OREGON®

Mechanical Timber Harvesting Handbook

EFFECTIVE JANUARY 1, 2012

OREGON® MECHANICAL TIMBER HARVESTING HANDBOOK

Introduction

This handbook provides information that OREGON® considers critical to the successful and safe use of OREGON® saw chain-based cutting systems in mechanized wood harvesting and processing. In offering this information, Oregon® does not assume any responsibility for the design or manufacture of equipment, nor for the content of literature supplied by equipment manufacturers. This handbook is intended for designers, manufacturers, sellers, and users of saw chain-based cutting systems for mechanized wood harvesting/processor machinery.

The saw chain-based cutting system on a mechanized wood harvesting/processor machinery must meet two fundamental objectives:

- **Performance (production, reliability, life)**
- **Safety**

In saw chain-based cutting systems, a number of interrelated factors influence the degree of success in both performance and safety. This Oregon® Mechanical Timber Harvesting Handbook is intended to assist you in understanding those factors.

OREGON® HARVESTER CHAIN
(Not intended for use on handheld chain saws)
.404" pitch:
16H – Micro Chisel®
18HX – Micro Chisel®

3/4" pitch:
11BC – Chipper
11H – Semi-Chisel

Table of Contents

Important Safety Information

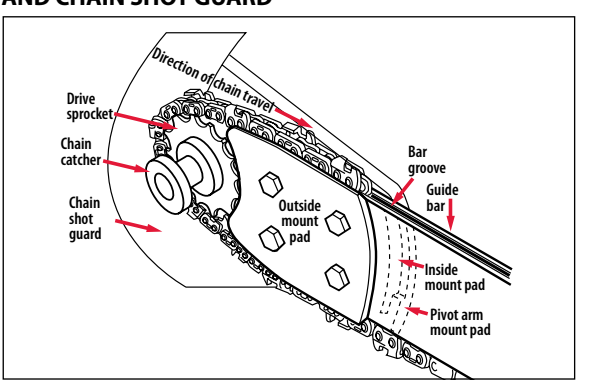
⚠WARNING: There is risk of serious injury or death to the machine operator, ground personnel and bystanders from chain shot. Chain shot occurs when a piece or pieces of cutting chain from the end of a broken saw chain in mechanized timber harvesting or processing is ejected at a high velocity. Chain shot typically originates near the drive end of the cutting system but can also originate from the guide bar tip area. Saw chain pieces usually travel in the cutting plane of the guide bar, but can deviate to either side (see illustration page 4). Although the shot cone reflects the most likely chain shot path, deflections can occur, substantially expanding where chain pieces may travel.

For maximum protection, machines should be equipped with chain catchers, chain shot guards, closed snow holes near the bar tip, appropriate window enclosures and recommendations contained in this handbook and your equipment's operator manuals should be followed.

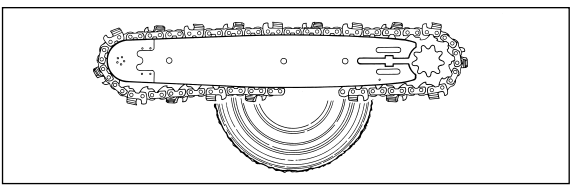
DO NOT USE SAW CHAIN THAT:

- Has broken twice.
- Is severely damaged.
- Has excessive saw chain stretch.
- Has broken or cracked components.
- Has loose rivet joints. If you can rotate the rivets with your fingers, they're too loose.

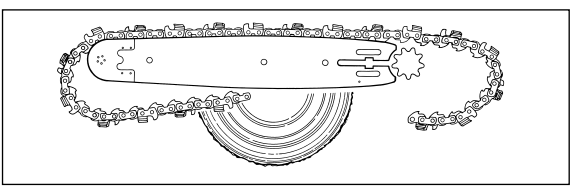
GUIDE BAR MOUNT, CHAIN CATCHER, AND CHAIN SHOT GUARD



