INVERTED TOOTH

Chains and Sprockets

For Power Transmission

Ramsey Products
CORPORATION

TABLE OF CONTENTS

Silent Chain Fundamentals	4
Applications	5
RPV	6
RP	9
SC 3/16”	12
Sprockets	13
RPV Sprockets	14
RP Sprockets	17
Sprocket Diameters	19
Ordering Information	20
Design Suggestions	20
Engineering Information	21
Chain Connection	21
Drive Selection	22
Formulas	23
Service Factors	24
Lubrication	25
Installation Guidelines	26

Ramsey Products specializes in the design, manufacture, and application of silent chain drives, also known as inverted tooth or toothed chain drives. For more than 100 years, this has been our focus, and today we remain committed to providing our customers with the world's widest range of top quality silent chain products.

Because we specialize in silent chain, we understand how important it is to choose the right chain and sprockets for each application. Whether selecting components for a new application, replacing an existing chain, or custom designing a chain, our goal is to provide our customers with the most practical and cost effective solutions. If a job can be done with silent chain, we will help find the best chain for the job, at the lowest possible cost.

Many companies sell silent chain but no one offers the product range, quality, and support provided by Ramsey. In addition to our extensive standard product line, we offer replacements for most competitors' chains, as well as custom designed chains. We also provide free consultation and drive selection assistance through our staff of experienced designers. Whether your requirement is a single chain, or a much larger volume, our sales and engineering staff has the experience to assist you. With warehouses and representatives around the world, we welcome the opportunity to serve you.

SILENT CHAIN PRODUCTS FOR POWER TRANSMISSION

ABOUT THIS CATALOG

Ramsey manufactures silent chain product lines for general power transmission. Each has unique features and advantages:

RPV SERIES

RPV chain and sprockets are high performance products offering maximum speed and power handling capability. RPV is usually the choice for challenging applications, particularly where space is limited and power or speed requirements exceed the capacity of other products.

RP SERIES

RP or RamPower silent chain provides approximately two times the power capacity of standard silent chain. RP chain operates on sprockets having an ASME Standard tooth profile and is well suited for new or replacement applications.

SC 3/16" CHAINS

Constructed from hardened carbon steel or corrosion resistant, 304 stainless steel, Ramsey 3/16" pitch chain and sprockets are designed to bring smooth, quiet operation to fractional horsepower applications.

SPROCKETS

Ramsey offers a full range of stock and made to order sprockets in pitches ranging from 3/16" pitch to 2 1/4" pitch. Stock sprockets are available with minimum plain bores or taper lock bushings. For an additional charge they can be machined with a finished bore and keyway. Made to order sprockets provide an almost unlimited range of options and are a large part of our daily production. Ramsey also supplies sprockets to replace most competitors' products.

SILENT CHAIN FUNDAMENTALS

WHY SILENT CHAIN?

Silent chain offers today's drive designer unique advantages and options for transmitting power smoothly, efficiently, and economically. Capable of transmitting loads and speeds that exceed the capacity of all other chains and belts, silent chain provides proven technology that is found in applications throughout modern industry. Silent chain also produces very little vibration or noise, and operates at efficiencies as high as 99%. Add to these features a wide range of standard chain and sprocket sizes and the result is an extremely flexible and powerful system for power transmission.

Silent Chain Drives Compared With Belts

1. Significantly higher speeds and power capacity
2. Greater efficiency
3. Larger ratios possible
4. No slippage
5. Withstands heavier overloads
6. Higher drive ratios at short center distances
7. Less affected by temperature or humidity
8. Lower bearing loads
9. Detachable and therefore more easily installed
10. Effective in oil filled gear boxes

Silent Chain Drives Compared With Roller Chain

1. Significantly higher speeds and power capacity
2. Much quieter
3. Transmits power more smoothly, less vibration
4. Lower impact load during sprocket engagement
5. Higher efficiency (as high as 99%)
6. Longer sprocket life

Silent Chain Drives Compared With Gears

1. Quieter than spur gears
2. Center distance much less restricted
3. Shaft parallelism tolerances are broader
4. Lower bearing loads
5. No end thrust as with helical gears
6. Greater elasticity to absorb shock

CHAIN CONSTRUCTION

Ramsey silent chains are made from hardened alloy steel components consisting of flat tooth shaped driving links, guide links and pins that form the chain joint. The driving links engage sprocket teeth much the way a rack and pinion mesh. Guide links serve to retain the chain on sprockets and pins hold the joint together and allow the chain to flex.

DRIVING LINKS

Driving links, also known as plain links, engage sprocket teeth with less sliding and less impact than other types of chain. This results in quieter operation and longer sprocket life. Reduced impact loading also allows for higher operating speeds.

GUIDE LINKS

Guide links maintain proper tracking of the chain on sprockets. They can be positioned on the outer edges of the chain in side guide or nearer to the middle of the chain with center guide. Wider chains will often have two rows of center guide links, commonly referred to as two center guide.

PINS AND JOINTS

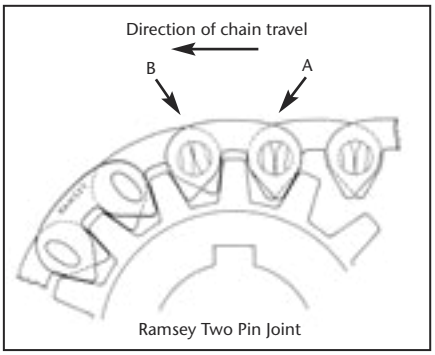
RPV and RP chains use highly specialized two-pin joints that have been developed to maximize chain load and speed capacity, while reducing friction and wear. RPV and RP use case hardened "crescent" shaped pins for maximum wear resistance. The one exception is the 3/16" Pitch chain, which due to relatively light loading, is produced with a single pin joint.

RPV and RP chain joint with "crescent" shaped pins

Many of the products listed in this catalog are successfully employed in applications other than power transmission. For additional information regarding other silent chain applications, such as conveying, or for details on specialty silent chain products, please call Ramsey or visit our website: www.ramseychain.com.

HOW TWO PIN JOINTS WORK

This figure shows how the Ramsey two pin joint works. As a chain engages the sprocket, and moves from position A to position B, the convex surfaced pins roll upon one another. This rolling action eliminates the sliding friction and galling that occurs in other types of chain. Pin action also minimizes the effects of chordal action by slightly increasing chain pitch and internally moving the pitch point up to coincide with the sprockets pitch circle. As a result, the chain smoothly and efficiently engages the sprocket, very nearly tangent to the pitch circle. The smoothness and lack of vibration results in a quiet drive with higher load and speed capability.

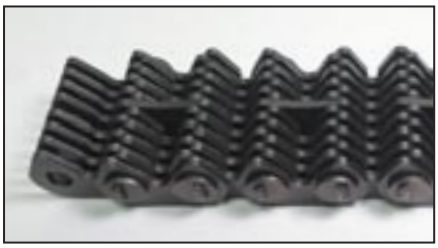


Ramsey Two Pin Joint

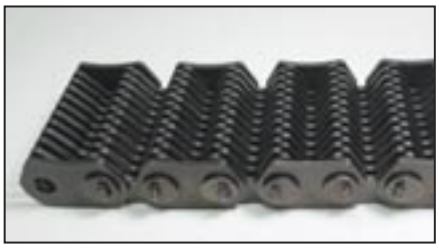
CHAIN GUIDE TYPE

Chain guide type describes the placement of guide links within the chain. The most common guide types are, one center guide, two center guide, and side guide.

CENTER GUIDE



SIDE GUIDE



MULTIGUIDE

APPLICATIONS

FOOD PROCESSING

MEDICAL EQUIPMENT

EXTRUSION

CONVEYING

GLASS MANUFACTURING

HEAVY EQUIPMENT

METAL FABRICATION

SPECIALTY VEHICLES

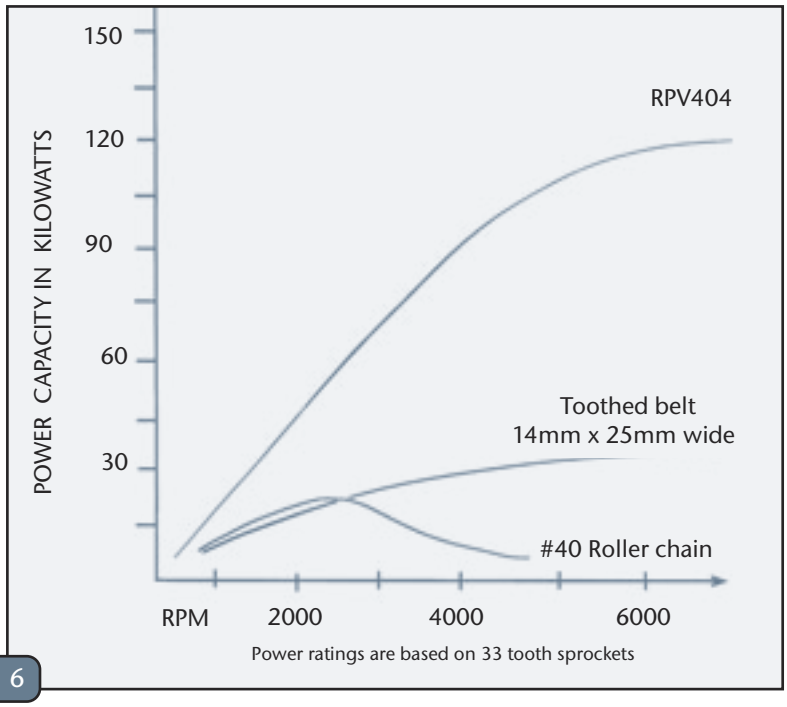
RPV HIGH PERFORMANCE SILENT CHAIN

RPV SERIES CHAIN

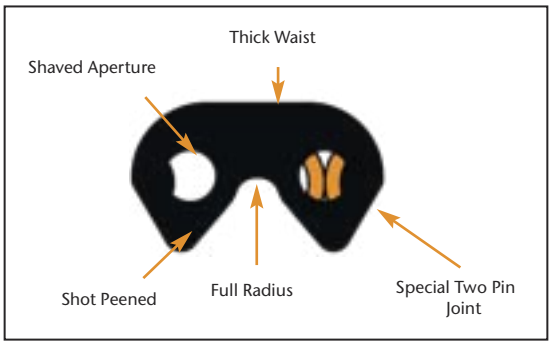
RPV is high performance inverted tooth chain, specifically designed to meet or exceed the capability of all other high performance chains. RPV is capable of speeds in excess of 35 m/s and loads exceeding 2200 kw.

RPV's strength and load capacity comes from improved link and sprocket designs. Links are designed to minimize stress concentrations and to increase the amount of steel in the line of chain pull. Innovative stamping methods maximize the amount of load bearing surface in each link and greatly reduce the rate of chain elongation during operation. All links are shot peened to improve fatigue strength and produce a uniform, high quality finish.

