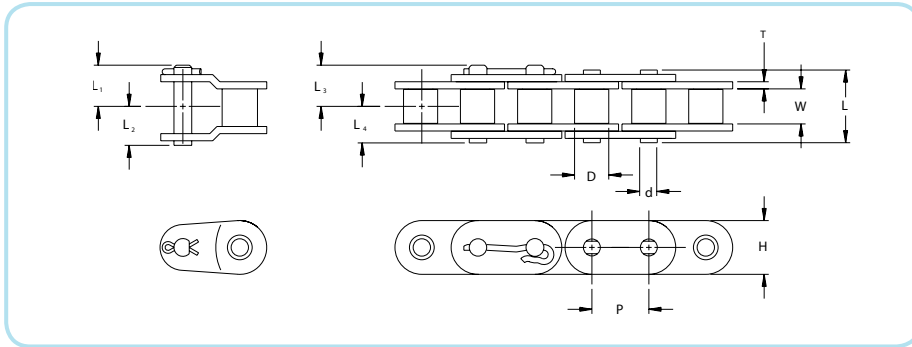
■ Extreme conditions within the metal processing industry demand chains that are designed to withstand the enormous weight of the materials being conveyed, high temperatures and the distance that the material must be conveyed.



Metal Processing Chain

E-Series Chain

Made in
U.S.A.



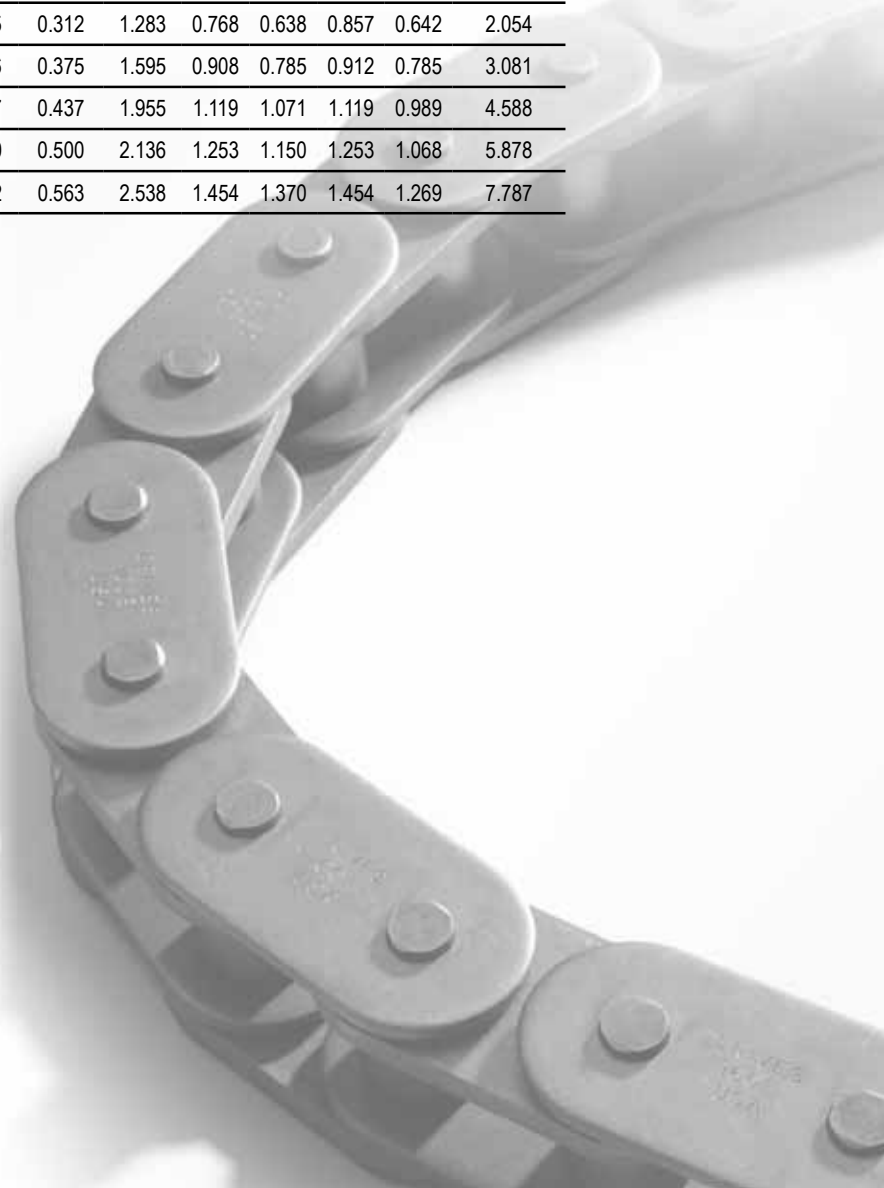
Cut-to-length chain available.

“E” Series recommended for heavy duty transfer systems.

Available in riveted style.

Drives	Pitch	Width Between L.P.	Roller Dia.	Link Plate			Pin					Average Weight
				H	T	d	L	L ₁	L ₂	L ₃	L ₄	
Chain No.	P	W	D	H	T	d	L	L ₁	L ₂	L ₃	L ₄	Lb./Ft.
C60E	0.750	0.500	0.469	0.705	0.094	0.234	0.996	0.600	0.498	0.648	0.498	1.173
C80E	1.000	0.627	0.625	0.943	0.125	0.312	1.283	0.768	0.638	0.857	0.642	2.054
C100E	1.250	0.755	0.750	1.180	0.156	0.375	1.595	0.908	0.785	0.912	0.785	3.081
C120E	1.500	1.000	0.875	1.425	0.187	0.437	1.955	1.119	1.071	1.119	0.989	4.588
C140E	1.750	1.000	1.000	1.663	0.220	0.500	2.136	1.253	1.150	1.253	1.068	5.878
C160E	2.000	1.250	1.126	1.899	0.252	0.563	2.538	1.454	1.370	1.454	1.269	7.787

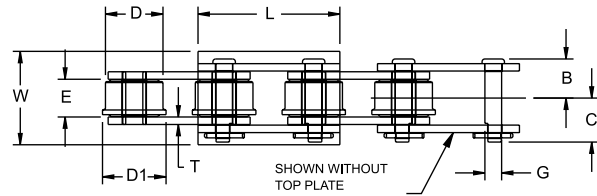
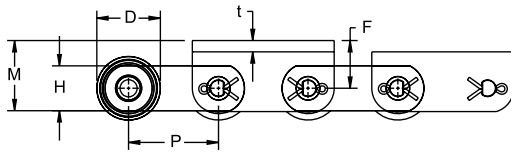
Note: Carrier roller available on made-to-order basis.



Metal Processing Chain

Metal Pin Transfer Chain

3162 TP



Drives Metal Pin Transfer Chains are designed with a top plate that allows the metal product to be placed directly on the chain. The flange style roller allows the chain to be tracked. Drives chains are manufactured from alloy steel and are specially heat treated for maximum performance.

Drives	Pin Link Pitch	Inside Width	Pin	Roller	Sidebar	Pin Head to CL	Pin End to CL	Maximum Recommended Working Load	Weight Per Foot		
Chain No.	P	E	G	D	D ₁	T	H	B	C	Lb.	Lb.
3162 TP	3.008	1.260	0.560	1.575	2.125	0.250	1.500	1.310	1.470	3,445	11.810

Note: Pin construction and pitch hole will be full round.

Metal Pin Transfer Chain Attachment

Drives	Pitch	Attachment			
Chain No.	P	t	F	W	L
3162 TP	3.008	0.380	1.600	3.130	4.750

Mining industry

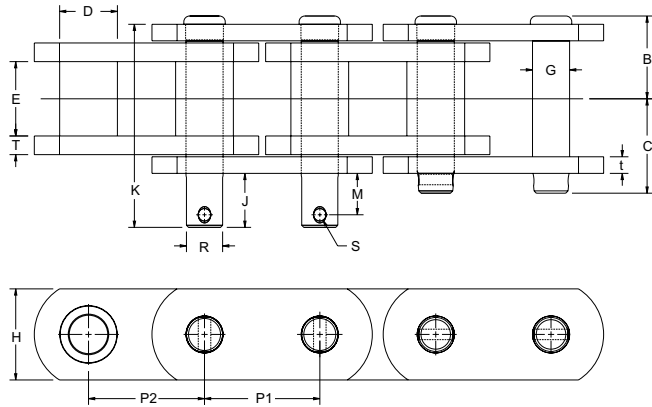
Drives Engineering Class Chain



Drives manufactures mining chains that will stand up to any environment – above ground or underground. Drives mining chains are built to precise specifications for strength and maximum wear life.

Mining

Feeder Breaker Chain



Feeder breaker chains convey coal and rock into mill crushing equipment for material processing. These chains are required to handle heavy shock loads and extremely abrasive conditions. Drives chains are engineered for optimum wear life.

Feeder Breaker Chain

Drives	Pin Link Pitch	Roller Link Pitch	Inside Width	Pin	Bushing	Sidebar			Pin Head to CL	Pin End to CL	Weight Per Foot
Chain No.	P ₁	P ₂	E	G	D	T	t	H	B	C	Lb.
3 X4 Feeder Breaker Chain	3.000	4.000	1.880	0.990	1.500	0.560	0.500	2.500	2.280	2.720	19.570
4 X4 Feeder Breaker Chain	4.000	4.000	1.880	0.990	1.500	0.560	0.500	2.500	2.280	2.720	20.170
3501	3.500	3.500	2.250	1.120	1.750	0.560	0.500	2.750	2.530	2.880	24.300

Feeder Breaker Chain Attachments

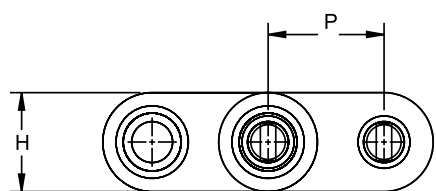
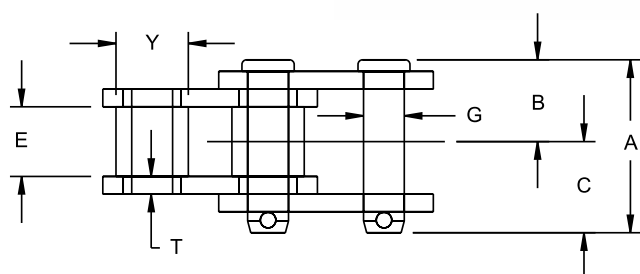
Drives	Pitch	Attachment				
Chain No.	P	M	J	K	R	S
3 X4 Feeder Breaker Chain	3.000	1.120	1.500	5.580	0.928	0.377
4 X4 Feeder Breaker Chain	4.000	1.120	1.500	5.580	0.928	0.377
3501	3.500	1.250	1.610	6.130	1.090	0.377

Note: Dimension varies by manufacturer.
 Extended pin style must be specified at time of quote.
 Please contact Drives for more detail.