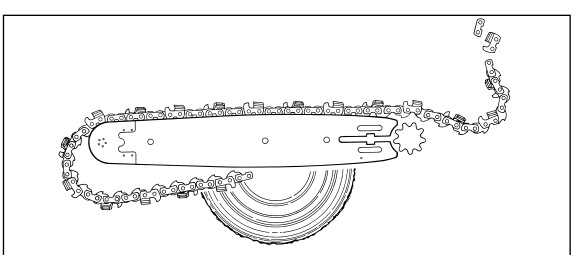
HOW CHAIN SHOT HAPPENS



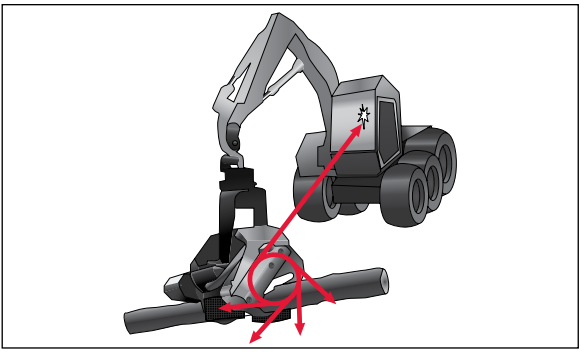
1. After a saw chain break, the “free” end of the saw chain begins to whip away from the break.



2. If the saw chain is not contained by the saw box or a chain shot guard, the broken saw chain’s free end can speed up rapidly, carrying immense dynamic energy.



3. At the peak of the whip, saw chain parts may break loose and be ejected at high speed, especially if the free end of the saw chain strikes the saw box.



Chain shot can cause saw chain parts to be thrown in many directions along the cutting plane of the saw guide bar (as shown in the illustration above). The shot cone zone (see illustration below) reflects where saw chain pieces usually travel, unless pieces are deflected.

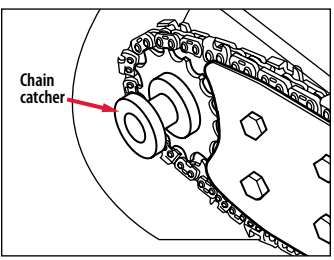
MACHINE OPERATOR, GROUND PERSONNEL AND BYSTANDER SAFETY

Guards and Shields: Because of the high speeds, high stress, heavy loads, wear factors, and varying levels of repair and maintenance given to saw chain-based mechanized wood harvesters/processors, there is a possibility that saw chain or saw chain pieces can be thrown from the machine at high speed and with immense energy. Machine operators, ground personnel and bystanders are exposed to a risk of serious injury or death.

Equipment should be designed with appropriate guards, shields, window enclosures and care should be taken to minimize the exposure of the machine operator, ground personnel and bystanders to the cutting plane of the saw. Bystanders and ground personnel should be kept at least 230 feet way.

Windows: Window glazing in operator's enclosures should comply with the local codes for impact resistance.

Chain Catcher: A chain catcher can assist in containing thrown saw chain, and is a complement to guards and shields. The chain catcher can be a sturdy rod or similar device placed perpendicular to the center of the drive sprocket. It can be mounted either to the drive shaft, or to the saw box, with a narrow gap to allow for safe saw chain installation and removal.

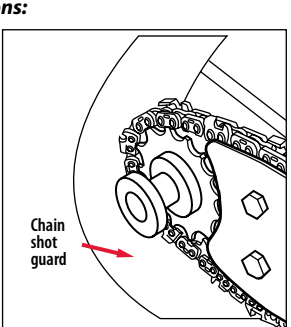


Chain Shot Guard: A chain shot guard is a piece of material mounted behind the drive sprocket. This guard performs two functions:

- Absorbs the energy of a broken saw chain coming in contact with the saw box, and prevents saw chain parts from breaking off and being ejected.
- Acts as an extension of the saw box, reducing the opportunity for thrown saw chain or saw chain parts to escape the saw box.

Operational Recommendations:

- Never engage in a cut with ground personnel or bystanders in the shot cone zone.
- Always engage in a cut as close to the ground as possible.



Cold Conditions Recommendations

LUBRICATION

Your cutting system (saw chain and guide bar) must receive sufficient lubrication to prevent excessive chassis wear.

The minimum amount of lubrication recommended for .404"-pitch cutting systems is 2 cubic inches/minute (33 cc/min) which equates to a minimum of two gallons (8 liters) per eight-hour shift in a harvesting application. For 3/4"-pitch cutting systems the minimum recommended is 2.5 cubic inches/minute (40 cc/min) or a minimum of 2.5 gallons (10 liters) per eight-hour shift in a harvesting application.

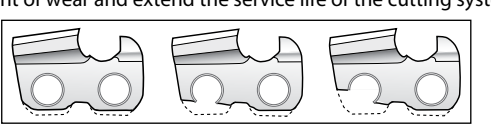
A practice on some machinery is to use hydraulic fluid to lubricate the cutting system. Hydraulic fluid **is not** an adequate cutting system lubricant.