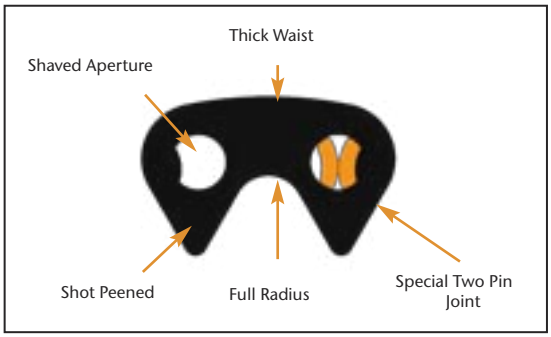
THE RPV ADVANTAGE

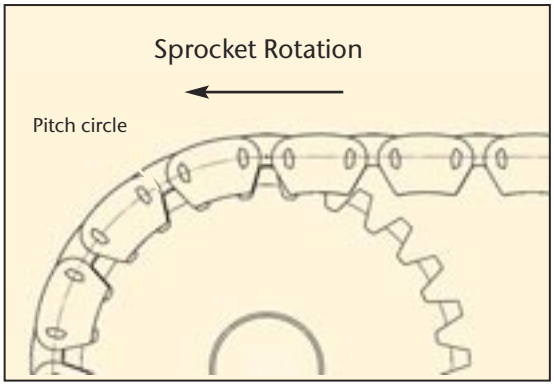


Type 115



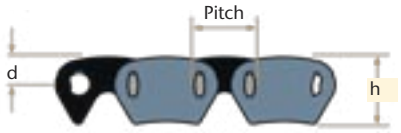
Type 139





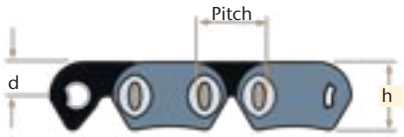
RPV SIDE GUIDE ASSEMBLIES

3/8” through 1” Pitch



Type 139

1½” and 2” Pitch



Type 115

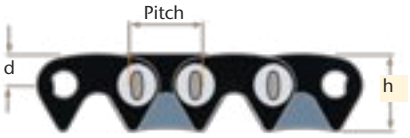
Pitch	Part Number	Nominal Width	Width Between Guides WBG	Width Over Heads WH	Width Over Links WL	Width At Connector WC	Weight (kg/m)	Breaking Load (kN)	h	d	t
3/8"	RPV303	19	17.5	22.9	20.6	26.2	1.0	27	10.9	4.3	1.5
	RPV304	25	23.6	29.2	26.7	32.5	1.3	36			
	RPV306	38	36.3	41.9	39.4	45.5	1.9	53			
	RPV308	51	49.0	54.9	52.1	58.2	2.7	71			
	RPV312	76	74.4	80.3	77.5	83.6	3.9	107			
1/2"	RPV404	25	23.6	29.2	26.7	32.5	1.8	49	14.5	5.8	1.5
	RPV406	38	36.3	41.9	39.4	45.2	2.7	73			
	RPV408	51	49.0	54.9	52.1	58.2	3.6	98			
	RPV412	76	74.4	80.3	77.5	83.6	5.2	147			
	RPV416	102	99.8	105.7	102.9	109.0	7.0	196			
3/4”	RPV606	38	36.3	45.0	41.4	48.5	4.6	110	21.6	139 - 8.5 115 - 10.4	2.0
	RPV608	51	49.0	58.7	54.4	62.2	5.5	147			
	RPV612	76	74.4	84.1	79.8	87.6	7.9	220			
	RPV616	102	99.8	109.5	105.2	113.0	10.4	294			
	RPV620	127	125.2	134.9	130.6	138.4	12.9	367			
1"	RPV808	51	48.0	61.0	56.6	63.8	7.4	196	29.0	11.4	3.0
	RPV812	76	73.4	86.4	82.0	89.2	10.7	294			
	RPV816	102	97.5	111.8	107.4	114.6	14.1	391			
	RPV820	127	124.2	137.2	132.8	140.0	17.4	489			
	RPV824	152	149.6	162.6	158.2	165.4	21.0	587			
1-1/2"	RPV1212	76	64.3	84.3	70.4	85.1	15.5	440	41.9	20.6	3.0
	RPV1216	102	89.7	109.7	95.8	110.5	20.5	587			
	RPV1220	127	115.1	135.1	121.2	135.9	25.7	734			
	RPV1224	152	140.5	160.5	146.6	161.3	30.8	881			
2"	RPV1616	102	85.5	111.8	93.6	112.3	27.4	783	55.6	27.4	4.1
	RPV1620	127	110.9	137.2	119.0	137.7	34.2	979			
	RPV1624	152	136.3	162.6	114.4	163.1	41.1	1174			
	RPV1632	203	187.1	213.4	195.2	213.9	54.8	1566			

Other chain widths are available
Unless indicated, all dimensions are in millimeters
3/4” and 1” pitch is also available in Type 115 link style

RPV CENTER GUIDE ASSEMBLIES

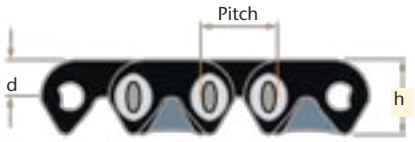
3/8” and 1/2” Pitch

Type 139



3/4” through 2” Pitch

Type 115



Pitch	Part Number	Nominal Width	Width Over Heads WH	Width Over Links WL	Width At Connector WC	Weight (kg/m)	Breaking Load (kN)	h	d	t
3/8"	RPV3-025	25	32.5	27.2	33.8	1.5	36	10.9	4.3	1.5
	RPV3-030	30	38.6	33.5	40.1	1.8	43			
	RPV3-040	41	45.2	40.1	46.7	2.1	57			
	RPV3-050	51	57.7	52.6	59.7	2.8	71			
	RPV3-065	66	70.1	65.0	72.1	3.4	93			
1/2"	RPV4-325	25	33.0	27.7	35.6	1.9	49	14.5	5.8	1.5
	RPV4-330	30	39.1	34.0	41.4	2.4	59			
	RPV4-340	41	46.2	40.6	47.8	2.8	78			
	RPV4-350	51	58.7	53.1	60.2	3.7	98			
	RPV4-365	66	70.6	66.0	72.4	4.5	127			
	RPV4-375	76	84.6	79.2	86.4	5.4	147			
	RPV4-3100	99	109.2	105.2	111.3	7.0	191			
3/4"	RPV6-535	36	43.2	35.1	46.5	3.9	103	21.1	139 - 8.5 115 - 10.4	2.0
	RPV6-540	41	50.0	43.7	53.6	4.8	117			
	RPV6-550	51	58.7	51.6	62.0	5.5	147			
	RPV6-565	66	75.7	68.1	78.7	7.1	191			
	RPV6-585	86	92.7	84.6	94.2	8.9	250			
	RPV6-5100	99	109.2	101.1	111.5	10.6	286			
1"	RPV8-640	41	51.1	41.7	54.1	6.0	157	27.9	13.7	3.0
	RPV8-650	51	61.7	54.1	65.3	7.6	196			
	RPV8-665	66	74.7	67.1	78.0	9.4	254			
	RPV8-675	76	87.6	79.5	90.7	11.0	294			
	RPV8-6100	99	112.5	105.2	115.8	14.4	382			
	RPV8-6125	124	138.2	130.6	141.5	17.9	479			
	RPV8-6150	150	163.6	156.2	166.9	21.3	577			

Other chain widths are available
Unless indicated, all dimensions are in millimeters
3/4” and 1” pitch is also available in Type 139 link style

RP RAMPOWER SILENT CHAIN

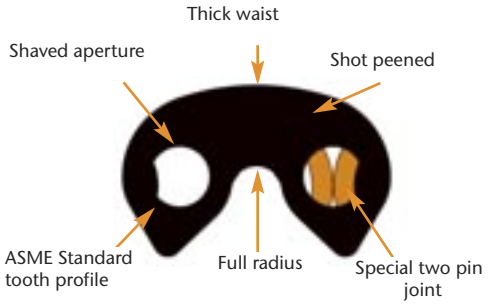
RP SERIES CHAIN

RP or RamPower series silent chain was designed to operate on sprockets manufactured with an ASME Standard tooth profile. Available exclusively through Ramsey, RamPower offers twice the power capacity of SC series chains and speeds up to 35 m/s. RamPower has been successfully employed in applications transmitting up to 1850 kw and is often preferred where high loads and speeds must be accommodated in a small amount of space.

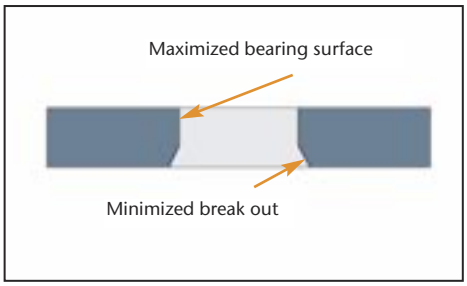
The increased load carrying capacity of RamPower is a result of improved link and pin designs. Working with independent laboratories, Ramsey engineers re-designed the standard SC link shape to reduce stress concentrations, improve fatigue life, and increase link tensile strength. Innovative stamping methods were also employed to maximize the amount of bearing surface area in each link. The increased bearing area produces less stress in the chain joint and greatly reduces the rate of chain elongation during operation. All chain links are shot peened to improve fatigue resistance and produce a uniform finish.

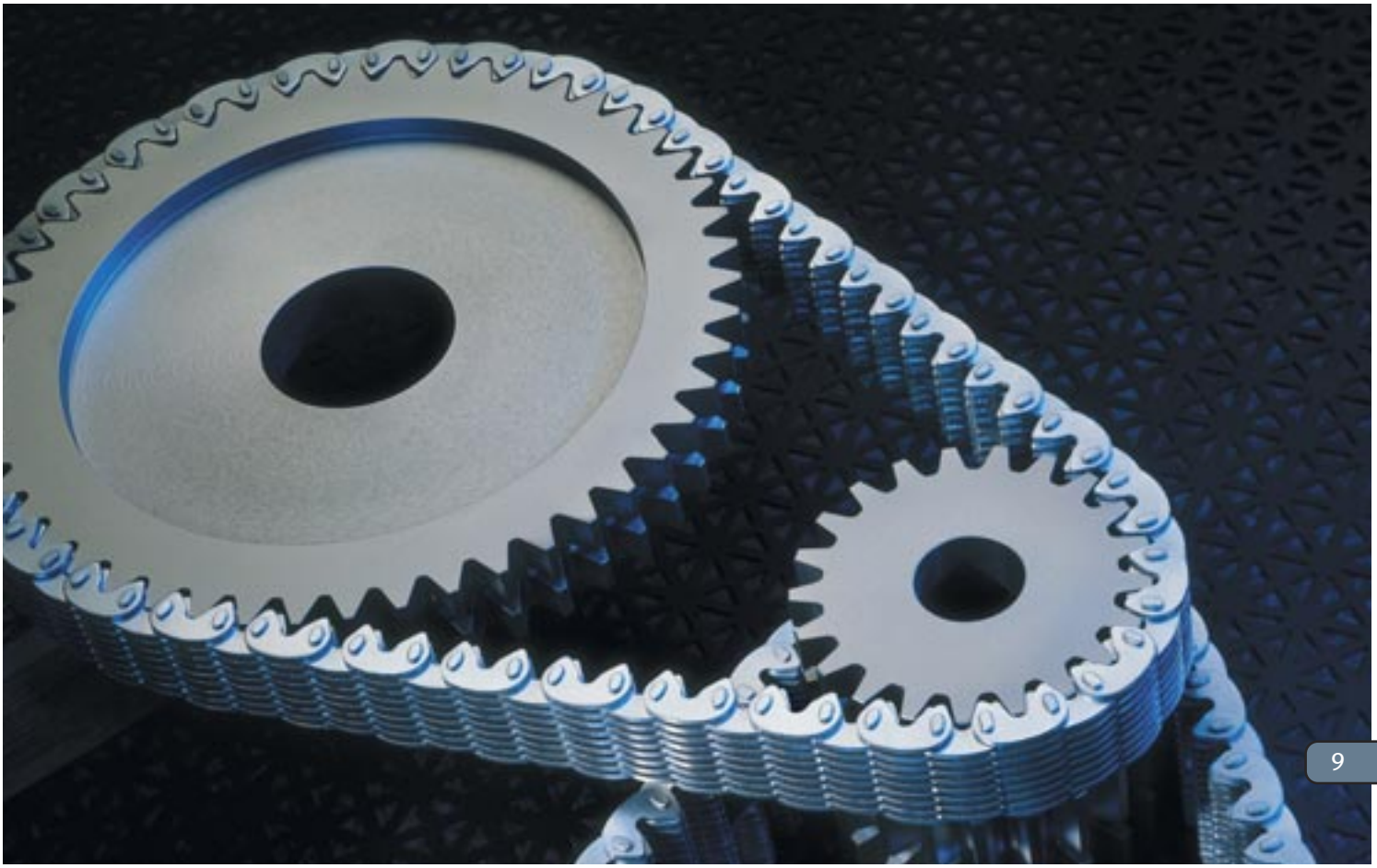
In most applications RamPower will experience very little initial elongation, making it well suited for fixed center drive applications. We recommend RamPower for all new chain drives where the customer desires to use sprockets with the ASME standard tooth profile. It is also well suited for upgrading existing SC chain applications when improved performance is desired.