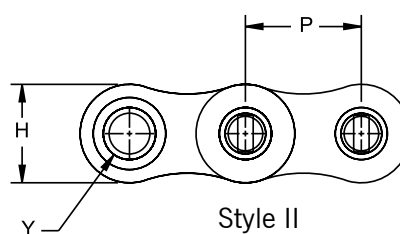
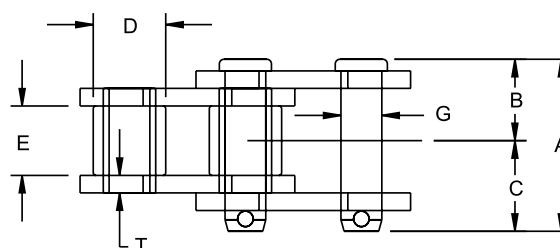
Mining

Tram Chain

Tram Chain



Style I



Style II

Tram Chain

Drives	Style	Pitch	Inside Width	Pin	Bushing	Roller	Sidebar	Pin Head to CL	Pin End to CL	Overall Width	Weight Per Foot	
Chain No.		P	E	G	Y	D	T	H	B	C	A	Lb.
D2	I	2.000	1.250	0.720	1.130	--	0.310	1.880	1.440	1.940	3.380	8.300
D64S / 264	II	2.500	1.500	0.880	--	1.560	0.380	2.130	1.720	2.000	3.720	13.500

- Note: 1. D2 is a bushing type chain without rollers.
 2. Tram chains are designed for use on mining transport vehicles.
 3. Depending on the application, cotter direction can either be in line (Style I) or across pitch (Style II).

Sugar Mill Chain

Drives Engineered Class Chain



Made in U.S.A.



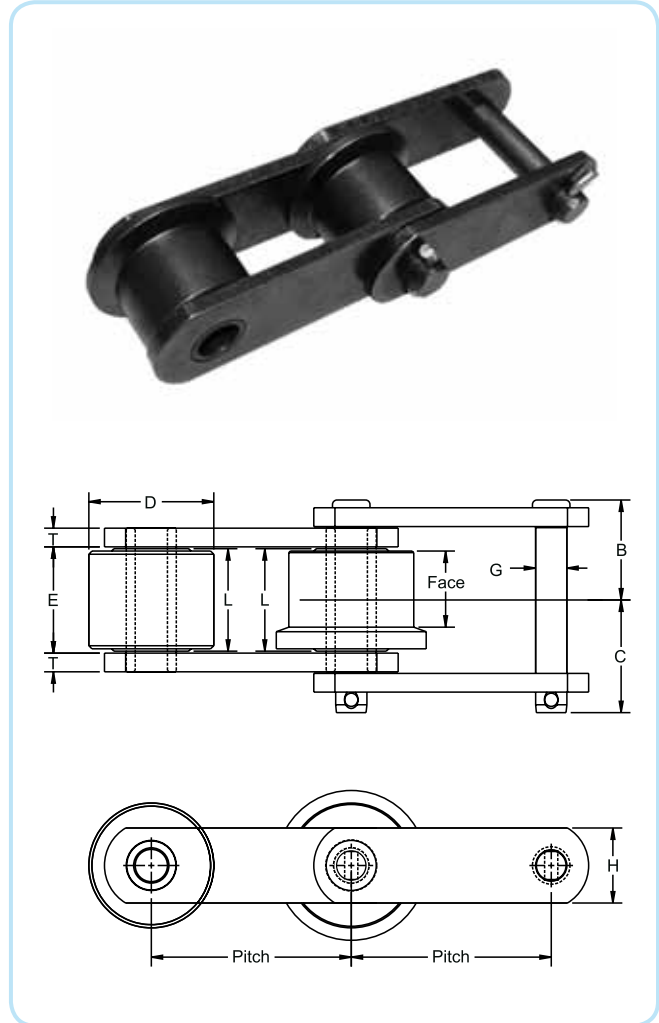
Drives Sugar Mill Chain

Roller Conveyor Plain Chain

Sugar mills provide a rugged test for chains as they convey the cane through the refining process. Drives produces several chains for this challenging application, including roller conveyor chain, bagasse carrier chain, main cane carrier chain and drive chain. Drives USA chains are designed and engineered to guarantee top performance in the 24-7 demand of the harvest season. Drives uses the precise combination of carbon and alloy steels to achieve the optimum chain life and offers stainless steel, chrome plating, and nickel plating for specialized service.

Drives chain components are heat treated in modern furnaces that are controlled by PLC (Programmable Logic Controllers) technology in Fulton, Illinois. Drives not only performs standard hardness tests, but also bending and crush tests to ensure that all parts have the proper balance of strength and ductility.

To achieve the proper press fits, Drives utilizes state-of-the-art manufacturing processes and in-house tooling designers to ensure round holes with maximum contact between mating surfaces. Drives' precision assembly equipment is used to manufacture the chain with equal twist and camber so the chain will run straight and true. Drives' advanced quality assurance processes verify that the chains surpass the highest standards in the industry, assuring that you, our customers, have the best chain available in the market.

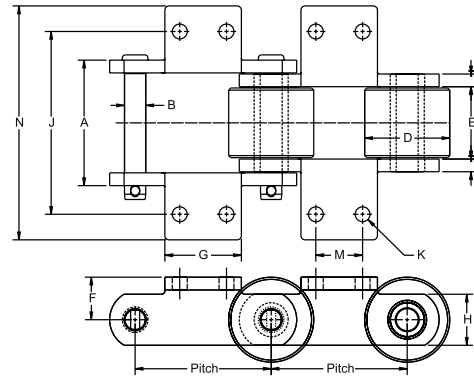


Drives	Pitch	Width			Roller		Pin		Sidebar		Avg. Ult. Strength	Max. Work Load	Approx. Weight	
		Pin Head to CL	Pin End to CL	Inside	Dia.	Length	Face Width	Dia.	Height	Th.				
Chain No.		B	C	E	D	Ft.	G	H	T	Lb.	Lb.	Lb./Ft.		
95R	4.000	1.03	1.25	1.00	1.50	0.97	--	0.44	1.13	0.19	13,000	2,100	3.4	
US-196R	6.000	1.20	1.45	1.13	2.00	1.06	--	0.44	1.25	0.25	18,000	2,500	5.0	
607R	6.000	Straight Sidebar	1.33	1.58	1.31	2.50	1.25	--	0.56	1.50	0.25	21,000	3,500	6.5
96R	6.000		1.84	2.09	1.50	2.75	1.44	1.31	0.75	2.00	0.38	47,000	5,900	11.8
96RX	6.000		1.84	2.09	1.50	2.75	1.44	1.31	0.75	2.00	0.38	70,000	5,900	11.8
614R	6.000	1.78	2.03	1.38	2.50	1.31	--	0.75	2.00	0.38	38,000	5,600	11.0	
2184R	6.000	Offset Sidebar	1.72	2.03	1.38	3.00	1.31	1.18	0.88	2.00	0.38	43,000	6,500	12.3
2184RX	6.000		1.72	2.03	1.38	3.00	1.31	1.18	0.88	2.00	0.38	75,000	6,500	12.0

¹ Bushing styles are typically full round or double flat, but may differ depending on the specific application.

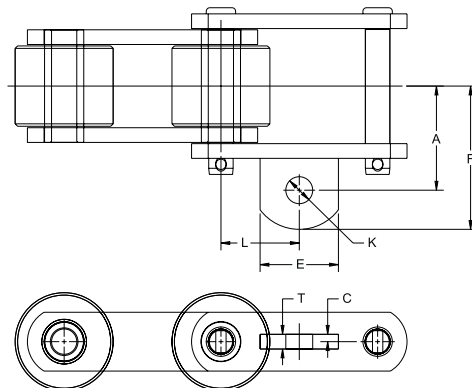
Drives Sugar Mill Chain

Main Cane Carrier Chain



Drives		Pitch	Pin Dia.	Inside Width	Roller Dia.	Sidebar		Attachment					Bolt Dia.	Avg. Tensile	Max. Work Load	Approx. Weight	
Attach. No.	Chain No.	A	B	E	D	H	T	F	G	M	N	J	K	Lb.	Lb.	Lb./Ft.	
K-2	96R	6.000	3.06	0.75	1.50	2.75	2.00	0.38	1.63	5.50	3.00	6.00	4.38	0.50	47,000	5,900	15.8
K-2	96RX	6.000	3.06	0.75	1.50	2.75	2.00	0.38	1.63	5.50	3.00	6.00	4.38	0.50	70,000	5,900	15.8
K-2	2178RX	6.000	3.06	0.88	1.50	2.75	2.25	0.38	1.63	4.50	3.00	5.72	4.38	0.50	85,000	6,900	15.3
K-2	2198RX	6.000	3.56	0.88	1.50	2.75	2.25	0.50	1.63	4.50	3.00	6.62	4.38	0.50	100,000	77,000	18.2
K-2	9063RXX	6.000	3.06	0.94	1.50	3.00	2.50	0.38	1.75	4.50	3.00	6.53	4.38	0.50	110,000	7,400	18.7
--	12230	12.000	6.70	1.50	4.10	3.50	4.00	0.63	--	--	--	--	--	--	280,000	36,300	39.2
--	1203	12.000	3.89	1.00	3.04	2.23	3.00	0.38	--	--	--	--	--	--	78,500	10,600	24.0

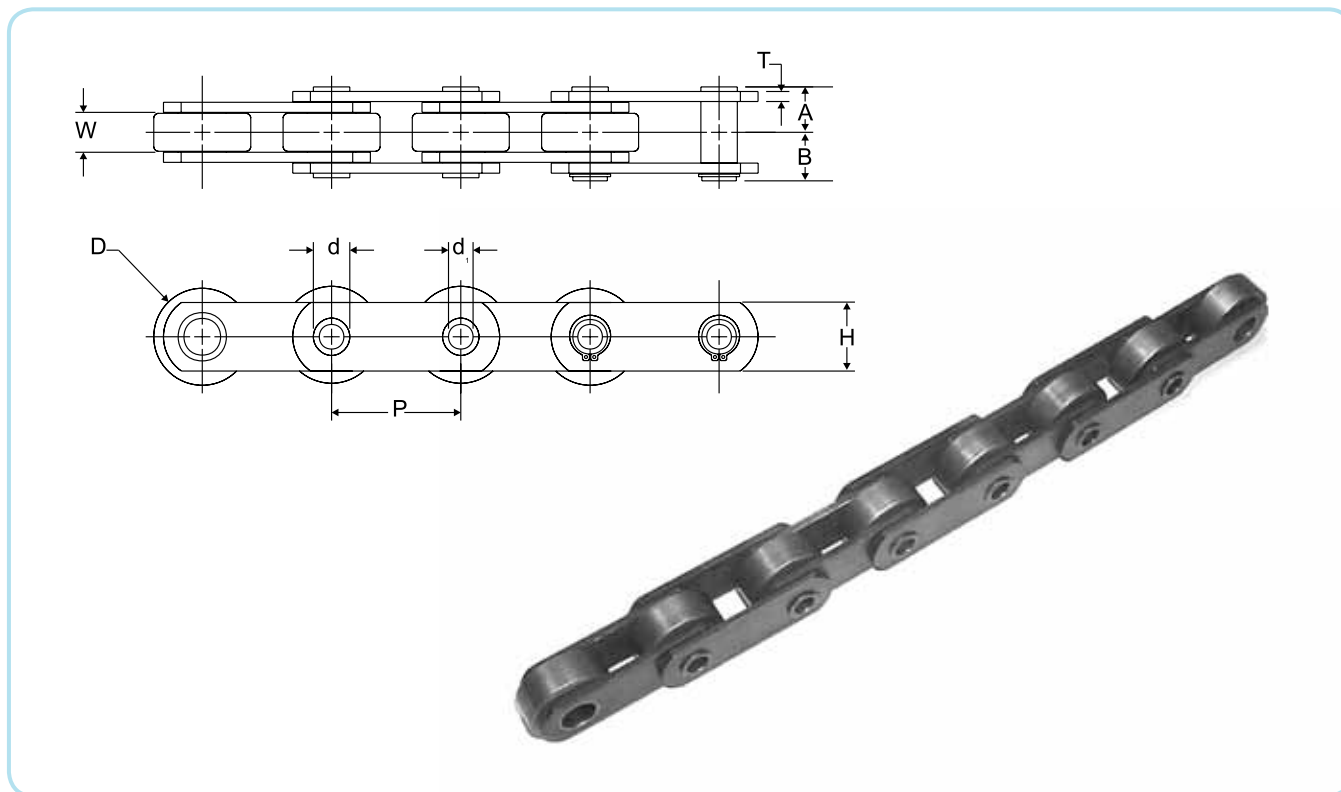
Bagasse Carrier Chain



Drives		Bolt Diameter							Approx. Weight
Attach. No.	Chain No.	A	C	E	F	K	L	T	Lb./Ft.
A-42	53R	1.56	0.13	1.00	2.00	0.38	2.00	0.25	4.2
A-42	95R	1.63	0.19	1.25	2.13	0.38	3.00	0.38	3.6
A-42	614R	2.75	0.25	2.00	3.75	0.63	3.00	0.50	12.3
A-42	2184RX	2.63	0.25	2.00	3.63	0.63	3.00	0.50	13.6