At startup, adequate time must be allowed for lubrication to reach the cutting system. In cold weather, or with the addition of a new guide bar or saw chain, the system will require additional time. Run the saw chain slowly while cycling the guide bar until lubrication can be observed leaving the tip of the guide bar.

To minimize debris in your lubrication systems, install a fine screen into the fill port.

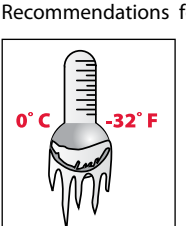
COLD WEATHER USE

Cutting frozen wood can cause heavy wear on the saw chain chassis and can create cracks resulting in possible breakage. Following our maintenance recommendations can reduce the amount of wear and extend the service life of the cutting system.



COLD CONDITIONS RECOMMENDATIONS

Recommendations for maximizing service life of your cutting systems in cold conditions:



Lubrication

- Use a light (winter) weight lubricant, if possible doubling the flow rate.
- Periodically cycle the guide bar without cutting (air cuts) to increase lubrication present on the cutting system and to ensure the lubrication system is working.

Cold Conditions Recommendations

BAR FEED FORCE

- Reduce guide bar feed force or feed speed.

GUIDE BAR

Maintenance

- Clean the guide bar groove (from tip to tail) and keep the oil holes open.
- Turn guide bar over to equalize wear. Recommended on a DAILY basis.

Shut Down Procedure

- Cycle guide bar several times to remove moisture from guide bar tip.

SAW CHAIN

Tension

- Maintain proper tension
- Check often.

Shut Down Procedure

- At breaks and at the end of each shift, relieve saw chain tension to prevent damage to the guide bar tip, saw motor and/or saw chain as the saw chain cools and contracts.

Sharpening

- Maintain cutters in agreement with the manufacturer's recommendations. For OREGON® harvester chain, refer to pages 25 – 27 or our "Optional Sharpening Modification" on page 30.
- Never force a dull saw chain to cut.
- OREGON® recommends sharpening saw chain at least once per shift or when saw chain becomes dull in agreement with maintenance recommendations contained in this handbook.

Cutter Depth Gauges

- Check cutter depth gauges at each sharpening
- Adjust as necessary *(Slightly reduced depth gauge settings will help extend service life under these extreme conditions.)*
- Never lower depth gauges more that the recommended setting. This will cause saw chain chassis to wear prematurely. See depth gauge settings page 26.

Breakage

- Discard saw chain after its second break.

Saw Chain Speed

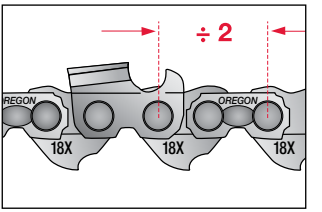
- Reduce saw chain speed

OREGON® Saw Chain Terms

Saw Chain Pitch

Saw chain pitch is the distance between any three consecutive rivets, divided by two. OREGON® Harvester saw chain pitches are:

.404"
3/4"

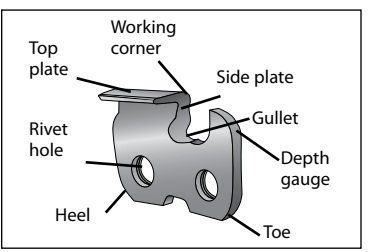


Saw Chain Gauge

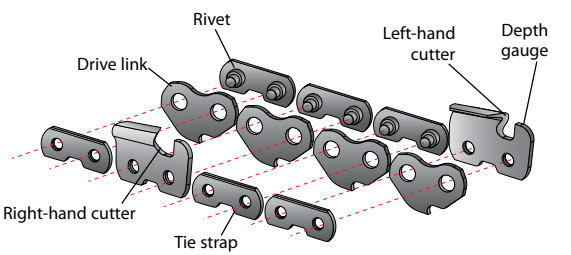
Saw chain gauge is the drive link's thickness where it fits into the guide bar groove. The industry standard for harvester application saw chain gauges are:

.063" (1.6 mm) OREGON® has 16 stamped on the drive link.
.080" (2 mm) OREGON® has 18 stamped on the drive link.
.122" (3.1 mm) OREGON® has 11 stamped on the drive link.