RamPower is available in center guide as well as side guide assemblies.



Cross section of an RP link aperture

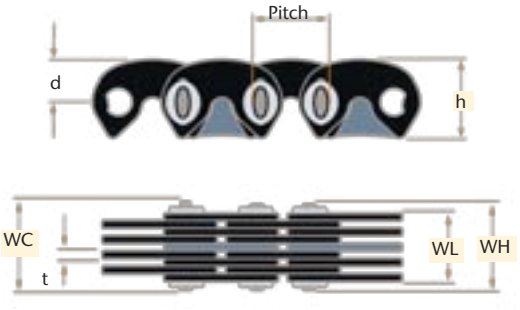




RP CENTER GUIDE ASSEMBLIES

3/8” and 1/2” Pitch

5/8” through 2” Pitch



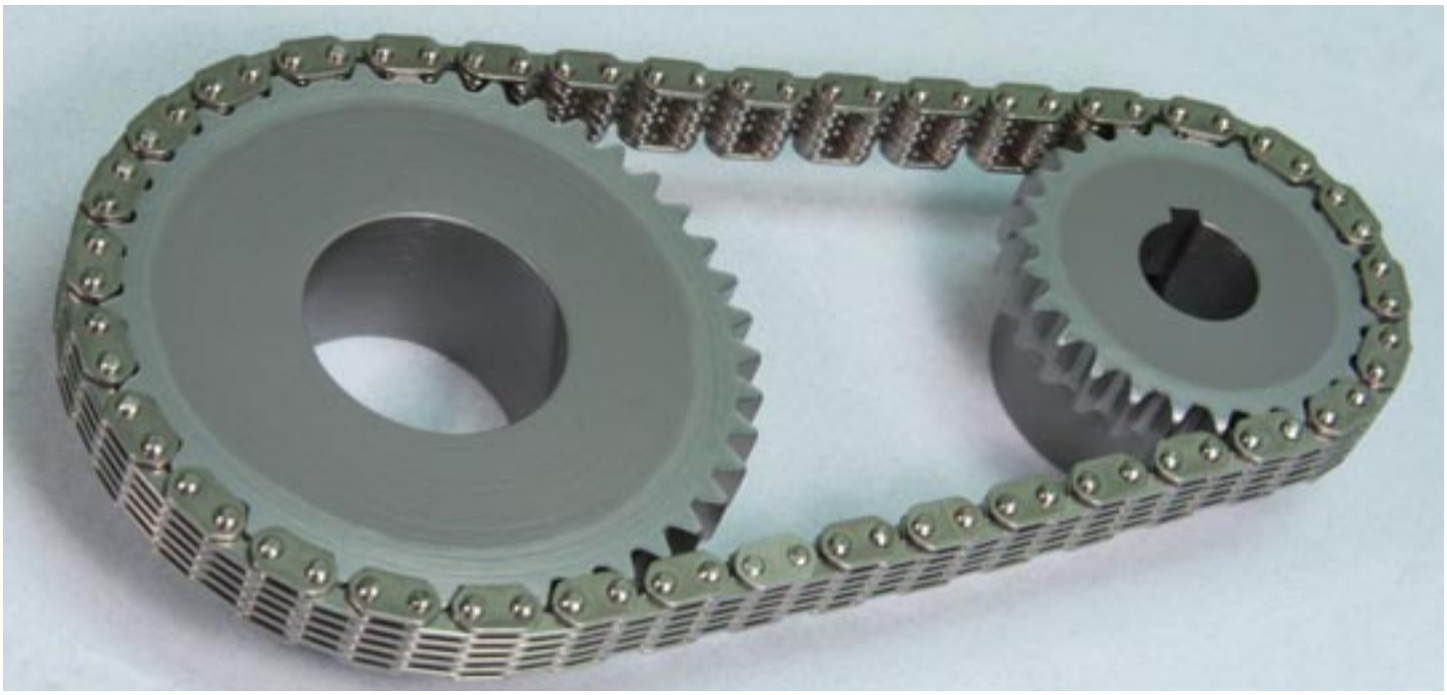
Pitch	Part Number	Nominal Width	Guide Type	Width Over Heads WH	Width Over Links WL	Width At Connector WC	Weight (kg/m)	Breaking Load (kN)	h	d	t
3/8"	RP302	13	CG	16.3	13.5	17.5	0.7	17	10.7	5.6	1.5
	RP303	19	CG	22.6	19.6	23.9	1.0	25			
	RP304	25	CG	29.0	25.7	30.5	1.3	33			
	RP305	32	CG	35.3	31.8	36.8	1.6	42			
	RP306	38	CG	41.7	37.6	43.2	2.1	50			
	RP308	51	CG	54.4	49.8	55.9	2.5	67			
	RP310	64	CG	67.1	62.0	68.8	3.3	83			
	RP312	76	2CG	79.2	73.9	81.5	3.7	100			
	RP316	102	2CG	104.6	98.0	107.2	5.1	133			
1/2"	RP403	19	CG	23.9	19.8	25.4	1.2	33	14.2	7.6	1.5
	RP404	25	CG	30.0	25.9	32.3	1.6	44			
	RP405	32	CG	36.3	32.3	38.1	2.1	56			
	RP406	38	CG	42.7	38.4	44.5	2.4	67			
	RP408	51	CG	55.4	50.5	57.2	3.3	89			
	RP410	64	CG	68.1	63.0	70.1	4.0	111			
	RP412	76	CG	81.8	75.2	82.8	4.9	133			
	RP414	89	CG	93.7	87.6	95.5	5.7	156			
	RP416	102	2CG	106.4	99.8	108.2	6.5	178			
	RP420	127	2CG	132.1	124.5	133.9	8.2	222			
	RP424	152	2CG	156.5	148.8	158.8	9.7	267			
5/8"	RP504	25	CG	33.5	25.7	35.6	2.7	56	17.8	9.4	2.0
	RP506	38	CG	46.2	37.6	48.3	3.4	83			
	RP508	51	CG	58.4	49.5	60.5	4.5	111			
	RP510	64	CG	70.1	61.5	72.1	4.6	139			
	RP512	76	CG	82.6	73.2	84.6	7.1	167			
	RP514	89	CG	94.7	85.1	96.8	7.9	195			
	RP516	102	CG	107.2	97.0	109.2	8.9	222			
	RP520	127	2CG	131.6	120.7	133.6	11.3	278			
	RP524	152	2CG	157.0	144.5	159.0	13.4	334			

Other chain widths are available
Unless indicated, all dimensions are in millimeters

Pitch	Part Number	Nominal Width	Guide Type	Width Over Heads WH	Width Over Links WL	Width At Connector WC	Weight (kg/m)	Breaking Load (kN)	h	d	t
3/4"	RP604	25	CG	33.5	25.7	35.6	2.7	66.7	21.3	10.9	2.0
	RP606	38	CG	46.2	37.6	48.3	3.9	100			
	RP608	51	CG	58.4	49.5	60.5	5.2	133			
	RP610	64	CG	71.1	61.5	73.2	6.5	167			
	RP611	70	CG	75.2	65.3	77.2	7.1	183			
	RP612	76	CG	81.5	73.2	83.6	7.9	200			
	RP616	102	CG	106.9	97.0	109.0	10.4	267			
	RP620	127	CG	131.6	120.7	133.6	13.1	334			
	RP624	152	CG	159.0	144.5	161.0	15.6	400			
	RP628	178	2CG	184.4	168.4	186.4	18.3	467			
	RP632	203	2CG	207.0	192.0	209.0	20.8	534			
1"	RP808	51	CG	57.4	45.5	60.2	6.2	178	28.4	15.2	3.0
	RP812	76	CG	81.0	69.3	85.1	9.4	267			
	RP816	102	CG	107.4	93.0	110.2	12.5	356			
	RP820	127	CG	131.6	116.8	134.4	15.6	445			
	RP824	152	CG	156.0	140.5	159.8	18.7	534			
	RP828	178	2CG	188.7	170.2	191.5	21.9	623			
	RP832	203	2CG	213.6	196.1	216.4	25.0	712			
	RP836	229	2CG	234.7	217.9	237.5	28.1	801			
	RP840	254	2CG	263.7	241.6	266.4	31.2	890			
	RP848	305	2CG	316.0	293.1	319.0	37.5	1068			
1-1/2"	RP1212	76	CG	84.3	72.9	84.3	14.0	400	42.7	22.9	3.0
	RP1216	102	CG	108.7	98.3	108.7	18.3	534			
	RP1220	127	CG	131.6	121.2	131.6	22.9	667			
	RP1224	152	CG	159.5	149.1	159.5	27.5	801			
	RP1228	178	CG	184.9	175.0	184.9	32.0	934			
	RP1232	203	2CG	210.6	200.7	210.6	36.6	1068			
	RP1236	229	2CG	236.7	226.6	236.7	39.1	1201			
	RP1240	254	2CG	264.7	254.0	264.7	45.8	1334			
2"	RP1616	102	CG	110.2	93.2	110.2	24.4	712	57.2	30.5	3.0
	RP1620	127	CG	135.6	117.3	135.6	30.5	890			
	RP1624	152	CG	161.0	141.2	161.0	36.6	1068			
	RP1628	178	CG	186.4	165.4	186.4	42.7	1245			
	RP1632	203	2CG	211.8	189.5	211.8	48.8	1423			
	RP1640	254	2CG	262.6	237.7	262.6	61.0	1779			
	RP1648	305	2CG	313.4	285.8	313.4	73.2	2135			
	RP1656	356	2CG	370.6	340.1	370.6	85.4	2491			
	RP1664	406	2CG	421.4	382.0	421.4	97.6	2847			

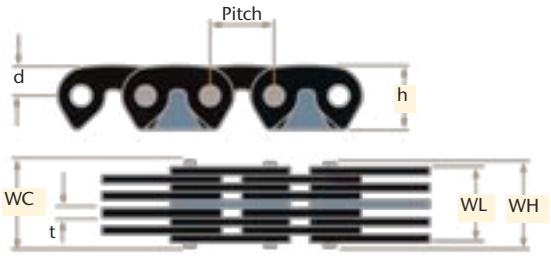
Other chain widths are available
Unless indicated, all dimensions are in millimeters

SC 3/16” PITCH CHAIN

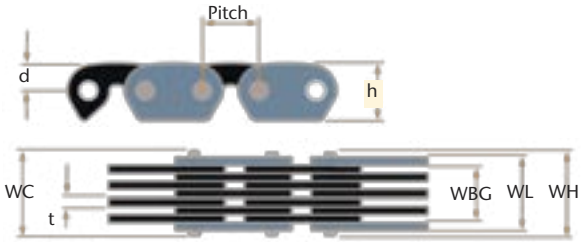


Ramsey 3/16" pitch chain is manufactured to ASME standards and will operate on standard sprockets. Chains can be made entirely of 304 stainless steel or carbon steel and are available in side guide or center guide assemblies, depending on chain width.