Harvester Chain - 2" HP Engineering Class

HP Chain 2.000" Pitch



Hollow Pin Chain

Drives	Pitch	Width Between L.P.	Bushing Dia.	Roller Dia.	Link Plate		Pin Dia.		Pin		Average Weight	Avg. Tensile Strength	Maximum Recommended Working Load
Chain No.	P	W	B	D	H	T	d	d ₁	A	B	Lb./Ft.	Lbs.	Lbs.
HP200	2.000	0.617	--	1.500	1.060	0.156	0.564	0.382	0.703	0.750	2.500	15,000	2,600

Drives Engineering Class Chain

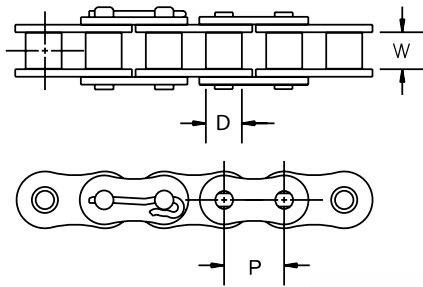
Specialty Drive chain products

Extended Life CHP® hard chrome plated pins possess standard steel's metallurgical properties for toughness and strength while delivering an extremely hard wear resistant pin surface. CHP chain pins resist wear longer than standard heat treated pins, even in dry and abrasive environments. Extended Life CHP® chain is directly interchangeable with standard ANSI chain.

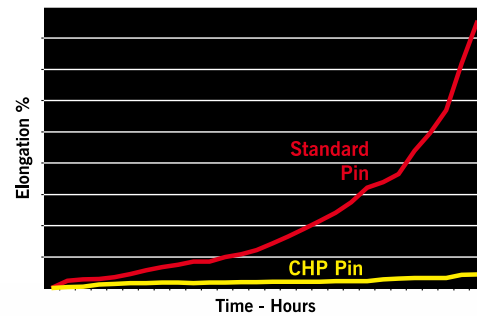


Extended Life CHP® Series Chain Products

Made in
U.S.A.



Elongation vs. Time



Extended Life CHP® chains:

CHP hard chrome plated pins possess standard steel's metallurgical properties for toughness and strength while delivering an extremely hard wear resistant pin surface with a 1/3 reduction in the coefficient of friction compared to steel on steel. CHP chain pins resist wear longer than standard heat treated pins, even in dry and abrasive environments.

- CHP chain is directly interchangeable with standard ANSI chain
- Outstanding wear and shock load performance even at elevated temperatures
- No reduction in working loads or operating speeds
- Exceptional pin wear resistance reduces chain elongation and can increase wear life by 3X over conventional premium chains
- Full range of ANSI standard attachments available

Drives	Pitch	Width Between L.P.	Roller Diameter	Average Weight
Chain No.	P	W	D	Lb./Ft.
40	0.500	0.313	0.313	0.420
50	0.625	0.376	0.400	0.713
60	0.750	0.500	0.469	1.067
80	1.000	0.627	0.625	1.868
100	1.250	0.755	0.750	2.801
120	1.500	1.000	0.875	4.135
140	1.750	1.000	1.000	5.136
160	2.000	1.250	1.126	6.603
180	2.250	1.400	1.406	9.100
200	2.500	1.490	1.562	10.900
240	3.000	1.864	1.875	16.400
C2040	1.000	0.312	0.312	0.340
C2050	1.250	0.376	0.400	0.580
C2060H	1.500	0.500	0.470	1.010
C2080H	2.000	0.625	0.625	1.204

NOTE:

- CHP offsets available on a made-to-order basis. Two pitch riveted offsets recommended.
- Cotter type connecting links standard for CHP chains.
 - 40 thru 60 pitch dual cotter key
 - 80 thru 180 pitch hardened hook cotter
 - 200 thru 240 pitch coated T-pin
- Available in single and double strand sizes - #40 to #240.
- Riveted or cotted pins available depending on size.
- Corrosion resistant finishes available upon request for remaining chain components.

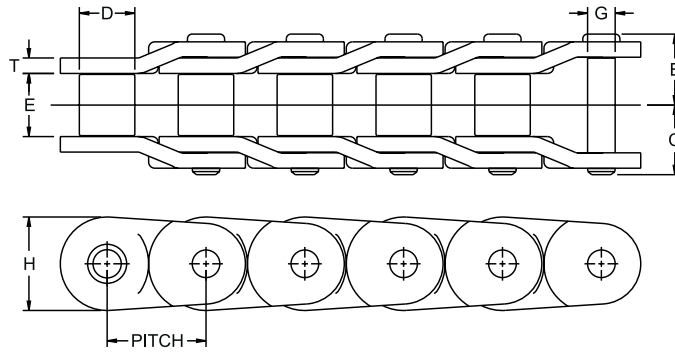
* Drives Engineering and the American Chain Association (ACA) recommend sprockets and roller chain changed out at the same time.

* Drives recommends operating roller chain with periodic lubrication and maintenance review. Various lubricants are available including food grade and "no stain", depending on application.

* Product specifications subject to change without notice.



Engineered Steel Drive Chain



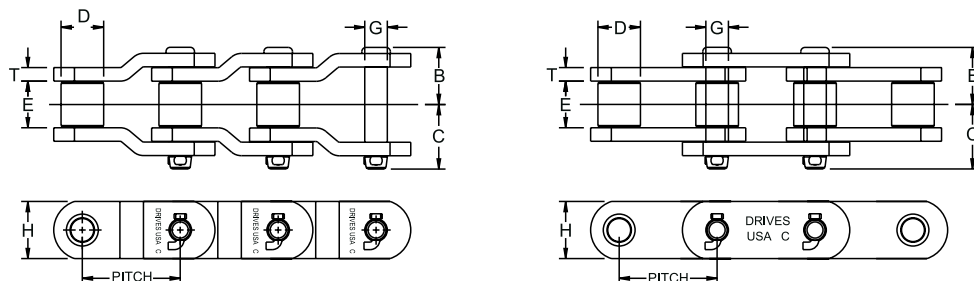
3100 Series

Drives	Pitch	Inside Width	Pin				Roller		Sidebar			Average Tensile Strength	Maximum Recommended Working Load	Weight Per Foot
			Chain No.	P	E	G	B	C	Properties	D	Properties			
DO-3120	1.500	1.000	0.437	1.071	1.119	AHT	0.875	AHT	0.187	1.425	AHT	34,000	2,100	4.100
DO-3140	1.750	1.000	0.500	1.253	1.253	AHT	1.000	AHT	0.220	1.663	AHT	46,000	2,520	5.100
DO-3160	2.000	1.250	0.562	1.370	1.454	AHT	1.125	AHT	0.250	1.899	AHT	58,000	3,450	6.700
DO-3180	2.250	1.406	0.687	1.390	1.561	AHT	1.406	AHT	0.281	2.132	AHT	80,000	4,800	9.600
DO-3200	2.500	1.500	0.781	1.544	1.889	AHT	1.562	AHT	0.312	2.312	AHT	95,000	5,800	11.100
DO-3264	2.500	1.500	0.875	1.672	2.015	AHT	1.562	AHT	0.375	2.375	AHT	135,000	6,900	12.600
DO-3240	3.000	1.875	0.937	1.854	2.212	AHT	1.875	AHT	0.375	2.812	AHT	152,200	8,600	16.700

AHT = Alloy Heat Treated

Engineered Steel Drive Chain

Made in
U.S.A.



Drive Chain

Drives	Pitch	Inside Width	Pin				Roller	Sidebar		Average Tensile Strength	Maximum Recommended Working Load	Weight Per Foot
Chain No.	P	E	G	B	C	Properties	D	T	H	Lb.	Lb.	Lb.
D-3075	3.075	1.500	0.648	1.840	2.000	AHTIH	1.250	0.375	1.750	75,000	5,100	9.600
D-3514	3.500	1.500	0.875	2.060	2.340	AHTIH	1.750	0.500	2.250	140,000	7,700	16.100
D-1245	4.073	1.940	0.937	2.380	2.750	AHTIH	1.775	0.562	2.375	170,000	10,100	18.000
D-4522	4.500	2.060	1.100	2.500	2.880	AHTIH	2.250	0.562	3.000	220,000	12,300	25.400
D-64S *	2.500	1.500	0.875	1.500	1.690	AHT	--	0.375	2.130	--	6,891	--

* Note: Straight sidebar style. Offset sidebar drive chains are manufactured on a made-to-order basis with minimum order quantities.

AHTIH = Alloy Heat Treated Induction Hardened

AHT = Alloy Heat Treated



Drives Engineering Class Chain

Engineering information



■ A complete line of superior quality engineered conveyor chains are available to meet your exact needs. Drives delivers leading edge solutions with over 100 years of advanced engineering knowledge and experience.

Drives Engineering Information

Selection Guide

The following procedure is useful for economical and quick chain selection.

- Step 1: Confirm the operating conditions of the conveyor
- Step 2: Tentatively select the chain size
- Step 3: Calculate the design chain tension (actual chain tension)
- Step 4: Calculate design pull
- Step 5: Calculate chain tensions
- Step 6: Verify the chain selection

Step 1: Confirm the operating conditions of the conveyor

The following information is needed to design a chain conveyor.

1. Type of conveyor (slat conveyor, bucket elevator, etc.)
2. Method of chain travel (horizontal, inclined, or vertical conveyor)
3. Type, weight, and size of materials to be conveyed
4. Weight of materials to be transported per foot of conveyor length
5. Conveyor speed
6. Conveyor length
7. Lubrication
8. Considerations for special environments

Step 2: Tentatively select the chain size

To tentatively select the chain size, estimate the chain tension (P) by the formulas on the following page. A chain with an allowable load equal to or over the below calculated chain tension may be tentatively selected.

$$P = (M) (C) (f)$$

Where:

P = Chain Pull (Lbs.)

M = Weight of Material Being Conveyed on Conveyor (Lbs./Ft.)