Parts of a Cutter



Parts of a Saw Chain

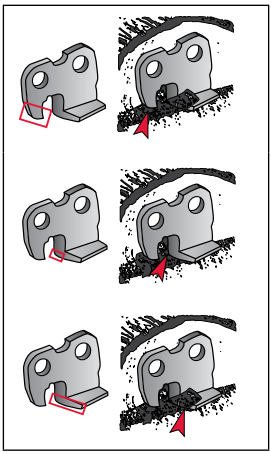


OREGON® Saw Chain Terms

How a Cutter Works

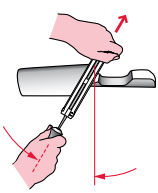
Understanding how cutters work can help you see why proper saw chain maintenance is so important.

1. The depth gauge rides on the wood and controls the bite of the working corner.
2. The working corner and side plate sever the wood fibers across the grain.
3. The top plate cutting angle chisels out the severed wood fibers, lifting them up and out of the kerf.

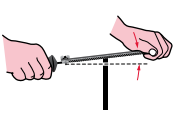


Cutter Maintenance Terms

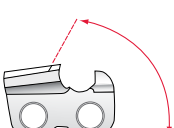
A Top Plate Angle



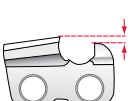
B File Guide Angle



C Top Plate Cutting Angle



D Depth Gauge Setting



OREGON® Saw Chain Tension

SAW CHAIN TENSION

To minimize wear on the guide bar and saw chain, saw chain tension for hard nose guide bars should be **tight** (the length of a drive link tangs at the mid-point of the guide bar should nearly come out of the bar groove) and **tighter** for sprocket nose guide bars (1/8" at the mid-point of the guide bar).

Manual Tensioning

As a rule, saw chain should be tight enough so the chassis of the saw chain is pulled firmly against the guide bar around the perimeter of the guide bars.

Tension must be checked periodically.

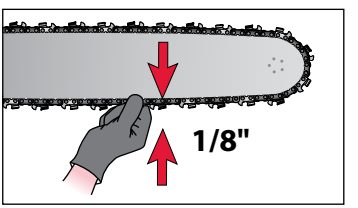
Saw chain should only be tensioned when it is cool. Steel expands when hot and contracts when cool. Tensioning a hot saw chain can damage your cutting system and drive motor as it cools and contracts.

Checking Tension

To check for proper tension grasp the saw chain at mid-span of the guide bar with your thumb and forefinger and pull the saw chain away from the rails.

For hard-nose guide bars, the drive link tangs should nearly come out of the guide bar groove.

For sprocket nose guide bars, the saw chain come out of the guide bar groove about 1/8" (approximately 3 mm) and then snap back into the guide bar groove.



Shut Down Procedure

At breaks and the end of the shift, relieve saw chain tension to prevent damage as it cools and contracts.

AUTOMATIC SAW CHAIN TENSIONERS

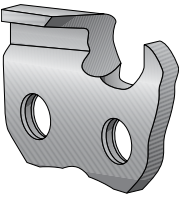
Automatic saw chain tensioners can be the most effective means to keep proper saw chain tension if they are designed to compensate for the dynamic affects of saw chain moving around the guide bar at high speeds. A loop of saw chain will increase in length as saw chain speed increases. Automatic saw chain tensioners can be optimized to respond to the changing loop length. As the saw chain goes from rest to full speed, the guide bar will need to move forward, to fill the gap and maintain the proper tension. If the guide bar does not move forward, the tension will decrease **sometimes as much as 50%** and can result in thrown saw chain.

When the saw chain comes to a stop the loop length will decrease and the guide bar must move back or the tension will become excessive.

The proper amount of force to apply to the guide bar during saw chain tensioning is shown on Technical Data on page 22.

16H – Harvester Saw Chain, Micro Chisel® – .404"

Micro Chisel®



P/N	Gauge
16H	.063" 1.6 mm

Use

End View

7/32" 5.5 mm

3/16" 4.8 mm

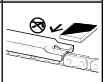
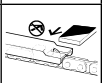
TOOL	File ●	File ■	File Guide	Depth Gauge	5-3/4" Grind Wheel	4-1/8" Grind Wheel
P/N	70502	12211	31686	38850	OR534-316	OR4125-316
Harvester multi-purpose tool						533689

16H* saw chain is specifically developed to cut fast and cut reliably under the high-stress of mechanical harvesting/processing.