CENTER GUIDE



SIDE GUIDE



Pitch	Part Number	Nominal Width	Guide Type	Width Between Guides WBG	Width Over Heads WH	Width Over Links WL	Width At Connector WC	Weight (g/m)	h	d	t
3/16"	SC0305	4	SG	2.4	5.6	4.1	5.6	112	5.1	2.5	0.8
	SC0307	6	SG	4.0	6.9	5.6	6.9	149			
	SC0309	7	SG	5.6	8.6	7.1	8.6	177			
	SC0311	9	SG	7.1	10.2	8.9	10.2	223			
	SC0315	12	SG	10.3	13.5	12.2	13.5	298			
	SC0315A	12	CG		13.5	12.2	13.5	298			
	SC0319	15	CG		16.5	15.5	16.5	400			
	SC0319A	15	SG	13.5	16.5	15.5	16.5	400			
	SC0325	20	CG		21.8	20.6	21.8	502			
	SC0325A	20	SG	18.3	21.8	20.6	21.8	502			
	SC0331	20	CG		26.2	24.9	26.2	623			

SPROCKETS

Ramsey offers a full range of stock and made to order sprockets. Because they are produced in larger quantities, stock sprockets are often the most economical choice. Made to order sprockets provide a wider range of drive ratio options and are a large part of our daily production.

All sprockets can be fully machined to your specifications, or you can request they be supplied with an unfinished bore to allow secondary machining. Ramsey also supplies sprockets to replace most competitors' products.

MATERIALS

RPV and RP sprockets are typically made from carbon steel with sprocket teeth hardened to Rockwell hardness of Rc 50. Other materials are available subject to customer preference, sprocket size, cost, and availability.

PERFORMANCE GUIDELINES

In general, larger sprocket diameters will provide for smoother operation, less vibration, and longer life. We recommend using sprockets with at least 21 teeth whenever possible. Also, to ensure proper meshing of sprockets and chain we recommend they be purchased from the same source.

GUIDE TYPE

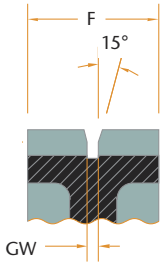
Similar to chains, sprockets can be grouped into two broad categories: center guide and side guide.

Center Guide. A groove machined in the center of the sprocket face accepts the chain's center guide link. Two grooves are machined for two center guide.

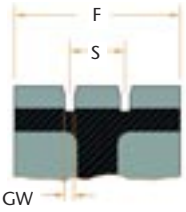
Side Guide. The sprocket fits between the chain's side guide plates.

SPROCKET FACE PROFILES

One Center Guide



Two Center Guide



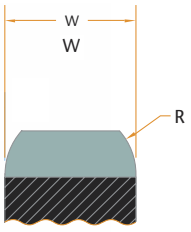
F = Face Width, the same as the nominal chain width

CENTER GUIDE GROOVE WIDTH AND GUIDE SPACING

Pitch	3/16"	3/8"	1/2"	5/8"	3/4"	1"	1-1/2"	2"
GW	1.3	3.2	3.2	4.0	4.0	6.4	6.4	6.4
S*		25.4	25.4	50.8	101.6	101.6	101.6	101.6

Table values in millimeters
*Only applies to sprockets for two center guide chains

Side Guide



W_{max} = WBG - X

WBG = Chain width between guides (See Chain data tables)

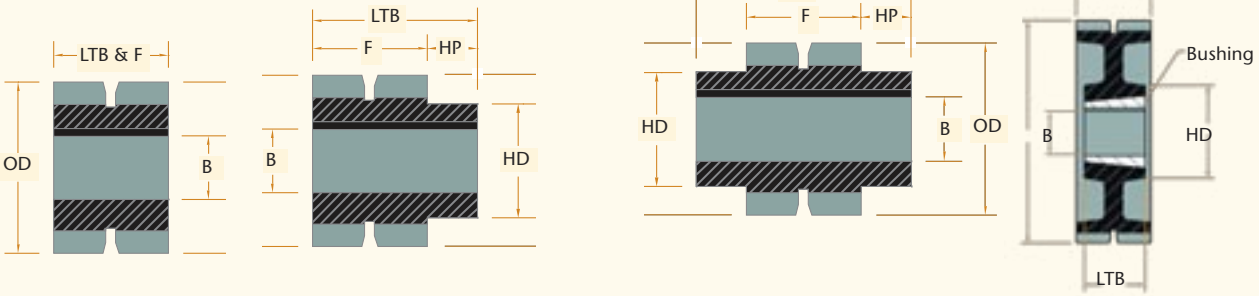
SPROCKET WIDTH AND CHAMFER DATA FOR RP AND SC SPROCKETS

Pitch	3/16"	3/8"	1/2"	5/8"	3/4"	1"	1-1/2"
X	0.5	1.6	1.6	1.6	1.6	3.2	3.2
R	0.8	4.8	6.4	7.9	9.5	12.7	19.1

Table values in millimeters
Consult Ramsey for RPV Sprocket Dimensions

RPV STANDARD SPROCKETS

HUB TYPES



Type A Type B Type C Type D

3/8" PITCH

19 mm Nominal Face Width-Type B Hub — Actual Face Width = 16.8 mm

Number of Teeth	Part Number	Pitch Diameter	Outside Diameter	Minimum Plain Bore	Maximum Bore	Hub Diameter	Length Thru Bore	Approximate Weight (kg)
19	RPV303-19	57.9	54.3	12.7	29.4	41.3	35.7	0.4
21	RPV303-21	63.9	60.5	12.7	32.5	47.6	35.7	0.5
23	RPV303-23	70.0	66.6	12.7	34.9	54.0	35.7	0.7
25	RPV303-25	76.0	72.8	19.1	41.3	60.3	35.7	0.8
27	RPV303-27	82.0	79.0	19.1	44.5	66.7	35.7	1.0
29	RPV303-29	88.1	85.2	19.1	46.0	71.4	35.7	1.2
31	RPV303-31	94.2	91.3	19.1	54.0	77.7	35.7	1.4
38	RPV303-38	115.3	112.6	19.1	73.0	100.0	35.7	2.3
42	RPV303-42	127.5	124.8	19.1	84.1	111.9	35.7	2.9
57	RPV303-57	172.9	170.5	31.8	114.3	152.4	35.7	5.3
76	RPV303-76	230.5	228.2	31.8	114.3	152.4	35.7	7.6

25 mm Nominal Face Width-Type B Hub — Actual Face Width = 22.9 mm

19	RPV304-19	57.9	54.3	12.7	29.4	41.3	41.3	0.5
21	RPV304-21	63.9	60.5	12.7	32.5	47.6	41.3	0.6
23	RPV304-23	70.0	66.6	12.7	34.9	54.0	41.3	0.8
25	RPV304-25	76.0	72.8	19.1	41.3	60.3	41.3	1.0
27	RPV304-27	82.0	79.0	19.1	44.5	66.7	41.3	1.2
29	RPV304-29	88.1	85.2	19.1	46.0	71.4	41.3	1.4
31	RPV304-31	94.2	91.3	19.1	54.0	77.7	41.3	1.6
38	RPV304-38	115.3	112.6	19.1	73.0	100.0	41.3	2.6
42	RPV304-42	127.5	124.8	19.1	84.1	111.9	41.3	3.4
57	RPV304-57	172.9	170.5	31.8	114.3	152.4	41.3	6.2
76	RPV304-76	230.5	228.2	31.8	114.3	152.4	41.3	9.3

Unless indicated, all dimensions in millimeters

3/8" PITCH

38 mm Nominal Face Width-Type B Hub Actual Face Width = 35.6 mm

Number of Teeth	Part Number	Pitch Diameter	Outside Diameter	Minimum Plain Bore	Maximum Bore	Hub Diameter	Length Thru Bore	Approximate Weight (kg)
19	RPV306-19	57.9	54.3	12.7	29.4	41.3	54.8	0.7
21	RPV306-21	63.9	60.5	12.7	32.5	47.6	54.8	0.9
23	RPV306-23	70.0	66.6	12.7	34.9	54.0	54.8	1.1
25	RPV306-25	76.0	72.8	19.1	41.3	60.3	54.8	1.3
27	RPV306-27	82.0	79.0	19.1	44.5	66.7	54.8	1.5
29	RPV306-29	88.1	85.2	19.1	46.0	71.4	54.8	1.9
31	RPV306-31	94.2	91.3	19.1	54.0	77.7	54.8	2.2
38	RPV306-38	115.3	112.6	19.1	73.0	100.0	54.8	3.5
42	RPV306-42	127.5	124.8	19.1	84.1	111.9	54.8	4.4
57	RPV306-57	172.9	170.5	31.8	114.3	152.4	54.8	8.3
76	RPV306-76	230.5	228.2	31.8	114.3	152.4	54.8	13.1

1/2" PITCH

25 mm Nominal Face Width-Type B Hub Actual Face Width = 22.9 mm

Number of Teeth	Part Number	Pitch Diameter	Outside Diameter	Minimum Plain Bore	Maximum Bore	Hub Diameter	Length Thru Bore	Approximate Weight (kg)
19	RPV404-19	77.2	72.4	12.7	36.5	56.4	50.8	1.1
21	RPV404-21	85.2	80.6	12.7	42.9	63.5	50.8	1.5
23	RPV404-23	93.3	88.8	19.1	46.0	73.0	50.8	1.8
25	RPV404-25	101.3	97.1	19.1	54.0	81.0	50.8	2.2
27	RPV404-27	109.4	105.4	19.1	60.3	88.9	50.8	2.7
29	RPV404-29	117.5	113.5	19.1	65.1	96.8	50.8	3.2
31	RPV404-31	125.5	121.7	19.1	69.9	105.6	63.5	4.6
38	RPV404-38	153.8	150.2	19.1	95.3	134.1	63.5	7.3
42	RPV404-42	169.9	166.4	19.1	111.1	150.8	63.5	9.2
57	RPV404-57	230.5	227.3	31.8	114.3	152.4	63.5	12.3
76	RPV404-76	307.3	304.2	25.4	63.5	92.1	50.8	14.1

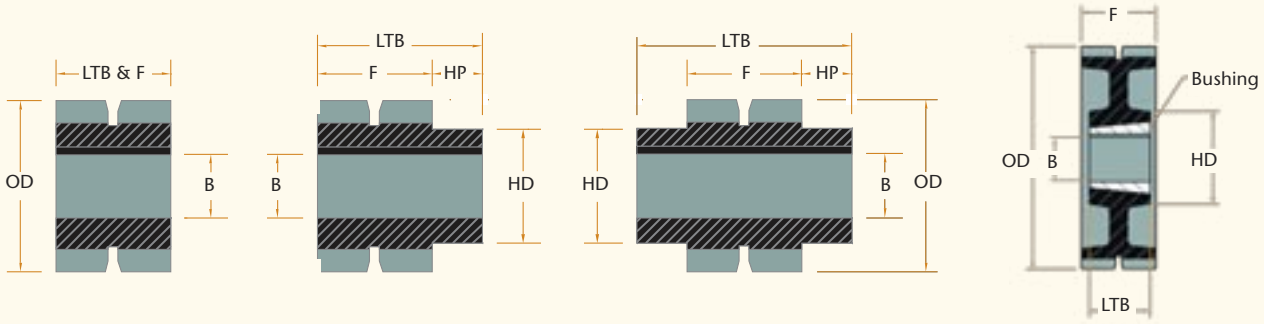
Unless indicated, all dimensions in millimeters