C = Center Distance Between Sprockets (Ft.)

f = Coefficient of Friction (See Table I or II)

Drives Engineering Information

Selection Guide

Step 3: Calculate chain tension

Next, the chain tension should be calculated using the actual weight of the conveyor chain and material conveyed.

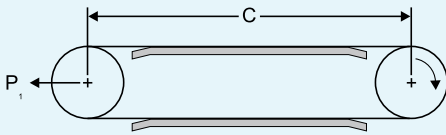
CONVEYOR CHAIN PULL FORMULAS

Horizontal

$$P = C (2.1Mf_m + Wf_w) + J^* + P_1$$

* Where applicable (See next page)

HORIZONTAL - RETURN SIDE SUPPORTED



Inclined

Where the angle of incline is known:

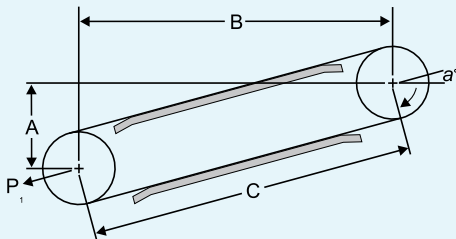
$$P = (Mf_m \cos a + Wf_w \cos a + M \sin a + W \sin a) C + (Mf_m \cos a - M \sin a) 1.1C + J^* + P_1$$

When distances A and B are known:

$$\cos a = \frac{B}{C} \quad \sin a = \frac{A}{C}$$

* Where applicable (See next page)

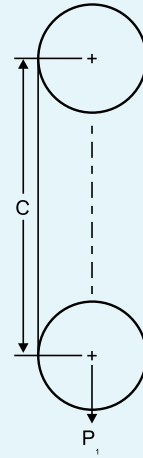
Note: When $(Mf_m \cos a - M \sin a)$ is less than zero, set this quantity to zero.



Vertical

Material Carried:

$$P = (M + W) C + P_1 / 2$$



GLOSSARY

P = Total conveyor pull (lbs.)

P_1 = Take-up force (lbs.)

M = Weight of chains, attachments, slats, etc. and other moving elements of the conveyor per ft. (lbs./ft.)

W = Weight of material per ft. on the conveyor (lbs./ft.) (See Table VI)

f_m = Coefficient of friction of chain sliding or rolling Table II (f_s) or Table I (f_r)

f_w = Coefficient of material sliding in trough Table III (f_w) (Note: When material is carried on chain $f_w = f_m$)

C = Center distance (ft.)

J = Pull (lbs.) caused by sideboard sliding friction (See next page)

Drives Engineering Information

Selection Guide

Step 3: Continued

Additional Pull on Conveyor (J) Material Sliding Against Sideboards

$$J = Ch^2/R$$

Where:

h = Height of material in inches

R = Variable factor for different materials (see Table III)

C = Length of conveyor in feet

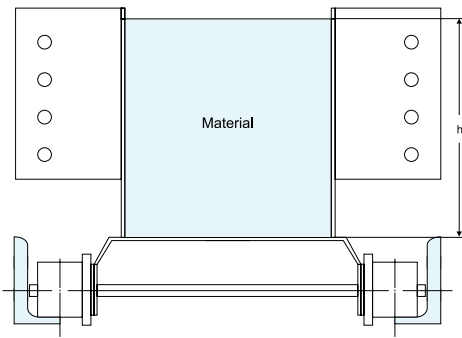


Table I - Coefficient of Chain Rolling Friction (f_r)

Type of Roller	Dry	Lubricated
Oversized Roller	0.12	0.08
Standard Roller	0.21	0.14

Table II - Coefficient of Chain Sliding Friction (f_s)

Material	Coefficient	
	Dry	Lubricated
Steel on steel	0.33	0.20
Cast iron or cast steel on same surface	0.50	0.40
Steel on bronze	--	0.15
Steel on hardwood	0.35	0.25
Cast iron or cast steel on hardwood	0.44	--
Steel on UHMW	0.25	0.15

Table III - Material Characteristics

Material Description	Coeff. of Friction on Steel f_w	Trough Side Factor R
Alum, Lumps	.45	25
Alumina	.55	N/A
Aluminum, Dry	.40	27
Ammonium Chloride, Crystalline	.79	N/A
Asbestos, Shredded	.58	N/A
Ashes, Coal, Dry - 1/2"	.55	35.7
Ashes, Coal, Dry - 3"	.65	50
Ashes, Coal, Wet - 1/2"	.55	31.3
Ashes, Coal, Wet - 3"	.65	38.5
Asphalt, Crushed	.41	N/A
Bagasse	.45	167
Barley	.71	N/A
Beans, Castor, Whole, Shelled	.40	17.2
Beans, Navy, Dry	.40	17.2
Cement, Aerated Portland	.70	11.1
Cement, Clinker	.75	11.6
Cement, Mortar	.54	N/A
Cement, Portland	.70	11.1
Charcoal	.41	N/A
Coal, Anthracite, Culm and River	.55	13.3
Coal, Anthracite, Sized - 1/2"	.45	15.6
Coal, Bituminous, Mined	.65	19.6
Coal, Bituminous, Mined, Sized	.55	20
Coal, Bituminous, Mined, Slack	.55	27
Coke, Breeze	.70	35.3
Coke, Loose	.60	38.5
Coke, Petrol, Calcimined	.60	38.5
Corn	.40	23
Cottonseed, Dry, Not Delinted	.40	83.3
Dolomite, Crushed	.54	N/A
Dolomite, Lumpy	.54	N/A
Feldspar	.55	N/A
Flyash	N/A	14
Gypsum	.64	N/A
Ice, Crushed	.20	31.3
Iron Ore, Concentrate	.47	N/A
Lead Ore	.77	N/A
Lime, Ground, Unslaked	.45	26.3
Lime, Hydrated	.63	N/A
Lime, Pebble	.55	14.7
Limestone, Agricultural	.65	7.5
Limestone, Crushed	.70	9.1
Limestone, Dust	.55	11.1
Phosphate Rock	.42	N/A
Pyrite, Pellets	.58	N/A
Quartz - 100 Mesh	.55	N/A
Rice	.40	N/A
Rubber, Reclaimed, Ground	.53	N/A
Rye	.35	N/A
Salt, Dry, Coarse	.57	N/A
Salt, Dry Bank, Damp	.90	5.9
Salt, Dry Bank, Dry	.65	7.1
Sand, Foundry, Shake Out	.75	13.9
Sand, Silica	N/A	5.5
Sawdust, Dry	.45	167
Slag, Blast Furnace	.48	N/A
Soda Ash, Light	.45	N/A
Soybean, Whole	.41	N/A
Starch	.57	N/A
Urea Prills, Coated	.63	N/A
Wheat	.43	N/A
Wood Chips, Screened	.45	48

Drives Engineering Information

Step 4: Calculate Design Pull (DP)

$$DP = P \times V \times E \quad (\text{See Tables IV \& V})$$

Using Table V under conveyor speed, read down to the number nearest 1.00 (this will be in the vicinity of the heavy dividing line). Read across to the left to obtain the optimum sprocket size. If space limitations require using smaller sprockets, read across from the right from the number of teeth to the column under conveyor speed - obtain the Speed Correction Factor (E).

Service Factors (V)

Table IV

V_s	V_L	V_o	V_T
Frequency of Shock	Character of Conveyor Loading	Conditions of Operation	Daily Operating Period
Infrequent (1)	Uniform or Steady (1)	Relatively clean and moderate room temperature (1)	8-10 Hours (1)
	Moderate Shock (1.2)	Moderately dusty (1.2)	
Frequent (1.2)	Heavy Shock (1.5)	Unprotected from weather, dirty corrosive conditions or unusual temperatures within permissible operating range (1.4)	24 Hours (1.2)

Note: Service Factor $V = V_s \times V_L \times V_o \times V_T$

Speed Correction Factors (E)

Table V

No. of Teeth	Conveyor Speed / Feet Per Minute														
	10	25	50	75	100	125	150	175	200	225	250	275	300	400	500
6	0.917	1.090	1.370	1.660	2.000	2.400	2.910	3.570	4.410	5.650	7.650	10.600	16.700	--	--
7	0.855	0.971	1.130	1.270	1.440	1.610	1.310	2.040	2.290	2.600	2.960	3.420	3.950	8.620	--
8	0.813	0.909	1.040	1.160	1.260	1.370	1.490	1.630	1.760	1.930	2.100	2.290	2.480	3.620	6.210
9	0.794	0.870	0.980	1.070	1.170	1.260	1.360	1.450	1.550	1.650	1.760	1.880	2.000	2.560	2.940
10	0.775	0.840	0.943	1.020	1.090	1.160	1.240	1.310	1.370	1.450	1.530	1.610	1.680	2.030	2.410
11	0.758	0.820	0.901	0.971	1.030	1.090	1.150	1.220	1.280	1.640	1.400	1.460	1.520	1.780	2.050
12	0.741	0.787	0.862	0.926	0.990	1.050	1.100	1.160	1.121	1.260	1.320	1.370	1.420	1.630	1.840
14	0.735	0.769	0.833	0.885	0.935	0.980	1.020	1.070	1.110	1.150	1.190	1.240	1.280	1.470	1.610
16	0.725	0.763	0.813	0.855	0.893	0.935	0.971	1.010	1.050	1.080	1.120	1.160	1.190	1.340	1.480
18	0.719	0.752	0.800	0.833	0.877	0.909	0.943	0.980	1.010	1.040	1.080	1.110	1.140	1.270	1.400
20	0.719	0.746	0.787	0.826	0.855	0.893	0.917	0.952	0.980	1.010	1.040	1.070	1.100	1.220	1.340
24	0.714	0.735	0.769	0.800	0.820	0.847	0.877	0.901	0.935	0.962	0.980	1.010	1.040	1.150	1.260

Drives Engineering Information

Selection Guide

Step 5: Calculate Chain Tensions (T)

Single strand conveyor $T = DP$

Double strand conveyor $T = (DP) (1.2) / 2$

Triple strand conveyor $T = (DP) (1.2) / 3$

More than three strands Consult Drives Engineering

Note: The 1.2 multiplier is used to provide for possible overload in one strand due to unequal load distribution.

Step 6: Verify the Chain Selection

Compare the chain tension of Step 5 to the maximum recommended working load for the chain. The chain tension should be less than the working load. If the chain tension is much smaller than the working load, try the next smaller chain size. If the chain tension is greater than the working load, try the next larger chain size. Repeat Steps 3-5 for the new chain size.

Helpful Engineering Formulas

Material Weight per Ft. on Conveyor (M) for Bulk Materials (Lb./Ft.)

$$M = \frac{(33.3) (Q)}{S}$$

$$M = \frac{(CFM) (d)}{S}$$

Where:

Q = Capacity (Tons/Hr.)

S = Chain Speed (Ft./Min.)

CFM = Capacity or conveyed material flow rate (Ft.³/Min.)

d = Material density (Lbs./Ft.³)

Chain Speed (S)

$$S = \frac{(P) (N) (RPM)}{12}$$

Where:

S = Speed (Ft./Min.)

P = Chain pitch (In.)

N = Number of teeth in sprocket

RPM = Rotational speed of sprocket

Horsepower (HP)

$$HP = \frac{(t) (rpm) (1.1)}{63,025}$$

$$HP = \frac{(T) (rpm) (1.1)}{5,252}$$

$$HP = \frac{(P) (S) (1.1)}{33,000}$$

$$HP = (Amp) (Volt) (1.341)$$

$$\text{Chain Pull } P = \frac{33,000 \times HP}{S}$$

Where:

t = Torque transmitted by headshaft (In. Lb.)