- Micro Chisel® cutters have small-radius working corners for excellent performance and ease of maintenance.
- Patented Saw Chain Steel - OREGON® OCS-01 steel is patented and provides greater durability, especially in cold cutting conditions.
- **LubriLink™** tie straps help keep oil where it's needed – on the saw chain.

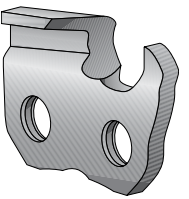
This chain will be discontinued in 2013.

16H – Harvester Saw Chain, Micro Chisel® – .404"

		|←x→|	A	B	C	D
	OREGON					
	16H	7/32"	35°	10°	80°	.050" 1.27 mm
	OREGON					
	16H	3/16"	35°	10°	60°	.050" 1.27 mm

18HX – Harvester Saw Chain, Micro Chisel® – .404"

Micro Chisel®



P/N	Gauge
18HX	.080" 2.0 mm

Use

End View

*

7/32" 5.5 mm

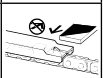
3/16" 4.8 mm

TOOL	File ●	File ■	File Guide	Depth Gauge	5-3/4" Grind Wheel	4-1/8" Grind Wheel
P/N	70502	12211	31686	38850	OR534-316	OR4125-316
Harvester multi-purpose tool						533689

18HX saw chain is an enhanced version of our aggressive, durable 18H saw chain built exclusively for mechanized harvesters/processors.

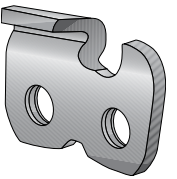
- Micro Chisel cutters have small-radius working corners for excellent performance and ease of maintenance.
- Patented Saw Chain Steel - OREGON® OCS-01 steel is patented provides greater durability, especially in cold cutting conditions.
- Blued cutters provide superior corrosion resistance and improved strength.
- Wider, tougher coined drive links are thicker above the groove for increased strength.
- Larger rivets for reduced saw chain stretch.
- Wider kerf for reduced guide bar binding.
- **LubriLink™** tie straps help keep oil where it's needed – on the saw chain.

18HX – Harvester Saw Chain, Micro Chisel® – .404"

		|←X→|	A	B	C	D
	OREGON					
	18HX	7/32"	35°	10°	80°	.050" 1.27 mm
	OREGON					
	18HX	3/16"	35°	10°	60°	.050" 1.27 mm

11BC – Chipper, Harvester Saw Chain – 3/4"

Chipper

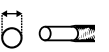


P/N	Gauge
11BC	.122" 3.1 mm

Use

End View

*



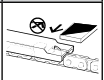
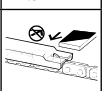
5/16" 7.9 mm	5/16" 7.9 mm

TOOL	File ●	File ■	File Guide	Depth Gauge	5-3/4" Grind Wheel	4-1/8" Grind Wheel
P/N	90410	12211	31686	26800	OR534-316	-
Harvester multi-purpose tool						533700

11BC is a big 3/4"-pitch .122"-gauge saw chain, built for mechanical harvester/processor applications. Features classic chipper-style cutters. Delivers excellent cutting performance with heavyweight durability.

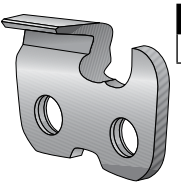
- Chipper cutters have fully rounded working corners and side plates for a big, aggressive bite, easy sharpening, and edge-holding durability.
- Tested, proven chassis delivers superior strength and outstanding durability.
- Patented Chain Steel – OREGON® OCS-01 steel is patented and provides greater durability.

11BC – Chipper, Harvester Saw Chain – 3/4"

		|←X→|	A	B	C	D
	OREGON					
	11BC	5/16"	35°	0°	85°	.060" 1.52 mm
	OREGON					
	11BC	5/16"	35°	0°	60°	.060" 1.52 mm

11H – Semi-Chisel, Harvester Saw Chain – 3/4"

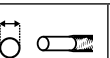
Semi-Chisel



P/N	Gauge
11H	.122" 3.1 mm

Use

End View

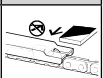
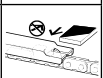
 *		
	5/16" 7.9 mm	5/16" 7.9 mm

TOOL	File ●	File ■	File Guide	Depth Gauge	5-3/4" Grind Wheel	4-1/8" Grind Wheel
P/N	90410	12211	107529	26800	OR534-516	-
Harvester multi-purpose tool						533700

Putting semi-chisel cutters on a 3/4"-pitch saw chain, the 11H cutter features more aggressive grind angles for maximum performance on more powerful machines.