1/2" PITCH

Number of Teeth	Part Number	Pitch Diameter	Outside Diameter	Minimum Plain Bore	Maximum Bore	Hub Diameter	Length Thru Bore	Approximate Weight (kg)
38 mm Nominal Face Width-Type B Hub			**Actual Face Width = 35.6 mm**					
19	RPV406-19	77.2	72.4	12.7	36.5	56.4	63.5	1.5
21	RPV406-21	85.2	80.6	12.7	42.9	63.5	63.5	2.0
23	RPV406-23	93.3	88.8	19.1	46.0	73.0	63.5	2.3
25	RPV406-25	101.3	97.1	19.1	54.0	81.0	63.5	2.9
27	RPV406-27	109.4	105.4	19.1	60.3	88.9	63.5	3.4
29	RPV406-29	117.5	113.5	19.1	65.1	96.8	63.5	4.1
31	RPV406-31	125.5	121.7	19.1	69.9	105.6	76.2	5.6
38	RPV406-38	153.8	150.2	19.1	95.3	134.1	76.2	8.9
42	RPV406-42	169.9	166.4	19.1	111.1	150.8	76.2	11.2
57	RPV406-57	230.5	227.3	31.8	114.3	152.4	76.2	16.1
76	RPV406-76	307.3	304.2	25.4	63.5	92.1	63.5	20.9
51 mm Nominal Face Width-Type B Hub			**Actual Face Width = 48.3 mm**					
19	RPV408-19	77.2	72.4	12.7	36.5	56.4	76.2	1.9
21	RPV408-21	85.2	80.6	12.7	42.9	63.5	76.2	2.4
23	RPV408-23	93.3	88.8	19.1	46.0	73.0	76.2	2.9
25	RPV408-25	101.3	97.1	19.1	54.0	81.0	76.2	3.5
27	RPV408-27	109.4	105.4	19.1	60.3	88.9	76.2	4.2
29	RPV408-29	117.5	113.5	19.1	65.1	96.8	76.2	4.9
31	RPV408-31	125.5	121.7	19.1	69.9	105.6	76.2	5.8
38	RPV408-38	153.8	150.2	19.1	95.3	134.1	76.2	9.1
42	RPV408-42	169.9	166.4	19.1	111.1	150.8	76.2	11.4
57	RPV408-57	230.5	227.3	31.8	114.3	152.4	88.9	19.8
76	RPV408-76	307.3	304.2	25.4	63.5	92.1	76.2	27.5
76 mm Nominal Face Width-Type B Hub			**Actual Face Width = 73.7 mm**					
19	RPV412-19	77.2	72.4	12.7	36.5	56.4	101.6	2.4
21	RPV412-21	85.2	80.6	12.7	42.9	63.5	101.6	3.1
23	RPV412-23	93.3	88.8	19.1	46.0	73.0	101.6	3.9
25	RPV412-25	101.3	97.1	19.1	54.0	81.0	101.6	4.8
27	RPV412-27	109.4	105.4	19.1	60.3	88.9	101.6	5.7
29	RPV412-29	117.5	113.5	19.1	65.1	96.8	101.6	6.7
31	RPV412-31	125.5	121.7	19.1	69.9	105.6	101.6	7.8
38	RPV412-38	153.8	150.2	19.1	95.3	134.1	101.6	12.3
42	RPV412-42	169.9	166.4	19.1	111.1	150.8	101.6	15.4
57	RPV412-57	230.5	227.3	31.8	114.3	152.4	114.3	27.3
76	RPV412-76	307.3	304.2	25.4	63.5	92.1	101.6	37.7

Unless indicated, all dimensions in millimeters

RP STANDARD SPROCKETS



Type A Type B Type C Type D

F = Nominal Chain Width
B = Bore
OD = Outside Diameter
HD = Hub Diameter
LTB = Length Through the Bore
HP = Hub Projection

3/8" PITCH

25 mm Nominal Face Width

Number of Teeth	Part Number	Pitch Diameter	Outside Diameter	Hub Type	Minimum Plain Bore	Maximum Bore	Hub Diameter	Length Thru Bore	Approx Weight (kg)
17	SC304-17	51.8	50.5	B	12.7	22.2	36.6	44.5	0.4
19	SC304-19	57.9	56.6	B	12.7	31.8	41.3	44.5	0.6
21	SC304-21	63.9	62.8	B	12.7	33.3	47.6	44.5	0.7
23	SC304-23	74.5	69.0	B	12.7	38.1	54.0	44.5	0.9
25	SC304-25	76.0	75.2	B	12.7	44.5	60.3	44.5	1.1

1/2" PITCH

25 mm Nominal Face Width

Number of Teeth	Part Number	Pitch Diameter	Outside Diameter	Hub Type	Minimum Plain Bore	Maximum Bore	Hub Diameter	Length Thru Bore	Approx Weight (kg)
17	404-17	69.1	67.3	B	19.1	34.9	47.8	44.5	0.7
19	404-19	77.2	75.5	B	19.1	41.3	57.2	44.5	0.9
21	404-21	85.2	83.7	B	19.1	47.6	65.0	44.5	1.2
23	404-23	93.3	92.0	B	19.1	54.0	73.2	44.5	1.6
25	404-25	101.3	100.2	B	19.1	60.3	81.0	44.5	2.0
38	404-38	153.8	153.4	B	25.4	63.5	101.6	44.5	3.6
38	404-38 TLB	153.8	153.4	B	1615 TLB		101.6	38.1	2.7
57	404-57	230.5	230.6	C	25.4	63.5	101.6	38.1	8.6
57	404-57 TLB	230.5	230.6	D	1615 TLB		101.6	38.1	7.3
76	404-76	307.3	307.5	C	25.4	63.5	101.6	38.1	13.4
76	404-76 TLB	307.3	307.5	D	1615 TLB		101.6	50.8	14.5
95	404-95	384.1	384.4	C	28.6	76.2	127.0	50.8	23.8
95	404-95 TLB	384.1	384.4	D	2517 TLB		127.0	44.5	18.1
114	404-114	460.9	461.3	C	28.6	76.2	127.0	50.8	15.0
114	404-114 TLB	460.9	461.3	D	2517 TLB		127.0	44.5	12.9

Unless indicated, all dimensions in millimeters

1/2" PITCH

51 mm Nominal Face Width

Number of Teeth	Part Number	Pitch Diameter	Outside Diameter	Hub Type	Minimum Plain Bore	Maximum Bore	Hub Diameter	Length Thru Bore	Approx Weight (kg)	Material
17	408-17	69.1	67.3	B	22.2	34.9	47.8	69.9	1.1	Steel
19	408-19	77.2	75.5	B	22.2	41.3	57.2	69.9	1.6	Steel
21	408-21	85.2	83.7	B	22.2	47.6	65.0	69.9	2.0	Steel
23	408-23	93.3	92.0	B	22.2	54.0	73.2	69.9	2.5	Steel
25	408-25	101.3	100.2	B	22.2	60.3	81.0	69.9	3.2	Steel
38	408-38	153.8	153.4	B	25.4	63.5	101.6	69.9	7.3	Steel
38	408-38 TLB	153.8	153.4	D	1615 TLB			38.1	4.1	Steel
57	408-57	230.5	230.6	C	25.4	63.5	127.0	76.2	17.2	Steel
57	408-57 TLB	230.5	230.6	D	2517 TLB			44.5	11.3	Steel
76	408-76	307.3	307.5	C	31.8	63.5	127.0	76.2	18.6	Cast Iron
76	408-76 TLB	307.3	307.5	D	2517 TLB		146.1	63.5	16.3	Cast Iron
95	408-95	384.1	384.4	C	31.8	76.2	139.7	76.2	18.8	Cast Iron
95	408-95 TLB	384.1	384.4	D	2525 TLB		146.1	63.5	16.3	Cast Iron
114	408-114	460.9	461.3	C	31.8	76.2	127.0	76.2	21.3	Cast Iron
114	408-114 TLB	460.9	461.3	D	2525 TLB		127.0	63.5	18.1	Cast Iron

76 mm Nominal Face Width

Number of Teeth	Part Number	Pitch Diameter	Outside Diameter	Hub Type	Minimum Plain Bore	Maximum Bore	Hub Diameter	Length Thru Bore	Approx Weight (kg)	Material
17	412-17	69.1	67.3	B	25.4	34.9	47.8	95.3	1.4	Steel
19	412-19	77.2	75.5	B	25.4	41.3	57.2	95.3	1.8	Steel
21	412-21	85.2	83.7	B	25.4	47.6	65.0	95.3	2.5	Steel
23	412-23	93.3	92.0	B	25.4	54.0	73.2	95.3	3.2	Steel
25	412-25	101.3	100.2	B	25.4	60.3	81.0	95.3	4.1	Steel
38	412-38	153.8	153.4	B	25.4	63.5	101.6	95.3	10.0	Steel
38	412-38 TLB	153.8	153.4	D	2517 TLB			44.5	4.5	Steel
57	412-57	230.5	230.6	C	31.8	63.5	114.3	101.6	24.0	Steel
57	412-57 TLB	230.5	230.6	D	2525 TLB			63.5	16.8	Steel
76	412-76	307.3	307.5	C	31.8	63.5	114.3	101.6	16.6	Cast Iron
76	412-76 TLB	307.3	307.5	D	2525 TLB		114.3	63.5	12.5	Cast Iron
95	412-95	384.1	384.4	C	34.9	76.2	152.4	101.6	33.6	Cast Iron
95	412-95 TLB	384.1	384.4	D	2525 TLB		152.4	63.5	21.5	Cast Iron
114	412-114	460.9	461.3	C	34.9	76.2	152.4	101.6	31.1	Cast Iron
114	412-114 TLB	460.9	461.3	D	3030 TLB		152.4	76.2	24.3	Cast Iron

3/4" PITCH

76 mm Nominal Face Width

Number of Teeth	Part Number	Pitch Diameter	Outside Diameter	Hub Type	Minimum Plain Bore	Maximum Bore	Hub Diameter	Length Thru Bore	Approx Weight(kg)	Material
17	612-17	103.7	100.9	B	31.8	52.4	73.2	95.3	3.6	Steel
19	612-19	115.7	113.3	B	31.8	60.3	85.9	95.3	5.0	Steel
21	612-21	127.8	125.6	B	31.8	69.9	98.6	95.3	6.4	Steel
23	612-23	139.9	138.0	B	34.9	82.6	111.3	95.3	8.2	Steel
25	612-25	152.0	150.3	B	34.9	92.1	122.2	95.3	10.0	Steel
38	612-38	230.7	230.1	C	34.9	76.2	101.6	101.6	22.7	Steel
38	612-38 TLB	230.7	230.1	D	2525 TLB		152.4	63.5	16.3	Steel
57	612-57	345.8	345.8	C	34.9	88.9	152.4	101.6	26.3	Cast Iron
57	612-57 TLB	345.8	345.8	D	3030 TLB		152.4	76.2	18.6	Cast Iron
76	612-76	461.0	461.3	C	34.9	88.9	152.4	101.6	29.7	Cast Iron
76	612-76 TLB	461.0	461.3	D	3030 TLB		152.4	76.2	23.6	Cast Iron
95	612-95	576.2	576.7	C	38.1	114.3	190.5	101.6	45.4	Cast Iron
95	612-95 TLB	576.2	576.7	D	3535 TLB		190.5	88.9	43.5	Cast Iron
114	612-114	691.4	692.0	C	38.1	114.3	196.9	101.6	59.6	Cast Iron
114	612-114 TLB	691.4	692.0	D	3535 TLB		196.9	88.9	55.1	Cast Iron

Unless indicated, all dimensions in millimeters

SPROCKET DIAMETERS

CALCULATING OUTSIDE DIAMETERS

In the tables below, locate the diameter factor that corresponds to the number of teeth in your sprocket. Multiply this factor by the sprocket pitch to obtain the outside diameter.

Example: Number of teeth in your sprocket: 20, Sprocket Pitch: 1/2", Diameter Factor for 20 teeth Type 139: 153.086 mm, 153.086 x 1/2 = 76.543 mm is the sprocket diameter.