T = Torque transmitted by headshaft (Ft. - Lb.)

rpm = Speed of headshaft

P = Total conveyor pull (Lbs.)

S = Chain Speed (Ft./Min.)

Amp = Amperage

Volt = Voltage

Note: 1.1 compensates for motor efficiency.

Drives Engineering Information

CEMA Material Code*

Drives	Material Characteristics	Code
Density	Bulk, Density, Loose	Actual Lbs./Cu. Ft.
	Very fine - 100 mesh and under	A
Size	Fine - 1/8 inch and under	B
	Granular - under 1/2 inch	C
	Lumpy - containing lumps over 1/2 inch	D
	Irregular - stringy, interlocking, mats together	E
	Very free flowing - angle of repose less than 20 degrees	1
Flowability Angle of Repose	Free flowing - angle of repose 20 degrees to 30 degrees	2
	Average lowing - angle of repose 30 degrees to 45 degrees	3
	Sluggish - angle of repose 45 degrees and over	4
	Non-abrasive	5
Abrasiveness	Abrasive	6
	Very Abrasive	7
	Very dusty	L
Miscellaneous Characteristics (Sometimes more than one of these characteristics may apply)	Aerates and develops fluid characteristics	M
	Contains explosive dust	N
	Contaminable, affecting use of saleability	P
	Degradeable, affecting use or saleability	Q
	Gives off harmful fumes or dust	R
	Highly corrosive	S
	Mildly corrosive	T
	Hygroscopic	U
	Interlocks or mats	V
	Oils or chemical present - may affect rubber products	W
	Packs under pressure	X
	Very light and fluffy - may be wind swept	Y
	Elevated temperature	Z

Example: A powdery (200 mesh), light material with a density of 11 Lbs./Cu.Ft. which is free flowing, abrasive, hygroscopic (attracts moisture), explosive, and packs under pressure would have the following material code **11A26NUX**.

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Drives Engineering Information

Table VI - Material Characteristics

Drives	Loose Bulk Density	Material Code
Material Description	Lb./Cu. Ft.	
Adipic Acid	45	45A35N
Alfalfa, Meal	14-22	18B45WY
Alfalfa, Pellets	41-43	42C25
Almonds, Broken	27-30	29C35Q
Almonds, Whole, Shelled	28-30	29C35Q
Alum, Fines	45-50	48B35U
Alum, Lumps	50-60	55B25
Alumina	55-65	58B27MY
Alumina, Fines	35	35A27MY
Alumina, Sized or Briquette	65	65D37
Aluminate Gel (Aluminate Hydroxide)	45	45B35
Aluminum Chips, Dry	7-15	11E45VN
Aluminum Chips, Oily	7-15	11E45Y
Aluminum Hydrate	13-20	17C35N
Aluminum Oxide	60-120	90A17MN
Aluminum Silicate (Andalusite)	49	49C35S
Aluminum Sulfate	45-58	52C25
Aluminum, Ore (See Bauxite)		
Ammonium Chloride, Crystalline	45-52	49A45RS
Ammonium Nitrate	45-62	54A35NTU
Ammonium Sulfate	45-58	52C35TU
Antimony, Powder		A35
Apple Pomace, Dry	15	15C45Y
Arsenate of Lead (See Lead Arsenate)		
Arsenic Oxide Arsenolite	100-120	110A35R
Arsenic, Pulverized	30	30A25R
Asbestos Rock, Ore	81	81D37R
Asbestos, Shredded	20-40	30E46XY
Ash, Black, Ground	105	105B35
Ashes, Coal, Dry - 1/2"	35-45	40C46TY
Ashes, Coal, Dry - 3"	35-40	38D46T
Ashes, Coal, Wet - 1/2"	45-50	48C46T
Ashes, Coal, Wet - 3"	45-50	48D46T
Ashes, Fly (See Flyash)		
Asphalt, Crushed - 1/2"	45-125	45C45
Bagasse	7-10	9E45RVXY
Bakelite, Fines	30-45	38B25
Baking, Powder	40-55	48A35
Baking, Soda	40-55	48A25
Barite Barium Sulfate, 1/2" to 3"	120-180	150D36
Barite, Powder	120-180	150A35X

Drives	Loose Bulk Density	Material Code
Material Description	Lb./Cu. Ft.	
Bark, Wood, Refuse	10-20	15E45TVY
Barley, Fine Ground	24-38	31B35
Barley, Malted	31	31C35
Barley, Meal	28	28C35
Barley, Whole	36-48	42B25N
Basalt	80-105	93B27
Bauxite, Crushed - 3"	75-85	80D36
Bauxite, Dry, Ground	68	68B25
Beans, Castor, Meal	35-40	38B35W
Beans, Castor, Whole, Shelled	36	36C15W
Beans, Navy, Dry	48	48C15
Beans, Navy, Steeped	60	60C25
Bentonite - 100 Mesh	50-60	55A25MX
Bentonite, Crude	34-40	37D45X
Benzene Hexachloride	56	56A45R
Bicarbonate of Soda (See Baking Soda)		
Blood, Dried	35-45	40D45U
Blood, Dried, Ground	30	30A35U
Bone, Ash (See Tricalcium Phosphate)	40-50	45A45
Boneblack	20-25	23A25Y
Bonechar	27-40	34B35
Bonemeal	50-60	55B35
Bones, Crushed	35-50	43D45
Bones, Ground	50	50B35
Bones, Whole	35-50	43E45V
Borate of Lime	60	60A35
Borax Lumps, 1 1/2" to 2"	55-60	58D35
Borax Lumps, 2" to 3"	60-70	65D35
Borax, Fines	45-55	50B25T
Borax, Screenings, -1/2"	55-60	58C35
Boric Acid, Fine	55	55B25T
Braunite (See Manganese Oxide)		
Bread, Crumbs	20-25	23B35PQ
Brewer's Grain, Spent, Dry	14-30	22C45
Brewer's Grain, Spent, Wet	55-60	58C45T
Brick, Ground, -1/8"	100-120	110B37
Bronze, Chips	30-50	40B45
Buckwheat	37-42	40B25N
Calcine, Flour	75-85	80A35
Calcium Carbide	70-90	80D25N
Calcium Carbonate (See Limestone)		

Drives	Loose Bulk Density	Material Code
Material Description	Lb./Cu. Ft.	
Calcium Fluoride (See Fluorspar)		
Calcium Hydrate (See Lime, Hydrated)		
Calcium Hydroxide (See Lime, Hydrated)		
Calcium Lactate	26-29	28D45QTR
Calcium Oxide (See Lime, Unslaked)		
Calcium Phosphate	40-50	45A45
Calcium Sulfate (See Gypsum)		
Carbon, Activated, Dry, Fine	8-20	14B25Y
Carbon, Black, Pelleted	20-25	23B15Q
Carbon, Black, Powder	4-7	6A35Y
Carborundum	100	100D27
Casein	36	36B35
Cashew, Nuts	32-37	35C45
Cast Iron, Chips	130-200	165C45
Caustic Soda	88	88B35RSU
Caustic Soda, Flakes	47	47C45RSUX
Celite (See Diatomaceous Earth)		
Cement, Aerated Portland	60-75	68A16M
Cement, Clinker	75-95	85D36
Cement, Mortar	133	133B35Q
Cement, Portland	94	94A26M
Cerrusite (See Lead Carbonate)		
Chalk, Crushed	75-95	85D25
Chalk, Pulverized	67-75	71A25MX
Charcoal, Ground	18-28	23A45N
Charcoal, Lumps	18-28	23D45QN
Chocolate, Cake, Pressed	40-45	43D25
Chrome, Ore	125-140	133D36
Cinders, Blast Furnace	57	57D36T
Cinders, Coal	40	40D36T
Clay (See Bentonite, Diatomaceous Earth, Fuller's Earth, Kaolin, & Marl)		
Clay, Brick, Dry, Fines	100-120	110C36
Clay, Calcined	80-100	90B36
Clay, Ceramic, Dry, Fines	60-80	70A35P
Clay, Dry, Lumpy	60-75	68D35
Clinker, Cement (See Cement, Clinker)		
Clover, Seeds	45-48	47B25N

See page 42 for material code explanation.

Drives Engineering Information

Table VI - Material Characteristics

Drives	Loose Bulk Density	Material Code
Material Description	Lb./Cu. Ft.	
Coal, Anthracite, Culm and River	55-61	60B35TY
Coal, Anthracite, Sized - 1/2"	49-61	55C25
Coal, Bituminous, Mined	40-60	50D35LNXY
Coal, Bituminous, Mined, Sized	45-55	48D35QVN
Coal, Bituminous, Mined, Slack	43-50	47C45TN
Coal, Lignite	37-45	41D35TN
Cocoa, Beans	30-45	38C25Q
Cocoa, Nibs	35	35C25
Cocoa, Powdered	30-35	33A45XY
Coconut, Shredded	20-22	21E45
Coffee, Beans, Green	25-32	29C25PQ
Coffee, Beans, Roasted	20-30	25C25PQ
Coffee, Chaff	20	20B25MY
Coffee, Ground, Dry	25	25A35P
Coffee, Ground, Wet	35-45	40A45X
Coffee, Soluble	19	19A35PUY
Coke, Breeze	25-35	30C37N
Coke, Loose	25-35	30D37N
Coke, Petrol, Calcimined	35-45	40D37N
Compost	30-50	40D45TV
Concrete, Pre-Mix, Dry	85-120	103C36U
Copper Sulphate Bluestone	75-95	85C35S
Copper, Ore	120-150	135D36
Copper, Ore, Crushed	100-150	125D36
Copra, Cake, Ground	40-45	43B45W
Copra, Cake, Lumpy	25-30	28D35W
Copra, Lumpy	22	22E35W
Copra, Meal	40-45	42B35W
Cork, Granulated	12-15	14C35YN
Cork, Ground, Fines	5-15	10B35NY
Corn Cobs, Ground	17	17C25YN
Corn Cobs, Whole	12-15	14E35N
Corn Ear	56	56D5N
Corn Fiber Feed, Dry, Cooled	15-35	25B35
Corn Fiber Feed, Dry, Ground	15-35	25B35
Corn Fiber Feed, Dry, Not Cooled	15-35	25B35
Corn Fiber Feed, Pellets, Dry	30-40	35C35
Corn Fiber Feed, Wet	15-40	28B35
Corn Fiber, Dewatered	10-25	18B35
Corn Fiber, Wet	15-50	33B35PUN
Corn Filter Aid	15-50	33B37