- Semi-chisel cutters make 11H an aggressive, high-performance saw chain.
- Tested, proven chassis delivers superior strength and outstanding durability.
- Patented Saw Chain Steel – OREGON® OCS-01 steel is patented and provides greater durability, especially in cold cutting conditions.
- Advanced chrome plating process for excellent stay-sharp and edge-holding durability.
- 11H cutters provide wider gullets, longer stay-sharp, and an offset footprint to help minimize guide bar "knife-edging."

11H – Semi-Chisel, Harvester Saw Chain – 3/4"

		|←x→|	A	B	C	D
	OREGON					
	11H	5/16"	30°	0°	80°	060" 1.52 mm
	11H	5/16"	30°	0°	80°	.070" 1.78 mm
	OREGON					
	11H	5/16"	30°	0°	50°	.060" 1.52 mm
	11H	5/16"	30°	0°	80°	070" 1.778 mm

11H cutters are set to .060"/1.52 mm at the factory and should be left at those settings for cold cutting conditions. In other conditions, .070"/1.788 mm will yield better cutting performance.

OREGON® Saw Chain Information

SAW CHAIN SPEED, FEED FORCE, SERVICE LIFE, AND SAFETY

It is well recognized higher saw chain speeds and/or guide bar feed forces with sufficient power input generally equate to faster cutting speeds, but at a cost to a cutting system in shortened service life.

Exceeding our guidelines for recommended cutting system maintenance, saw chain speed and feed forces will result in increased wear, shorter cutting system service life, and increase the potential for a chain shot event and potential injury or death. At no time should the maximum saw chain speed be exceeded.

SAW CHAIN SPEED AND FEED FORCE

Saw chain speed may be calculated according to the formula below. For quick reference, the charts on page 21 show saw chain speed as a function of the drive sprocket tooth count for a variety of saw chains and over a range of drive shaft speeds.

Our recommendations for saw chain speed and feed-force are supplied in the Technical Data tables on page 22. These guidelines are intended to provide a balance between performance and cutting system service life (wear). When our recommendations for cutting system maintenance, saw chain speed and guide bar feed-forces are exceeded, it will result in:

1. Reduced cutting system service life
2. Will require extra lubrication
3. Increased potential for a saw chain shot event and potential injury or death to operators, ground personnel and bystanders

SAW CHAIN SPEED CALCULATION

SPEED = (RPM) x (T) x (P)

RPM = Motor or drive shaft revolutions per minute
T = Number of teeth on drive sprocket
P_1 = Saw chain pitch factor for ft/min
P_2 = Saw chain pitch factor for m/sec

Saw Chain Pitch	FACTOR	
	P_1	P_2
.404"	.067	.00034
3/4"	.131	.00066

OREGON® Saw Chain Information

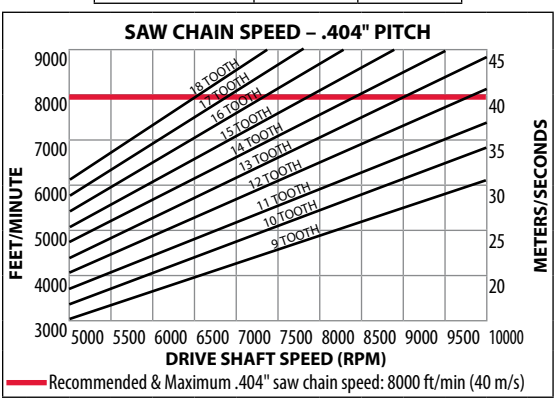
ESTIMATING CUTTING RATE

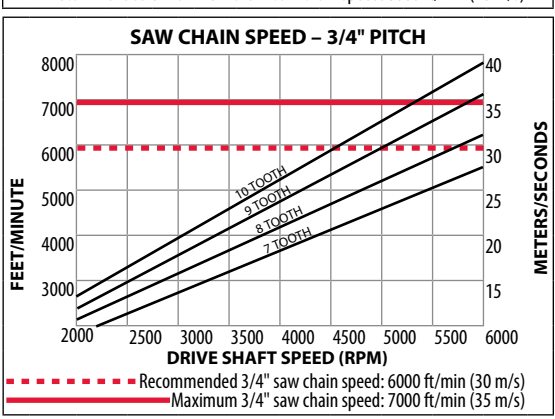
When running at recommended saw chain speeds (see tables that follow), an estimate of soft-wood cutting rate may be calculated according to the following expression:

CUTTING RATE = (FACTOR) x (Hp)

Hp = Horsepower input to saw chain
F_1 = Factor for in^2/sec
F_2 = Factor for cm^2/sec

Saw Chain Pitch	FACTOR	
	F_1	F_2
.404"	3.5	22.6
3/4"	2.8	18.1





These recommendations apply to OREGON® brand saw chain only, and are not meant to apply to any other saw chain brand.