RPV SPROCKETS-OUTSIDE DIAMETER FACTORS

Number of Teeth	Diameter Factor Type139	Type 115	Number of Teeth	Diameter Factor Type139	Type 115	Number of Teeth	Diameter Factor Type139	Type 115	Number of Teeth	Diameter Factor Type139	Type 115
18	136.550	143.561	39	308.534	315.036	60	478.942	485.242	81	649.021	655.218
19	144.805	151.816	40	316.662	323.164	61	486.994	493.370	82	657.073	663.321
20	153.086	160.045	41	324.790	331.241	62	495.122	501.472	83	665.201	671.398
21	161.265	168.275	42	332.918	339.369	63	503.199	509.549	84	673.278	679.475
22	169.545	176.479	43	341.046	347.497	64	511.327	517.652	85	681.406	687.553
23	177.724	184.683	44	349.174	355.600	65	519.455	525.755	86	689.458	695.655
24	185.928	192.862	45	357.302	363.728	66	527.507	533.832	87	697.586	703.758
25	194.132	201.066	46	365.354	371.831	67	535.635	541.934	88	705.637	711.835
26	202.590	209.220	47	373.482	379.959	68	543.687	550.037	89	713.765	719.938
27	210.718	217.399	48	381.610	388.036	69	551.815	558.114	90	721.843	727.989
28	218.923	225.552	49	389.738	396.138	70	559.943	566.217	91	729.971	736.092
29	227.101	233.705	50	397.866	404.266	71	568.020	574.319	92	738.022	744.195
30	235.229	241.833	51	405.917	412.369	72	576.148	582.397	93	746.074	752.272
31	243.434	250.012	52	414.045	420.446	73	584.200	590.499	94	754.202	760.374
32	251.562	258.140	53	422.173	428.549	74	592.328	598.602	9	762.279	768.477
33	259.690	266.268	54	430.301	436.677	75	600.380	606.654	96	770.407	776.529
34	267.894	274.396	55	438.379	444.779	76	608.508	614.756	97	778.459	784.631
35	276.022	282.550	56	446.507	452.857	77	616.585	622.833	98	786.587	792.709
36	284.150	290.678	57	454.635	460.959	78	624.713	630.936	99	794.639	800.811
37	292.278	298.780	58	462.686	469.062	79	632.841	639.039	100	802.767	808.914
38	300.406	306.908	59	470.814	477.139	80	640.893	647.116			

RP SPROCKETS - OUTSIDE DIAMETER FACTORS

Number of Teeth	Diameter Factor	Number of Teeth	Diameter Factor	Number of Teeth	Diameter Factor	Number of Teeth	Diameter Factor
18	142.824	39	314.884	60	485.445	81	655.549
19	151.054	40	323.012	61	493.547	82	663.651
20	159.283	41	331.140	62	501.650	83	671.754
21	167.513	42	339.268	63	509.778	84	679.856
22	175.743	43	347.396	64	517.855	85	687.934
23	183.972	44	355.524	65	525.983	86	696.036
24	192.227	45	363.652	66	534.086	87	704.139
25	200.406	46	371.780	67	542.188	88	712.216
26	208.610	47	379.908	68	550.291	89	720.319
27	216.84	48	386.766	69	558.394	90	728.421
28	225.019	49	396.164	70	566.496	91	736.524
29	233.197	50	404.292	71	574.599	92	744.601
30	241.402	51	412.394	72	582.701	93	752.704
31	249.631	52	420.522	73	590.779	94	760.806
32	257.810	53	428.650	74	598.881	95	768.883
33	265.963	54	436.78	75	606.984	96	776.986
34	274.142	55	444.881	76	615.086	97	785.089
35	282.321	56	452.984	77	623.189	98	793.191
36	290.500	57	461.112	78	631.266	99	801.268
37	298.628	58	469.214	79	639.369	100	809.371
38	308.585	59	477.342	80	647.471		

Unless otherwise indicated, all dimensions are in millimeters

ORDERING INFORMATION

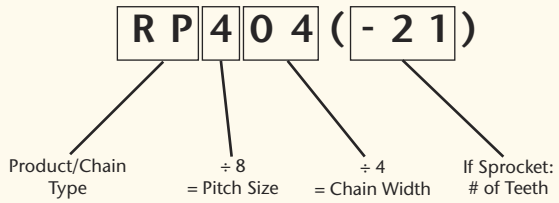
CHAIN ORDERING

If you know the chain's part number, simply supply the part number along with the chain length in pitches, feet or meters.

If you have a chain description, but do not know the part number...
Please specify the following details:

- Product type: For example, RPV or competitor's product
- Pitch: Best determined by measuring across 3 pin heads and dividing the measurement by 2
- Chain width across the links and across the heads
- Guide type
- Chain length in pitches, feet or meters

UNDERSTANDING PART NUMBERS



SPROCKET ORDERING INFORMATION

If you know your sprocket part number, simply supply the part number along with the following details.

Or, If you know your chain part number, a compatible sprocket can be identified by the chain part number followed by the number of sprocket teeth. For example a 21 tooth sprocket for a RamPower 1/2" pitch by 25 mm wide chain can be specified as RP404-21. Also please supply the following machining details:

- Hub type A, B, C or D
- Hub projection
- Hub diameter
- Bore diameter
- Keyway size
- No. of setscrews

If you have an engineering drawing, email or mail the drawing to Ramsey. After a review of the drawing we will respond to your inquiry.

If you are uncertain about what you need, contact us. Our experienced sales engineers will be pleased to assist you in identifying sprockets for your application.

DESIGN SUGGESTIONS

SPROCKETS: For long life, sprockets should have a minimum of 21 teeth. For smoother, quieter drives use a larger number of teeth.

DRIVE RATIOS: Ratios of 12:1 or greater are possible, but above 8:1 it is usually desirable to make the reduction in two steps.

SHAFT CENTER ADJUSTMENT: Center adjustment to allow for wear is always desirable. It is particularly important in vertical center drives. Typically, the amount of adjustment should equal at least 1% of the center distance.

SHAFT CENTER DISTANCE: The center distance should be great enough that the chain wraps the small sprocket at least 120 degrees. Center distances should generally not exceed 60 pitches.

CHAIN LENGTH: Whenever possible, chain length should be an even number of pitches so an offset section can be avoided.

TENSIONING DEVICES: An idler sprocket or shoe can often be used to maintain tension on fixed center drives.

CHAIN WIDTH: The use of a wider than recommended chain will result in a more rugged drive and improved drive life.

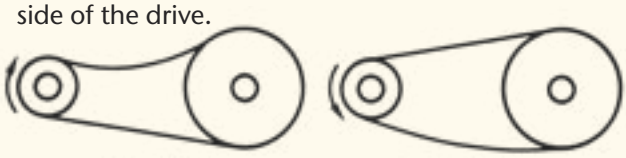
DRIVE ENCLOSURES: Fully enclosed drives with proper lubrication are desirable for maximum service life and personnel safety.

NON-HORIZONTAL AND VERTICAL SHAFTS: Drives using non-horizontal shafts often work best with side guide chain and an automatic tensioner. Consult Ramsey for specific recommendations.

ENGINEERING INFORMATION

DRIVE POSITIONS

The preferred position for a drive is where a line between shaft centers is horizontal or inclined not more than 45 degrees. Under ordinary conditions the slack strand may be either on the upper or lower side of the drive.

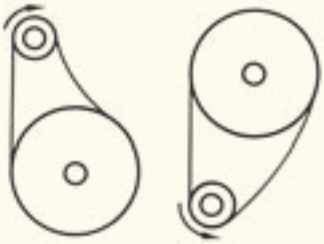


Acceptable Acceptable

Where the center distance is comparatively short, slack on the lower strand is preferable. With the slack on the upper strand there is a tendency for the chain to be forced out of proper engagement with the sprockets.

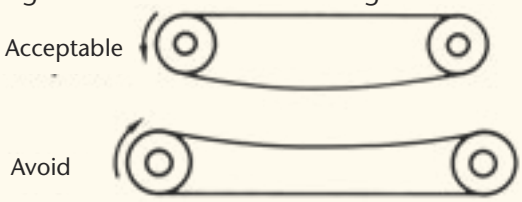
Acceptable Avoid

Vertical drives should be avoided if possible. They must be run fairly taut which means frequent adjustment of centers as the chain elongates due to normal wear. Less care and adjustment will be required if the drive can be positioned slightly off the vertical.



Acceptable Acceptable

Drives with long center distances and small sprockets should have the slack strand on the bottom. With the slack on top there is danger of the upper strand hitting the lower as the chain elongates.



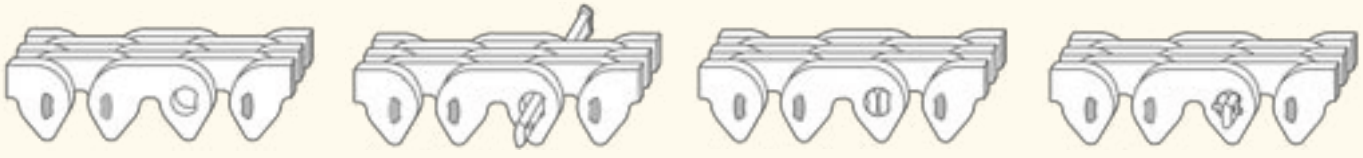
Acceptable

Avoid

CHAIN CONNECTION

Once the links in each end are properly laced together, chain connection is completed by first inserting the longer pin and then the shorter pin. Position the pins so that the convex surfaces contact one another. Complete the connection by putting a washer or side link on the long pin where appropriate and then fasten with a spirol pin or cotter. Optional annealed connecting pins are available that are secured by peening over the pin end. The illustrations show the most common connection methods; other methods are available upon request.

FOR RPV AND RP CHAINS 3/8" - 1/2" PITCH



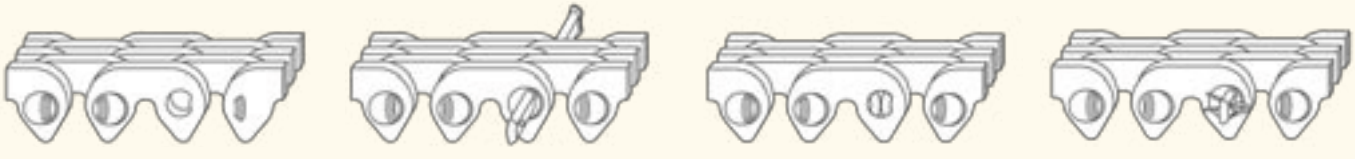
Bring the ends of the chain together so the holes are aligned

Insert longer pin through the chain.

Insert short pin so convex pin surfaces are in contact

Install spirol roll pin

FOR RPV AND RP CHAINS 5/8" - 2" PITCH



Bring the ends of the chain together so the holes are aligned

Insert longer pin through the chain.

Insert short pin so convex pin surfaces are in contact

Put washer on long pin and install cotter or spirol roll pin

Other chain connections are available

DRIVE SELECTION

Drive selection consists of choosing the appropriate chain and sprockets for the space, loads, and speeds involved. Often more than one pitch and width will work in a given situation. In such cases one may choose two or three possible selections and base the final choice on factors such as cost, stock availability, ruggedness or space availability. Contact Ramsey for a computer program that simplifies the drive selection process.