Drives	Loose Bulk Density	Material Code
Material Description	Lb./Cu. Ft.	
Corn Germ	21	21B35PYN
Corn Germ, Dewatered	30-35	33B35PUN
Corn Germ, Dry	30-40	35B35
Corn Germ, Expanded Cake	30-40	35B35
Corn Germ, Oil Meal	30-35	33B35
Corn Oil, Cake	25	25D45W
Corn Seed	45	45C25PQN
Corn Shelled	45	45C25N
Corn Sugar	30-35	33B35PUN
Corn Sugar, Crystalline, Dry	25-60	43B35
Corn Sugar, Crystalline, Wet	30-60	45C35
Corn, Cleanings	25-30	28B35PY
Corn, Cracked	40-50	45B25PN
Corn, Grits	40-45	43B35PN
Corn, Steeped	40-60	50D
Cornmeal	38-40	39B35PWN
Cottonseed, Cake, Crushed	40-45	43C45W
Cottonseed, Cake, Lumpy	40-45	43D45W
Cottonseed, Dry, Delinted	22-40	31C25X
Cottonseed, Dry, Not Delinted	18-25	22C45XY
Cottonseed, Flakes	20-25	23C35WY
Cottonseed, Hulls	12	12B35Y
Cottonseed, Meal, Expeller	25-30	28B45W
Cottonseed, Meal, Extracted	35-40	37B45W
Cottonseed, Meats, Dry	40	40B35W
Cottonseed, Meats, Rolled	35-40	38C45W
Cracklings, Crushed	40-50	45D45W
Cryolite, Dust	75-90	83A36L
Cryolite, Lumpy	90-110	100D6
Cullet, Fines	80-120	100C37
Cullet, Lumps	80-120	100D
Culm (See Coal, Anthracite)		
Cupric Sulphate (See Copper Sulfate)		
Detergent (See Soap, Detergent)		
Diatomaceous Earth	11-17	14A36Y
Dicalcium Phosphate	40-50	45A35
Disodium Phosphate	25-31	28A35
Distiller's Grain, Spent, Dry	30	30B35
Distiller's Grain, Spent, Wet	40-60	50C45V
Dolomite, Crushed	80-100	90C36
Dolomite, Lumpy	90-100	95D36
Earth, Loam, Dry, Loose	76	76C36

Drives	Loose Bulk Density	Material Code
Material Description	Lb./Cu. Ft.	
Ebonite, Crushed	63-70	67C35
Egg, Powder	16	16A35MPYN
Epsom Salts (See Magnesium Sulfate)	40-50	45A35U
Ethane Diacid, Crystals	60	60B35QS
Feldspar, Ground	65-80	73A37
Feldspar, Lumps	90-100	95D37
Feldspar, Powder, -200 Mesh	100	100A36
Feldspar, Screenings	75-80	78C37
Ferrous Sulfide, -1/2"	120-135	128C26
Ferrous Sulfate	50-75	63C35U
Ferrous Sulfide, -100 Mesh	105-120	113A36
Fish, Meal	35-40	38C45P
Fish, Scraps	40-50	45D45
Flaxseed	43-45	44B35X
Flaxseed Cake Linseed Cake	48-50	49D45W
Flaxseed Meal Linseed Meal	25-45	35B45W
Flour, Wheat	33-40	37A45LP
Flue Dust, Basic Oxygen Furnace	45-60	53A36LM
Flue Dust, Blast Furnace	110-125	118A36
Flue Dust, Boiler H. Dry	30-45	38A36LM
Fluorspar, Fines	80-100	90B36
Fluorspar, Lumps - 1 1/2" to 3"	90-100	100D36
Flyash	30-45	38A36M
Flyash, Coal	30-60	45A36M
Flyash, Fluidized Bed	60-90	75A36
Foundry Sand, Dry (See Sand)		
Fuller's Earth, Calcined	30-40	35A25
Fuller's Earth, Dry, Raw	30-40	35A25
Fuller's Earth, Oily, Spent	60-65	63C45W
Galena (See Lead Sulfide)		
Gelatine, Granulated	32	32B35PU
Gilsonite	37	37C35
Glass, Batch Wool & Container	80-100	90C37
Glue, Ground	40	40B45U
Glue, Pearl	40	40C35U
Glue, Veg. Powdered	40	40A45U
Gluten Cake, Wet	30-50	40C45
Gluten, Meal, Dry	30-40	35B35P
Granite, Fines	80-90	85C27
Grape, Pomace	15-20	18D45U

See page 42 for material code explanation.

Drives Engineering Information

Table VI - Material Characteristics

Made in U.S.A.

Drives	Loose Bulk Density	Material Code
Material Description	Lb./Cu. Ft.	
Graphite, Flakes	40	40B25LP
Graphite, Flour	28	28A35LMP
Graphite, Ore	65-75	70D35L
Guano, Dry	70	70C35
Gypsum, Calcined	55-60	58B35U
Gypsum, Calcined, Powdered	60-80	70A35U
Gypsum, Raw - 1"	70-80	75D25
Hay, Chopped	8-12	10C35Y
Hexanedioic Acid (See Adipic Acid)		
Hominy, Dry	35-50	43C25P
Hops, Spent, Dry	35	35D35
Hops, Spent, Wet	50-55	53D45V
Ice, Crushed	35-45	40D35
Ice, Cubes	40-45	42C35
Ice, Flaked	33-35	34D35
Ice, Shells	33-35	34D45
Ilmenite, Ore	140-160	150D37
Iron Ore, Concentrate	120-180	150A37
Iron Oxide Pigment	25	25A36LMP
Iron Oxide, Millscale	75	75A35LM
Iron Pyrites (See Ferrous Sulfide)		
Iron Sulfate (See Ferrous Sulfate)		
Iron Sulfide (See Ferrous Sulfide)		
Iron Vitriol (See Ferrous Sulfate)		
Kafir Corn	40-45	43C25
Kaolin Clay	63	63D25
Kaolin Clay, Tale	42-56	49A35LMP
Kryalith (See Cryolite)		
Lactose	32	32A35PUN
Lamp Black (See Carbon Black)		
Lead Arsenate	72	72A35R
Lead Arsenite	72	72A35R
Lead Carbonate	240-260	250A35R
Lead Ore, -1/2"	180-230	205C36
Lead Ore, -1/8"	200-270	235B35
Lead Oxide, -200 Mesh Red Lead	30-180	105A45LP
Lead Oxide, -100 Mesh Red Lead	30-150	90A45P
Lead Sulfide, -100 Mesh	240-280	260A45RX
Lignite (See Coal, Lignite)		

Drives	Loose Bulk Density	Material Code
Material Description	Lb./Cu. Ft.	
Limanite, Ore, Brown	120	120C47
Lime, Ground, Unslaked	60-65	63B35U
Lime, Hydrated	40	40B35LM
Lime, Hydrated, Pulverized	32-40	36A35LM
Lime, Pebble	53-56	55C25U
Limestone, Agricultural	68	68B35
Limestone, Crushed	85-90	88D36
Limestone, Dust	55-95	75A46MY
Lindane (See Benzene Hexachloride)		
Linseed (See Flaxseed)		
Litharge (See Lead Oxide)		
Lithopone	45-50	48A32535MR
Magnesium Chloride (Magnesite)	33	33C45
Maize (See Milo)		
Malt, Dry, Ground	20-30	25B35NP
Malt, Dry, Whole	20-30	25C35N
Malt, Meal	36-40	38B25P
Malt, Sprouts	13-15	14C35P
Manganese Dioxide	70-85	78A35NRT
Manganese Ore	125-140	133D37
Manganese Oxide	120	120A36
Manganese Sulfate	70	70C37
Marble, Crushed	80-95	88B37
Marl (See Clay)	80	80D36
Meat, Ground	50-55	53E45QTX
Meat, Scrap, W/bone	40	40E46
Mica, Flakes	17-22	20B16MY
Mica, Ground	13-15	14B36
Mica, Pulverized	13-15	14A36M
Milk, Dried, Flake	5-6	6B35PUYN
Milk, Malted	27-30	29A45PXN
Milk, Powdered	20-45	33B25PMN
Milk, Powdered, Whole	20-36	28B35PUX
Milk, Sugar	32	32A35PXN
Mill Scale Steel	120-125	123E46T
Milo, Ground	32-36	34B25
Milo, Maize Kafir	40-45	43B15N
Molybdenite Powder	107	107B26
Monosodium Phosphate	50	50B36
Mortar, Wet	150	150E46T
Mustard, seeds	45	45B15N
Naphtalene, Flakes	45	45B35

Drives	Loose Bulk Density	Material Code
Material Description	Lb./Cu. Ft.	
Niacin Nicotinic Acid	35	35A35P
Oats	26	26C25MN
Oats, Crimped	19-26	23C35
Oats, Crushed	22	22B45NY
Oats, Flour	35	35A35
Oats, Hulls	8-12	10B35NY
Oats, Rolled	19-24	22CNY
Oleo Margarine	59	59E45PWX
Orange, Peels, Dry	15	15E45
Oxalic Acid, Crystal Ethane Diacid Crystal	60	60B35QSU
Oyster, Shells, Ground	50-60	55C36T
Oyster, Shells, Whole	80	80D36TV
Paper, Pulp, -4%	62	62E45
Paper, Pulp, 6% to 15%	60-62	61E45
Paraffin, Cake, -1/2"	45	45C45
Peanut Meal	30	30B35P
Peanuts, Clean, Shelled	15-20	18D35Q
Peanuts, Raw, Uncleaned, Unshelled	15-20	18D36Q
Peanuts, Shelled	35-45	40C35Q
Peas, Dried	45-50	48C15NQ
Perlite, Expanded	8-12	10C36
Phosphate Disodium (See Sodium Phosphate)		
Phosphate Rock, Broken	75-85	80D36
Phosphate Rock, Pulverized	60	60B36
Phosphate Sand	90-100	95B37
Phosphate, Acid, Fertilizer	60	60B25T
Plaster of Paris (See Gypsum)		
Plumbago (See Graphite)		
Polystyrene Beads	40	40B35PQ
Polyvinyl Chloride, Pellets	20-30	25E45PQT
Polyvinyl Chloride, Powder	20-30	25A45T
Potash, Dry Muriate	70	70B37
Potash, Mine Run Muriate	75	75D37
Potassium Carbonate	51	51B36
Potassium Chloride, Pellets	120-130	125C25TU
Potassium Nitrate - 1/2"	76	76C16NT
Potassium Nitrate - 1/8"	80	80B26NT
Potassium Sulfate	42-48	45B46X
Potato, Flour	48	48A35MNP
Pumice, -1/8"	42-48	45B46
Pyrite, Pellets	120-130	125C26

See page 42 for material code explanation.