OREGON® Saw Chain Information

TECHNICAL DATA *(ENGLISH UNITS)*

OREGON® SAW CHAIN NUMBER	.404" pitch		3/4" pitch	
	16H	**18HX**	**11BC**	**11H**
PHYSICAL PROPERTIES				
Weight, lbs./ft.	0.220	0.261	0.640	0.630
Tensile strength, lbs.	2600	2700	6700	6700
Kerf, in.	0.34	0.36	0.57	0.57
Gauge, in.	0.063	0.080	0.121	0.121
Actual pitch, in.	0.4055	0.4055	0.7835	0.7835
Cutter height, in.	0.542	0.562	1.003	1.005
Guide bar thickness, in. min/max	0.225/0.237	0.238/0.252	0.355/0.410	0.355/0.410
Drive sprocket thickness, in.	0.46	0.46		
OPERATING PARAMETERS				
Guide bar/Saw chain oil				
Cubic inches/min	2.0	2.0	2.5	2.5
Cubic inches/stroke	0.5	0.5	0.6	0.6
Power, hp min/max	5/60	5/65	5/90	10/100
Force on guide bar to tension saw chain, lbs.	110	110	150	150
Guide bar feed load, at center, lbs.				
min/max	30/180	30/200	30/300	30/300
recommended	135	150	200	200
Saw chain speed, ft./min				
min/max	3000/8000	3000/8000	1500/7000	1500/7000
recommended	8000	8000	6000	6000
Min. guide bar adjustment, in/in. of guide bar	0.015	0.015	0.019	0.019

TECHNICAL DATA *(METRIC UNITS)*

OREGON® SAW CHAIN NUMBER	.404" pitch		3/4" pitch	
	16H	**18HX**	**11BC**	**11H**
PHYSICAL PROPERTIES				
Mass, kg/m	0.327	0.388	0.953	0.937
Tensile Strength, N	11500	12000	30000	30000
Kerf, mm	8.6	9.1	14.5	14.5
Gauge, mm	1.6	2.0	3.1	3.1
Actual pitch, mm	10.30	10.30	19.90	19.90
Cutter height, mm	13.8	14.3	25.5	25.5
Guide bar thickness, mm min/max	5.7/6.0	6.0/6.4	9.0/10.4	9.0/10.4
Drive sprocket thickness, mm	12	12		
OPERATING PARAMETERS				
Guide bar/Saw chain oil				
cc/min	30	30	40	40
cc/stroke	8	8	10	10
Power, kW min/max	5/45	5/50	5/65	5/75
Force on guide bar to tension saw chain, N	490	490	668	668
Guide bar feed load, at center, N				
min/max	100/800	100/900	100/1300	100/1300
recommended	600	700	900	900
Saw chain speed, m/sec				
min/max	15/40	15/40	10/35	10/35
recommended	40	40	30	30
Min. guide bar adjustment, cm/cm of guide bar	0.15	0.15	0.19	0.19

OREGON® Saw Chain Information

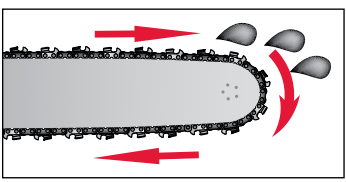
INSTALLATION AND BREAK IN

Critical times for saw chain is at the break in period for new and newly sharpened saw chain, especially during winter cutting conditions.

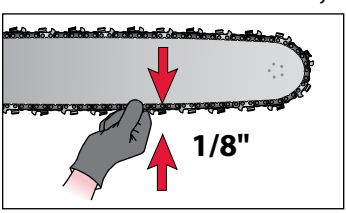
For new saw chain check saw chain tension often during the first 10 minutes of use.

Consider transporting new and newly sharpened saw chain to and from the job site in a container with lubricant.