Information Needed

- Type of power source and application
- Power to be transmitted (W)
- RPM of shafts (N1=faster shaft speed, N2=slower shaft speed)
- Shaft center distance (CD)
- Shaft diameters and keyway sizes

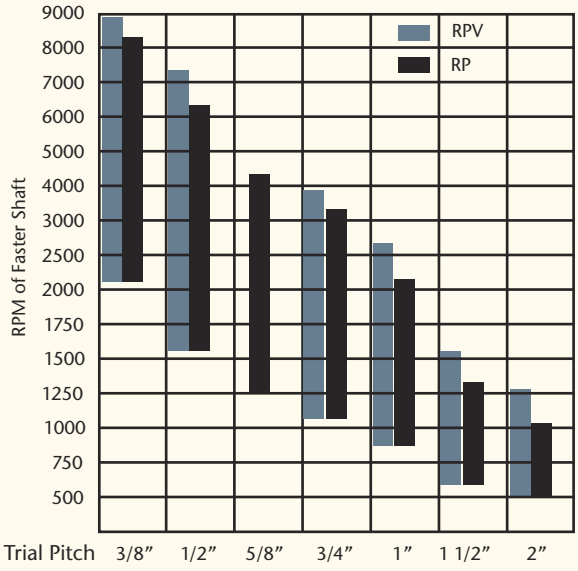
FOLLOW THESE STEPS

1. Choose a service factor (SF) from the table on pg 24.

2. Compute the design power (W_d) by multiplying the power to be transmitted (W) by the service factor.

3. Use the speed of the faster moving shaft (N1) to make a tentative pitch selection (p) from the chart below.

PITCH SELECTION CHART



4. Select the number of teeth in the small sprocket (Z1), making sure the sprocket can accommodate the shaft diameter. See maximum sprocket bores in sprocket tables. (pgs 14-18)

5. Use the following equations to calculate the required chain width (C_w). If the required chain width is not readily available it may be necessary to go to a wider chain or a larger sprocket.

For RPV and RP

$$C_w = \frac{98(W_d)}{p.V.R\,(1 - V^2(5.19 \times 10^{-4}))}$$

where:
C_w = required width (mm)
W_d =design power (kw)
R = factor from table
p = pitch (mm)
V = chain speed (M/s)

Table of R Values*

	Pitch						
	3/8"	1/2"	5/8"	3/4"	1"	1 1/2"	2"
RPV (SG)	1.5	1.8	na	1.6	1.5	1.1	1.0
RPV (CG)	1.5	1.8	na	1.3	1.2	1.1	1.0
RP	0.922	1.0	1.0	1.0	1.0	1.0	1.0

6. Select the large sprocket (Z2) by multiplying the number of teeth in the small sprocket by the desired shaft speed ratio.
Z2 = Z1 x N1/N2

7. Compute the chain length using the table provided on pg 23. If the computed length is fractional, round off to the nearest whole number of pitches. An even number of pitches is always preferable to an odd number of pitches which requires an offset section. If an offset section is required, it will be necessary to increase the width of the chain by 25% to account for the offsets reduced tensile strength. Note: offset sections are not available for RPV chain.

8. Compute the new center distance (C_d) for the rounded off chain length. The following formula provides an approximate center distance. When fixed center drives are used or extremely accurate center distance is required, consult Ramsey.

$$C_d = \frac{C_L - \left(\frac{Z1+Z2}{2}\right) + \sqrt{\left(C_L - \frac{Z1+Z2}{2}\right)^2 - 8\left(\frac{Z2-Z1}{4\pi^2}\right)^2}}{4}$$

Where:
Cd = corrected center distance in pitches
C_L = chain length in pitches
Z1 = number of teeth in smaller, faster moving sprocket
Z2 = number of teeth in larger, slower moving sprocket

9. Select a method for lubricating the drive. Forced feed lubrication will provide optimum results and is recommended whenever chain speeds exceed 12.7 m/s. Drip or bath type lubrication may be acceptable at lower speeds. Additional information on lubrication is given in the section describing lubrication. Also, if the drive will not operate inside a housing, a chain enclosure is recommended.

DRIVE SELECTION EXAMPLE

Fan (propeller type)
Power source: electric motor
Power: 26 kw
Shaft RPM: 1750 RPM (N1), 800 RPM (N2)
Center distance: 700 mm, adjustable centers
Shaft diameter = 38 mm

1 Determine the service factor (SF), using chart on pg 24
Fan (propeller) Service factor = 1.3

2. Calculate the design power (W_d)
$W_d = W \times SF = 26 \text{ kw} \times 1.3 = 33.8 \text{ kw}$

3. Choose an initial pitch (p)
Entering the pitch selection chart (pg 22) at 1750 rpm, select 1/2" pitch RP chain.

4. Select the number of teeth in the small sprocket (Z1). A minimum of 21 teeth is recommended. From the sprocket table on pgs 17-18, the maximum bore for a 21 tooth sprocket is 47.6mm. This is greater than the shaft diameter, so the sprocket choice is acceptable.

5. Calculate minimum chain width (C_W)
$W_d = 33.8$ kw
R = 1.0, from table on pg 22
$V = pZN = (12.7 \times 21 \times 1750)/60{,}000 = 7.78$ m/s

$$C_W = \frac{(98 \times 33.8)}{(12.7 \times 1.0 \times 7.78) \times (1-[(7.78)^2 x(5.19 \times 10\text{-}4)])}$$

$C_W = 34.8$ mm
The nearest larger standard chain width, from pgs 10-11, is 38 mm wide, RP406

6. Calculate the number of teeth in the larger sprocket (Z2)
$Z2 = Z1 \times (N1/N2) = 21 \times 2.19 = 46$ teeth

7. Calculate the chain length (C_L)
C = 55.1, A = 67, S = 25

From table below T = 15.83, and $C_L = 143.7$
Round to even number of pitches, $C_L = 144$ pitches

8. Calculate the new center distance (C_d)
From pg 22, $C_d = 54.962$ pitches
Converting to mm, $C_d = 54.962 \times 12.7 = 698$ mm

CHAIN LENGTH CALCULATION

Information Needed:
CD = center distance (mm)
Z2 = number of teeth in large sprocket
Z1 = number of teeth In small sprocket
p = chain pitch (mm)
Procedure
1. Calculate C, where C = CD/p
2. Calculate A, where A = Z1+Z2
3. Calculate S, where S = Z2-Z1
4. Refer to the below and find the T value corresponding to the calculated S value.
5. Chain length in pitches, $C_L = 2C + (A/2) + (T/C)$
Note: If chain length is fractional round off to the nearest whole number of pitches. An even number of pitches is always preferrable to an odd number which requires an offset section.

An offset section (also called a hunting link section) must be used when a chain contains an odd number of links. If an offset section is required, it will be necessary to increase the width of the chain by 25% to account for the reduced tensile strength of the offset.

S	T	S	T	S	T	S	T
1	0.03	26	17.12	51	65.88	76	146.31
2	0.10	27	18.47	52	68.49	77	150.18
3	0.23	28	19.86	53	71.15	78	154.11
4	0.41	29	21.30	54	73.86	79	158.09
5	0.63	30	22.80	55	76.62	80	162.11
6	0.91	31	24.34	56	79.44	81	166.19
7	1.24	32	25.94	57	82.30	82	170.32
8	1.62	33	27.58	58	85.21	83	174.50
9	2.05	34	29.28	59	88.17	84	178.73
10	2.53	35	31.03	60	91.19	85	183.01
11	3.06	36	32.83	61	94.25	86	187.34
12	3.65	37	34.68	62	97.37	87	191.73
13	4.28	38	36.58	63	100.54	88	196.16
14	4.96	39	38.53	64	103.75	89	200.64
15	5.70	40	40.53	65	107.02	90	205.18
16	6.48	41	42.58	66	110.34	91	209.76
17	7.32	42	44.68	67	113.71	92	214.40
18	8.21	43	46.84	68	117.13	93	219.08
19	9.14	44	49.04	69	120.60	94	223.82
20	10.13	45	51.29	70	124.12	95	228.61
21	11.17	46	53.60	71	127.69	96	233.44
22	12.26	47	55.95	72	131.31	97	238.33
23	13.40	48	58.36	73	134.99	98	243.27
24	14.59	49	60.82	74	138.71	99	248.26
25	15.83	50	63.33	75	142.48	100	253.30

ENGINEERING FORMULAS

p = pitch in millimeters
Z = number of teeth in sprocket
V = chain speed in meters per second
W = power in kilowatts
N = revolutions per minute
P_d = pitch diameter in millimeters
L = working load in kilo Newtons
T = torque in Newton meters

$$W = \frac{TN}{9549} \qquad T = \frac{LP_d}{2}$$

$$W = VL \qquad L = \frac{W}{V} \qquad T = \frac{9549W}{N}$$

$$L = \frac{60{,}000W}{pZN} \qquad V = \frac{pZN}{60{,}000} \qquad P_d = \frac{p}{\text{Sin}(180/Z)}$$

SERVICE FACTORS

Service factors are used during drive selection to compensate for less than optimum drive conditions. The chain width formulas on pg 25 are based on the following drive conditions:
• Power source = electric motor, hydraulic motor, turbine, or engine with fluid coupling
• Proper lubrication

For conditions that differ from those listed above, the power to be transmitted must be multiplied by a service factor to obtain the design power. The design power is then used to calculate the required chain width.

Select an appropriate service factor from the service factor table, then add one or more of the additional factors listed here:
Fixed center distance = 0.2 Engine with mechanical coupling = 0.2
Inadequate lubrication = 0.2 to 0.5

SERVICE FACTOR TABLE

AGITATORS (paddle or propeller)	
Pure liquid	1.1
Liquids (variable density)	1.2
BAKERY MACHINERY	
Dough Mixer	1.2
BLOWERS	See Fans
BREWING & DISTILLING EQUIPMENT	
Bottling Machinery	1.0
Brew Kettles, cookers, mash tubs	1.0
Scale Hopper (Frequent starts)	1.2
BRICK & CLAY EQUIPMENT	
Auger machines, cutting table	1.3
Brick machines, dry press, granulator	1.4
Mixer, pug mill, rolls	1.4
CEMENT PLANTS	
Kilns	1.4
CENTRIFUGES	1.4
COMPRESSORS	
Centrifugal, rotary (lobe)	1.1
Reciprocating (1 or 2 cyl.)	1.6
Reciprocating (3 or more cyl.)	1.3
CONSTRUCTION EQUIPMENT	
OR OFF-HIGHWAY VEHICLES	
Drive line , power take-off	Consult Ramsey
Accessory drives	
CONVEYORS	
Apron, bucket, pan, elevator	1.4
Belt (ore, coal, sand, salt)	1.2
Belt (light packages, oven)	1.0
Screw, flight (heavy duty)	1.6
CRANES & HOISTS	
Main hoist (medium duty)	1.2
Main hoist (heavy duty), skip hoist	1.4
CRUSHING MACHINERY	
Ball mills, crushing rolls, jaw crushers	1.6
DREDGES	
Conveyors, cable reels	1.4
Jigs, screens	1.6
Cutter head drives	Consult Ramsey
Dredge pumps	1.6
FANS & BLOWERS	
Centrifugal, propeller, vane	1.3
Positive blowers (lobe)	1.5
GRAIN MILL MACHINERY	
Sifters, purifiers, separators	1.1
Grinders, hammer mills	1.2
Roller mills	1.3
GENERATORS & EXCITERS	1.2
ICE MACHINES	1.5
LAUNDRY MACHINERY	
Dampeners, Washers	1.1
Tumblers	1.2
MACHINE TOOLS	
Grinders, lathes, drill press	1.0
Boring mills, milling machines	1.1
MARINE DRIVES	Consult Ramsey
MILLS	
Rotary type:	
Ball, Pebble, Rod, Tube, Roller	1.5
Dryers, Kilns, tumbling barrels	1.6
Metal type:	
Draw bench carriage, main drive	1.5
FORMING MACHINES	Consult Ramsey
MIXERS	
Concrete	1.6
Liquid, Semi-liquid	1.1
OIL INDUSTRY MACHINERY	
Compounding Units	1.1
Pipe line pumps	1.4
Slush pumps	1.5
Draw works	1.8
Chillers, Paraffin filter presses, Kilns	1.5
PAPER INDUSTRY MACHINERY	
Agitators, bleachers	1.1
Barker(mechanical)	1.6
Beater, Yankee Dryer	1.3
Calendars, Dryer, Paper Machines	1.2
Chippers,winder drums	1.5
PRINTING MACHINERY	
Embossing, flat bed presses, folders	1.2
Paper cutter, rotary press, linotype	1.1
Magazine, Newspaper Presses	1.5
PUMPS	
Centrifugal, gear, lobe, vane	1.2
Dredge	1.6
Pipe line	1.4
Reciprocating (3 or more cyl.)	1.3
Reciprocating (1 or 2 cyl.)	1.6
RUBBER & PLASTICS EQUIPMENT	
Calendars, rolls, tubers	
Tire-building, Banbury Mills	1.5
Mixers, sheeters	1.6
Extruders	1.5
SCREENS	
Conical, revolving	1.2
Rotary, gravel, stone, vibrating	1.5
STOKERS	1.1
DYNAMOMETERS	Consult Ramsey
TEXTILE INDUSTRY	
Spinning frames, twisters, Wrappers	1.0
Batchers, calendars, looms	1.1

LUBRICATION

CHOOSE THE PROPER LUBRICANT

Proper drive lubrication is essential for a long service life. In sufficient quantities a lubricant penetrates chain joints to protect against corrosion, dissipate heat, cushion impact, and flush away debris. The chain width equations presume that adequate lubrication is used.