Drives Engineering Information

Table VI - Material Characteristics

Drives	Loose Bulk Density	Material Code
Material Description	Lb./Cu. Ft.	
Quartz - 1/2"	80-90	85C27
Quartz - 100 Mesh	70-80	75A27
Rice, Bran	20	20B35NY
Rice, Grits	42-45	44B35P
Rice, Hulled	45-49	47C25P
Rice, Hulls	20-21	21B35NY
Rice, Polished	30	30C15P
Rice, Rough	32-36	34C35N
Rosin - 1/2"	65-68	67C45Q
Rubber, Pelleted	50-55	53D45
Rubber, Reclaimed, Ground	23-50	37C45
Rye	42-48	45B15N
Rye, Bran	15-20	18B35Y
Rye, Feed	33	33B35N
Rye, Meal	35-40	38B35
Rye, Middlings	42	42B35
Rye, Shorts	32-33	33C35
Safflower, Cake	50	50D26
Safflower, Meal	50	50B35
Safflower, seed	45	45B15N
Saffron (See Safflower)		
Sal Ammoniac (See Ammonium Chloride)		
Salicylic Acid	29	29B37U
Salt Cake, Dry, Coarse	85	85B36TU
Salt Cake, Dry, Pulverized	65-85	75B36TU
Salt, Dry, Coarse	45-60	53C36TU
Salt, Dry, Fine	70-80	75B36TU
Saltpeter (See Potassium Nitrate)		
Sand, Dry Bank, Damp	110-130	120B47
Sand, Dry Bank, Dry	90-110	100B37
Sand, Foundry, Shake Out	90-100	95D37Z
Sand, Silica, Dry	90-100	95B27
Sand, Silica, Resin Coated	104	104B27
Sand, Zircon, Resin Coated	115	115A27
Sawdust, Dry	10-13	12B45UX
Sea-Coal	65	65B36
Sesame seed	27-41	34B26
Shale, Crushed	85-90	88C36
Shellac, Powdered or Granulated	31	31B35P
Silica, Flour	80	80A46
Silica, Gel, 1/2" to 3"	45	45D37QU
Silicon Dioxide (See Quartz)		

Drives	Loose Bulk Density	Material Code
Material Description	Lb./Cu. Ft.	
Slag, Blast Furnace, Crushed	130-180	155D37Y
Slag, Furnace, Granular, Dry	60-65	63C37
Slate, Crushed - 1/2"	80-90	85C36
Slate, Ground - 1/8"	82-85	84B36
Sludge, Sewage, Dry	40-50	45E46TW
Sludge, Sewage, Dry, Ground	45-55	50B46T
Soap, Beads or Granules	15-35	25B35Q
Soap, Chips	15-25	20C35Q
Soap, Detergent	15-50	33B35Q
Soap, Flakes	5-15	10B35QXY
Soap, Powder	20-25	23B25X
Soapstone, Talc, Fine	40-50	45A45XY
Soda Ash, Heavy	55-65	60B36
Soda Ash, Light	20-35	28A36Y
Sodium Aluminate, Ground	72	72B36
Sodium Aluminum Fluoride (See Kryolite)		
Sodium Aluminum Sulphate	75	75A36
Sodium Bentonite (See Bentonite)		
Sodium Bicarbonate (See Baking Soda)		
Sodium Borate (See Borax)		
Sodium Carbonate (See Soda Ash)		
Sodium Chloride (See Salt)		
Sodium Hydrate (See Caustic Soda)		
Sodium Hydroxide (See Caustic Soda)		
Sodium Nitrate	70-80	75D25NS
Sodium Phosphate	50-60	55B35
Sodium Sulfate (See Salt, Cake)		
Sodium Sulfite	96	96B46X
Sorghum seed (See Kafir or Milo)		
Soybean Dust	25-35	30A35MN
Soybean, Cake	40-43	42D35W
Soybean, Cracked	30-40	35C36NW
Soybean, Flakes, Raw	15-35	25 C35Y
Soybean, Flour	25-35	30A35MN
Soybean, Meal, Cold	35-45	40B35
Soybean, Meal, Hot	40	40B35T
Soybean, Whole	45-50	48C26NW
Starch	25-50	38A15MN
Steel Turnings, Crushed	100-150	125D46VV

Drives	Loose Bulk Density	Material Code
Material Description	Lb./Cu. Ft.	
Sugar Beet, Pulp, Dry	12-15	14C26N
Sugar Beet, Pulp, Wet	25-45	35C35XN
Sugar, Powdered	50-60	55A35PXN
Sugar, Raw	55-65	60B35PXN
Sugar, Refined, Granulated, Dry	50-55	53B35PUN
Sugar, Refined, Granulated, Wet	55-65	60C35X
Sulphur, Crushed, - 1/2"	50-60	55C35N
Sulphur, Lumps - 3"	80-85	83D35N
Sulphur, Powdered	50-60	55A35MN
Sunflower seed	19-38	29C15
Talcum -1/2"	80-90	85C36
Talcum, Powder	50-60	55A36M
Tanbark, Ground	55	55B45
Timothy seed	36	36B35NY
Tobacco, Scraps	15-25	20D45Y
Tobacco, Snuff	30	30B45MQ
Tricalcium Phosphate	40-50	45A45
Triple Super Phosphate	50-55	53B36RS
Trisodium Phosphate	60	60C36
Trisodium Phosphate, Granular	60	60B36
Trisodium Phosphate, Pulverized	50	50A36
Tung Nuts	25-30	28D15
Tung Nuts, Meat, Crushed	28	28D25W
Urea Prills, Coated	43-46	45B25
Vermiculite, Expanded	16	16C35Y
Vermiculite, Ore	80	80D36
Vetch	48	48B16N
Walnut Shells, Crushed	35-45	40B36
Wheat	45-48	47C25N
Wheat, Cracked	40-45	43B25N
Wheat, Germ	18-28	23B25
White Lead, Dry	75-100	88A36MR
Wood, Chips, Screened	10-30	20D45VY
Wood, Flour	16-36	26B35N
Wood, Shavings	8-16	12E45VY
Zinc Oxide, Heavy	30-35	33A45X
Zinc Oxide, Light	10-15	13A45XY
Zinc, Concentrate, Residue	75-80	78B37

See page 42 for material code explanation.

Engineering Conversions

BUSHELs – bu
x 1.2445 = Cubic feet (ft³)

CENTIMETRES – cm
x 0.3937 = inches (in)

CENTIMETRES PER SECOND – cm/s
x 1.9685 = Feet per minute (ft/min)
x 0.03291 = Feet per second (ft/s)
x 0.03600 = Kilometres per hour (km/h)
x 0.6000 = Metres per minute (m/min)
x 0.02237 = Miles per hour (mph)

CUBIC CENTIMETRES – cm³
x 3.5315 x 10⁻⁵ = Cubic feet (ft³)
x 6.1024 x 10⁻² = Cubic inches (in³)
x 1.308 x 10⁻⁶ = Cubic yards (yd³)
x 2.642 x 10⁻⁴ = U.S. gallons (U.S. gal)
x 1.000 x 10⁻³ = Litres (l)

CUBIC FEET – ft³
x 0.02832 = Cubic metres (m³)
x 2.832 x 10⁴ = Cubic centimetres (cm³)
x 1728 = Cubic inches (in³)
x 0.03704 = Cubic yards (yd³)
x 7.481 = U.S. gallons (U.S. gal)
x 6.229 = Imperial gallons (imp gal)
x 28.32 = Litres (l)

CUBIC INCHES – in³
x 1.6387 x 10⁻⁵ = Cubic metres (m³)
x 16.387 = Cubic centimetres (cm³)
x 0.016387 = Litres (l)
x 5.787 x 10⁻⁴ = Cubic feet (ft³)
x 2.143 x 10⁻⁵ = Cubic yards (yd³)
x 4.329 x 10⁻³ = U.S. gallons (U.S. gal)
x 3.605 x 10⁻³ = Imperial gallons (imp gal)

CUBIC METRES – m³
x 1000 = Litres (l)
x 35.315 = Cubic feet (ft³)
x 61.024 x 10³ = Cubic inches (in³)
x 1.3080 = Cubic yards (yd³)
x 264.2 = U.S. gallons (U.S. gal)

CUBIC YARDS – yd³
x 0.7646 = Cubic metres (m³)
x 764.6 = Litres (l)
x 7.646 x 10⁵ = Cubic centimetres (cm³)
x 27 = Cubic feet (ft³)
x 46.656 = Cubic inches (in³)
x 201.97 = U.S. gallons (U.S. gal)

DEGREES, ANGULAR (°)
x 0.017453 = Radians (rad)
x 60 = Minutes (′)
x 3600 = Seconds (″)
x 1.111 = Grade (gon)

DEGREES PER SECOND, ANGULAR (°/s)
x 0.017453 = Radians per second (rad/s)
x 0.16667 = Revolutions per minute (r/min)
x 2.7778 x 10⁻³ = Revolutions per second (r/s)

FEET – ft
x 0.3048 = Metres (m)
x 30.480 = Centimetres (cm)
x 12 = Inches (in)
x 0.3333 = Yards (yd)

FEET PER MINUTE – ft/min
x 0.5080 = Centimetres per second (cm/s)
x 0.01829 = Kilometres per hour (km/h)
x 0.3048 = Metres per minute (m/min)
x 0.016667 = Feet per second (ft/s)
x 0.01136 = Miles per hour (mph)

FOOT-POUNDS-FORCE – ft-lb
x 1.356 = Joules (J)
x 1.285 x 10⁻³ = British thermal units (Btu)
x 2.329 x 10⁻⁴ = Kilocalories (kcal)
x 0.13825 = Kilogram-force-metres (kgf.m)
x 5.050 x 10⁻⁷ = Horsepower-hours (hp.h)
x 3.766 x 10⁻⁷ = Kilowatt-hours (kW.h)

GALLONS, U.S. – U.S. gal
x 3.7854 = Cubic centimetres (cm³)
x 3.7854 = Litres (l)
x 3.7854 x 10⁻³ = Cubic metres (m³)
x 231 = Cubic inches (in³)
x 0.13368 = Cubic feet (ft³)
x 4.951 x 10⁻³ = Cubic yards (yd³)

GRAMS – g
x 15.432 = Grains (gr)
x 0.035274 = Ounces (oz) av.
x 0.032151 = Ounces (oz) troy
x 2.2046 x 10⁻³ = Pounds (lb)

GRAMS-FORCE – gf
x 9.807 x 10⁻³ = Newtons (N)

HORSEPOWER – hp
x 745.7 = Watts (W)
x 0.7457 = Kilowatts (kW)
x 1.0139 = Horsepower (metric)

INCHES – in
x 2.540 = Centimetres (cm)
x 25.4 = Millimetres (ml)

KILOGRAMS – kg
x 2.2046 = Pounds (lb)
x 1.102 x 10⁻³ = Tons (ton) short

KILOGRAMS-FORCE – kgf
x 9.807 = Newtons (N)
x 2.205 = Pounds-force (lbf)

KILOWATTS – kW
x 1.3410 = Horsepower (hp)

LITRES – l
x 1000 = Cubic centimetres (cm³)
x 0.035315 = Cubic feet (ft³)
x 61.024 = Cubic inches (in³)
x 1.308 x 10⁻³ = Cubic yards (yd³)
x 0.2642 = U.S. gallons (U.S. gal)

METRES – m
x 3.281 = Feet (ft)
x 39.37 = Inches (in)
x 1.0936 = Yards (yd)

METRES PER MINUTE – m/min
x 1.6667 = Centimetres per second (cm/s)
x 3.281 = Feet per minute (ft/min)
x 0.05468 = Feet per second (ft/s)
x 0.03728 = Miles per hour (mph)

MICROMETRES – formerly m/cron
x 10⁻⁶ = Metres (m)

MILES – mi
x 1.6093 x 10³ = Metres (m)
x 1.6093 = Kilometres (km)
x 5280 = Feet (ft)
x 1760 = Yards (yd)

MILES PER HOUR – mph
x 44.70 = Centimetres per second (cm/s)
x 1.6093 = Kilometres per hour (km/h)
x 26.82 = Metres per minute (m/min)
x 88 = Feet per minute (ft/min)
x 1.4667 = Feet per second (ft/s)

MILES PER MINUTE – mi/min
x 1.6093 = Kilometres per minute (km/min)
x 2682 = Centimetres per second (cm/s)
x 88 = Feet per second (ft/s)
x 60 = Miles per hour (mph)

MINUTES, ANGULAR – (′)
x 2.909 x 10⁻⁴ = Radians (rad)

NEWTONS – N
x 0.10197 = Kilograms-force (kgf)
x 0.2248 = Pounds-force (lbf)

POUNDS-FORCE – lbf av.
x 4.448 = Newton (N)
x 0.4536 = Kilograms-force (kgf)

POUNDS – lb av.
x 453.6 = Grams (g)

RADIANS – rad
x 57.30 = Degrees (°) angular

TONS-MASS – tonm long
x 1016 = Kilograms (kg)
x 2240 = Pounds (lb) av.
x 1.1200 = Tons (ton) short

TONS- ton short
x 907.2 = Kilograms (kg)
x 0.9072 = Metric tons (t)
x 2000 = Pounds (lb) av.
x 0.8929 = Tons (ton) long

DRIVES, LLC

STANDARD TERMS AND CONDITIONS OF SALE

ANY PURCHASE ORDER PURSUANT TO ANY QUOTATION SHALL NOT RESULT IN A CONTRACT UNTIL IT IS APPROVED AND ACCEPTED BY THE FULTON, ILLINOIS, OFFICE OF DRIVES, LLC ("SELLER").