For most applications a good grade of non-detergent petroleum based oil is recommended. Multiviscosity oils are not recommended. Generally greases and high viscosity oils are too thick to penetrate chain joints and should be avoided.

A chain which does not receive sufficient lubrication will wear prematurely. An early indication is the appearance of a reddish brown, iron oxide deposit on the chain. When this is found the method and/or quantity of lubricant should be improved.

Chain drives should also be covered or enclosed in a manner that will protect the oil from contamination by dirt or moisture. For best results oil should be filtered and cooled when necessary.

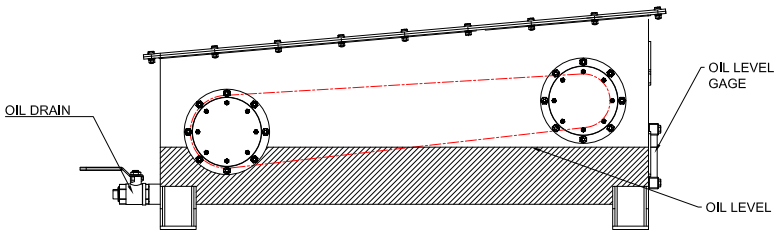
Ambient Temperature (°C)	Recommended Lubricant
< 5	SAE 5*
5-32	SAE 10*
> 32	SAE 20

* Type A or B Automatic Transmission Fluid may be substituted

LUBRICATION METHODS

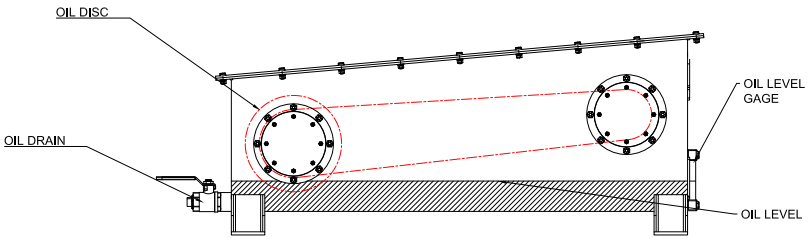
Bath Lubrication

Bath-The lower strand of chain runs through an oil bath. The oil level should be such that the pitch line of the chain is just submerged. Also, to prevent excessive heat generation, only a short section of chain should run through the bath.



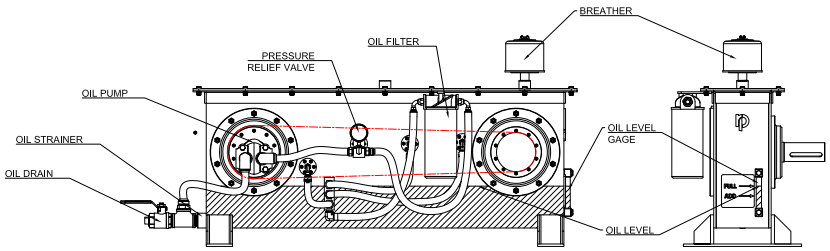
Disc Lubrication

Disc-A rotating disc picks up oil from a reservoir and directs it to the chain by means of a baffle or trough. The chain is not submerged in oil. This method requires that the disc rim speed be between 4 m/s and 40 m/s. These methods may be suitable for chain speeds up to approximately 12 m/s.



Force Feed Lubrication

Lubricant is supplied in a continuous stream by a circulating pump and distribution pipe. The oil should be directed to the inside of the slack strand with one oil stream for each 25 mm of chain width. This is the preferred method of lubrication, particularly for drives with heavy loads or speeds greater than 12.7 m/s. Recommended oil flow rates will vary depending on the application. The equation below lists minimum recommended flow rates based on the power transmitted. In general, oil flow rates should be 3.8 liters per minute, for every 25 mm of chain width.



Minimum Flow Rates

$$F = \frac{Pw + 0.4}{39.4}$$

Where:
F = Flow rate in liters per minute
Pw = Power transmitted in kilowatts

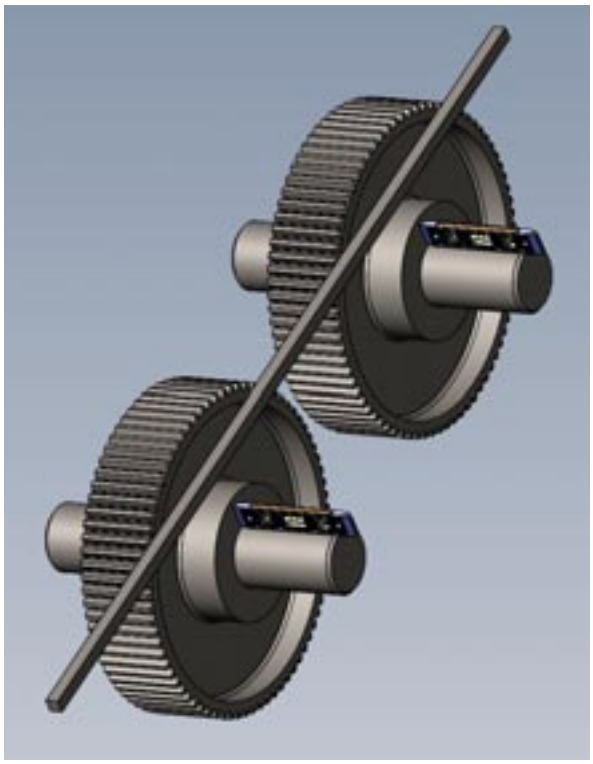
INSTALLATION GUIDELINES

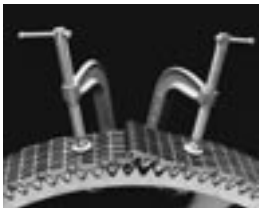
DRIVE INSTALLATION

Shaft Parallelism - Shaft parallelism should be checked before installing sprockets. Typically shafts should be parallel to within 0.4 mm per meter. Ramsey should be consulted for applications where shafts are not horizontal.

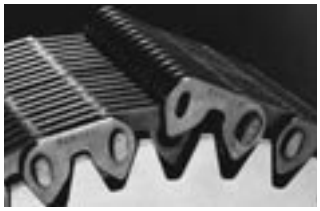
Sprocket Alignment - Sprockets should be aligned on the shafts so there is little or no lateral offset between sprocket faces. Excessive wear will result if the sprockets are not properly aligned.

Chain Connection - A variety of connector styles are used in Ramsey chain, depending on the chain type and customer preference. See pg 21 for the most common styles. During connection, it is very important that the ends of the chain be properly laced together and that the pins be inserted with their convex surfaces facing one another.





Chain clamped to the sprocket to simplify connection.



Symmetric chain lacing during connection

TENSIONING

Chains must be properly tensioned at installation and checked periodically. Chain life will be shortened both by running too tight and running too loose. A chain which is too tight has an additional load imposed on it which will accelerate wear and increase noise. A chain which is loose enough to whip or surge can be subjected to shock loads and excessive wear.

On drives where the line between shaft centers is horizontal or inclined as much as 60 degrees from horizontal, the chain should be tensioned to allow a sag in one strand equal to approximately two percent of the shaft center distance. The chain should be taut in vertical or fixed center drives, and on drives subject to shock loads, reversing, or dynamic braking.

ELONGATION

When elongation becomes excessive the chain can skip teeth and damage the sprocket. It is best to replace the chain before this happens. The size of the large sprocket will limit the allowable elongation of the chain. In general, a chain will not properly wrap sprockets when it has elongated by 200/N % where N = the number of teeth in the larger sprocket. Other application related considerations may further limit the amount of acceptable elongation.

ALIGNMENT

Examine the sides of the chain guide links for excessive wear or gouging; these are often symptoms of misaligned sprockets. Periodically check that sprockets are securely fastened. If sprocket position has changed since installation go through the alignment procedure used during installation.

OTHER SERVICES AND PRODUCTS

FLAME SURFACE HARDENING

Create a hardened, wear-resistant surface while maintaining a ductile core. Ramsey Products has more than 30 years of experience in precision surface hardening. Utilizing state-of-the-art flame hardening techniques and computer-controlled equipment, we can quickly respond to your flame hardening needs.

- Gears
- Sprockets
- Pulleys
- Cylindrical Parts

BENEFITS:

- Localized Heating with Minimal Distortion
- Allows Secondary Machining Operations
- Flexible Fixtures for Lower Set-Up Costs
- Economical

TECHNICAL SPECIFICATIONS:

- From 1" diameter up to 29" diameter
- Part weight up to 2000 lbs
- Up to 12" face width
- Typical Materials: C1045, 1141, 1144, 4140, 4150, SS (The last 2 digits of the material name denotes the amount of carbon. If the last 2 numbers are less than 40, pieces must be carburized before heat treatment)

INDUSTRIAL CONVEYING CHAINS AND SPROCKETS

Ramsey offers silent chain for industrial conveying applications. Silent conveying chains provide a strong, heat resistant, flat, durable, non-slip surface that can be customized to fit a wide range of industrial applications.

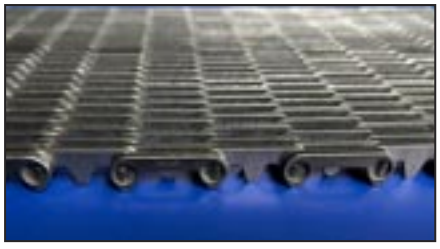
All Ramsey conveying chains are designed to smoothly and efficiently engage sprockets, providing minimal speed variation in the conveying surface. Conveyor chain options include single pin or two pin joint construction, link-spacer or all link constructions, pin head protection, and widths up to 20 inches (508mm). Ramsey also offers stainless steel conveyor chain in 410 and 316 series.

ULTRALIFE

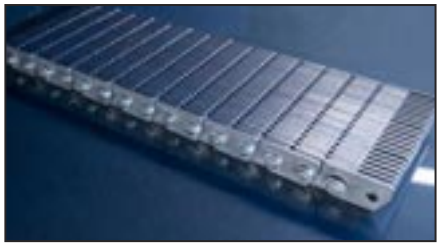
WEAR PROTECTED CHAINS

EXTENDED PITCH

RZ3



RFT



No one offers the product range, quality, and support that Ramsey does. In addition to our extensive standard product line, we offer replacements for most competitors' chains, as well as custom designed chains.

Ramsey also provides free consultation and drive selection assistance through our staff of experienced engineers. Whether your requirement is a single chain, or a much larger volume, our sales and engineering staff has the experience to assist you.

With warehouses and representatives around the world, we welcome the opportunity to serve you.

135 Performance Drive
Belmont, NC 28012
Tel: (704) 394-0322
Fax: (704) 394-9134
www.ramseychain.com
sales@ramseychain.com

Ramsey Products CORPORATION

Ramsey Europe
Germany
Tel: +49 151 24042790
Ireland
Tel: +353 (0) 892727769
euro.sales@ramseychain.com