1. CONDITIONS OF SALE

All orders shall be subject to these terms and conditions of sale; no terms and conditions may be added to, modified, superseded or otherwise altered except by a written instrument signed by an authorized executive of Seller. Failure of Seller to object to any terms or conditions that may be contained in any acknowledgment, invoice or other form from Buyer shall not be construed as a waiver of these conditions nor an acceptance of any such provision.

2. TAXES

The amount of the present or future sales, revenue, excise, occupation, use or other applicable taxes shall be added to the purchase price and shall be paid or reimbursed by Buyer.

3. DELIVERY

Delivery terms are F.O.B., Seller's factory or warehouse unless otherwise specifically provided in Seller's acknowledgment. Buyer shall assume all risk of loss or damage upon delivery to the carrier at the point of shipment. Any reference by Seller to a date of delivery shall be deemed to refer to the approximate date of shipment from factory and is a careful estimate of the approximate date of delivery, not a guaranty of a particular day of delivery. Seller shall not be liable for any delay in delivery. Without limiting the generality of the preceding sentence, Seller shall not be liable for failure to deliver the goods specified where such failure to deliver is due to contingencies beyond Seller's control, including strikes, lockouts and differences with workmen, when these events affect either Seller or its suppliers of material, or individuals or corporations upon whom Seller is dependent for transportation of supplies and delivery of its manufactured goods, and also including war, insurrection, embargoes, fire, flood, injuries to works when the goods or raw materials are manufactured, government regulations of fuel, transportation, labor or production, and inability for whatever reason to secure necessary labor, materials or supplies. In case of curtailment of production for any of the above reasons, Seller reserves the right to deliver pro rata the goods which it produces to all customers from whom it may have orders, and to invoice Buyer for partial shipment accordingly, and Buyer shall make payment on the purchase price in amounts as so invoiced. When a shipment is deferred at Buyer's request beyond the date of completion, the order will be subject to invoicing, payment and storage charges from date of completion.

4. TITLE

Title to all products sold by Seller to Buyer and all replacements, substitutions, repairs and additions thereto, and all proceeds of the foregoing, shall remain in Seller until full payment of the purchase price and all other amounts due Seller hereunder has been made. Buyer shall indemnify and hold Seller harmless from and against all claims of parties claiming under or through Buyer with respect to the products.

5. CREDIT APPROVAL

Shipments, deliveries and performance of work shall at all times be subject to the requirements of the Credit Department of Seller, including the requirement that Buyer may be required to pay part or all of the purchase price in advance.

6. TERMS OF PAYMENT

Subject to the provisions of "Credit Approval" above, terms of payment shall be 1% 10, NET 30 days and shall be effective from date of invoice.

7. QUOTATIONS

Prices stated on Seller's most recent published price list are in effect on the date listed and are subject to change by Seller at any time. Prices are for Seller's standard packaging specifications. All written quotations automatically expire thirty (30) calendar days from the date issued and are subject to termination by notice within that period. Verbal quotations expire the same day they are made. Quotations shall only be deemed to be binding if they specifically identify product or component part and list the actual quantities involved. All stenographic and clerical errors are subject to correction.

8. SHIPPING WEIGHTS AND DIMENSIONS

Published weights are careful estimates but are not guaranteed.

9. CANCELLATION

Orders accepted by Seller are subject to cancellation by Buyer only upon the consent of Seller. Upon such cancellation and consent, Seller shall cease work and hold for Buyer all completed and partially completed articles and work in process and Buyer shall pay Seller for all work and materials that have been committed and/or identified to the order plus a cancellation charge as prescribed by Seller, in addition to Seller's reasonably projected profit on the entire contract. Changes in design or construction requested by Buyer are Buyer's expense.

10. INSTALLATION

Seller's products shall be installed by Buyer at the expense of Buyer.

11. INSURANCE

After delivery to the carrier, Buyer assumes the risk of all loss or damage resulting from any cause. Buyer shall provide and maintain insurance protecting each party against loss or damage.

12. CLAIMS

Seller will not consider claims for shortage or error unless made promptly upon receipt of products.

13. RETURNED GOODS

No goods will be accepted for return without prior approval. Freight must be prepaid on all returned goods. A minimum 25% handling and restocking charge will be applied to all authorized returns. Special products or made-to-order products are not returnable.

14. MINIMUM ORDER REQUIREMENTS

A minimum charge of \$100 net per order applies to all orders. Minimum run quantity for made-to-order assemblies is 250 feet per order or a setup fee of \$50 may apply.

15. ILLINOIS LAW

The validity, interpretation and performance of any agreement shall be governed by the laws of the State of Illinois (including without limitation the Uniform Commercial Code). Any agreement shall be deemed to have been made in the City of Fulton, Whiteside County, Illinois, and the parties shall submit to the jurisdiction of the Circuit Court of the Fourteenth Judicial Circuit, Whiteside County, Illinois, for the purpose of adjudication of all their respective rights and liabilities.

16. DEFAULT

In the case of default or breach of Buyer in the performance of any or all of the provisions of any agreement, Seller may cancel any outstanding order(s) from Buyer, and declare all obligations immediately due and payable, and Buyer shall, in addition, be liable for Seller's expenses incurred in exercising any remedies available to it, including reasonable attorney's fees and legal expenses. All unpaid obligations shall bear interest at the highest lawful rate from the date they become due and payable.

17. WARRANTY

Seller warrants that the products of Seller's manufacture which are delivered by Seller hereunder shall be free from defects in material and workmanship during the warranty period. The warranty period for all such products is one year, which shall begin from date of shipment. If during the warranty period any such products are proven to be defective upon Seller's inspection, Seller's sole obligation is to repair any such products, or, at Seller's option, to supply a replacement product or component part. F.O.B., Seller's factory or warehouse upon receipt of the defective product or component part at Seller's factory, transportation charges prepaid. Seller shall not be responsible for charges for correcting defects, nor will Seller accept returns of allegedly defective products unless Seller is first notified in writing and the return is authorized by Seller in writing. Seller shall be released from all obligations under this warranty as to any products which have been subject to neglect, accident, misuse or improper operation or care, and any products on which repairs or modifications are made by persons other than Seller.

THE ABOVE WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESS OR IMPLIED. ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED BY SELLER AND EXCLUDED FROM ANY AGREEMENT.

18. LIMIT OF LIABILITY

In no event shall Seller be responsible or liable for penalty clauses of any description, or for indemnification of Buyer or others for costs, damages or expenses whether based in tort or contract, or for indirect or consequential damages under any circumstances. THE REMEDIES SET FORTH HEREIN ARE EXCLUSIVE. SELLER EXPRESSLY EXCLUDES, DENIES AND DISCLAIMS ANY LIABILITY FOR ANY OTHER WARRANTIES OTHER THAN THOSE SPECIFIED IN SECTION 17 ABOVE, INCLUDING BUT NOT LIMITED TO ALL CLAIMS FOR BREACH OF CONTRACT OR WARRANTY, NEGLIGENCE OR FOR ANY LOSS OR DAMAGE ARISING OUT OF, CONNECTED WITH, OR RESULTING DIRECTLY OR INDIRECTLY FROM THE CONTRACT BETWEEN BUYER AND SELLER OR ITS SUBJECT MATTER.

19. NOTICE OF BREACH

Buyer must give Seller written notice of each and every alleged breach of any of the warranties provided herein no later than sixty (60) days after Buyer has discovered or, by the exercise of reasonable diligence, should have discovered, such alleged breach. Failure to give timely written notice of an alleged breach of warranty as provided herein shall be deemed a complete waiver by Buyer of any claim for any such breach. Any written notice of breach shall be deemed to be notice only with respect to the product or component part addressed by the notice and only with respect to the alleged problem specified therein.

20. TIME TO BRING SUIT

Any action against Seller arising out of, in connection with, or resulting directly or indirectly from this Agreement or the products sold pursuant hereto must be filed within one year after the date of delivery to Buyer's F.O.B. point, regardless of Buyer's knowledge or lack of knowledge of the alleged breach; failure to bring such action within said period shall be deemed to constitute a waiver by Buyer of any such claim.

21. NON-ASSIGNABLE

Neither this Agreement nor any part hereof is assignable by Buyer without the prior written consent of Seller.

22. ENTIRE AGREEMENT

This Agreement and Seller's price lists (as revised from time to time by Seller) shall constitute the entire Agreement between Buyer and Seller irrespective of inconsistent or additional terms and conditions in Buyer's purchase orders or other documents submitted to Seller, whether or not the same have been executed or otherwise accepted by Seller. Except as specifically set forth herein all other agreements, proposals and understandings with respect to the subject matter hereof are merged herein, and there are no promises, terms, conditions or obligations with respect thereto other than those contained herein and in Seller's currently published price lists (as revised from time to time by Seller). Any and all representations, promises, warranties or statements by Seller's agents that differ in any way from the terms and conditions of this Agreement shall be of no force or effect.

Drives, LLC

Since 1959, Drives has become a leading manufacturer of ANSI Precision Roller Chain, Pintle Chain, Agricultural Conveyor Chain, Engineering Class Chain and Auger products. The company's markets include North and South America, Europe, Asia, Africa and Australia.

Today Drives employs approximately 400+ team members with manufacturing facilities exceeding 400,000 sq. ft. Our company's philosophy is shared below and expresses our objectives.

Company Philosophy

Each employee in respecting his own dignity, must respect the rights and privileges of his fellow employees, including the necessity of Drives to achieve it's fair and reasonable objectives.

Citizenship

We will conduct our business in a professional and ethical manner with high integrity.

Golden Rule

We believe we must treat others as we would like to be treated. This applies to employees, shareholders, customers, and suppliers.

People

People are our most important asset. We believe that by building our people we will build our company. We will promote teamwork and active participation in decision-making.

Be the Best

We believe we must strive each day to be the best in quality and service. Keep it simple. Strive each day to bring "what is" closer to "what it should be".

Profit

Profit is a measurement of accomplishment.

Communication

We believe effective communication is important to all employees, customers, and suppliers. We support the open door and open floor policy.

BE THE BEST

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Keep it simple.

Strive each day to bring "what is" closer to "what it should be".



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Drives registration to API Spec Q1 combined with ISO 9001 is a world class quality system. It means if you meet these requirements, you've shown you live up to the expectations of one of the most demanding industries in the world – the oil and natural gas industry.

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*People are our most
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we will build our company.*

*We promote teamwork and active
participation in decision-making.*

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 Denver, Colorado
 Lakeland, Florida
 Sparks, Nevada
 Crossville, Tennessee
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 Fulton, Illinois 61252
 Phone 1-800-435-0782
 Fax 1-815-589-4420

Sales Offices

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 Dallas • Davenport • Denver
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