1. Lubricate your saw chain prior to use.
2. Increase saw speed gradually over the first 2 – 4 minutes of running time while cycling the guide bar, until lubricant is observed coming off the tip of the guide bar.



3. Check saw chain tension and adjust if necessary.



Saw Chain Maintenance

HOW TO SHARPEN SAW CHAIN

⚠WARNING: There is risk of serious injury or death to the machine operator, ground personnel and bystanders from chain shot. Chain shot occurs when a piece or pieces of cutting chain from the end of a broken saw chain in mechanized timber harvesting or processing is ejected at a high velocity. Chain shot typically originates near the drive end of the cutting system but can also originate from the guide bar tip area. Saw chain pieces usually travel in the cutting plane of the guide bar, but can deviate to either side (see illustration page 4). Although the shot cone reflects the most likely chain shot path, deflections can occur, substantially expanding where chain pieces may travel.

DO NOT USE SAW CHAIN THAT:

- Has broken twice. Industry groups recommend discarding saw chain after the second break.
- Is severely damaged.
- Has excessive stretch/wear.
- Has broken or cracked components.
- Has loose rivet joints. If you can rotate the rivets with your fingers, they're too loose.

1. Always wear protective gloves and safety glasses when handling saw chain.
2. Before sharpening, clean, inspect, repair, replace or discard damaged saw chain.

Remember! If it has broken twice, discard the saw chain!

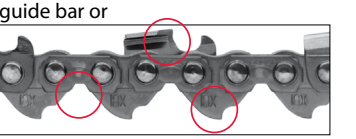
3. During your inspection, check for each of the following:

- Proper installation of saw chain components.
- Cracked, bent, or broken saw chain components.
- Cracks on the foot print of the cutters and tie-straps.
- Ground contact damage on the cutters.
- ***Excessive saw chain stretch.*** (Use OREGON® stretch gauge tools to measure.)
- Abnormal chassis wear, or wear patterns on the chassis that indicate a worn guide bar or drive sprocket.
- Loose rivets.

Multi-purpose tool & stretch gauge

533689 .404" pitch

533700 3/4" pitch



4. Do not re-use saw chain that
- Has broken twice
- Has broken components
- Has been severely damaged
- Has excessive stretch
- Has loose rivet joints
- Has too much play (loose chassis components)

5. Sharpen in agreement with the manufacturer's recommendations.
- Grind to good chrome, keeping all cutter geometry equal.
- Avoid burned cutters by using light intermittent strokes and dressing the grinding wheel often.
- Never grind into chassis components.
- Dress the grinding wheel often.

6. Use the correct sharpening specifications for your OREGON® saw chain type. See pages 12 through 19.
- If unsure of your OREGON® saw chain type or part number, ask your OREGON® saw chain dealer.
- For sharpening saw chain with a grinder, see pages 26 – 28.
- For sharpening saw chain with a round file see pages 28 – 29.

7. Check and adjust depth gauges. See page 29 for instructions.

8. After sharpening the saw chain, clean off any particles of material, then LUBRICATE THE SAW CHAIN THOROUGHLY WITH GUIDE BAR OIL.

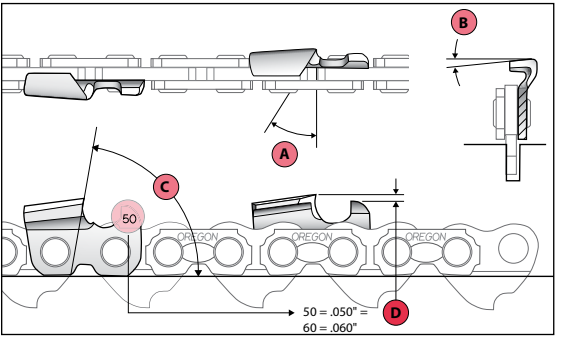
SHARPENING & MAINTENANCE TOOLS

OREGON									
16H	31686	40458	–	70502	12211	38850	OR 534-316	OR 4125-316	533689
18HX	31686	40458	–	70502	12211	38850	OR 534-316	OR 4125-316	533689
11BC	107617	–	90410	–	12211	26800	OR 534-516	–	533700
11H	107617	–	90410	–	12211	26800 107529	OR 534-516	–	533700

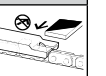
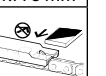
See page 26 for more detail on sharpening angles.

Saw Chain Maintenance

SHARPENING ANGLES



FILING AND GRINDING ANGLES

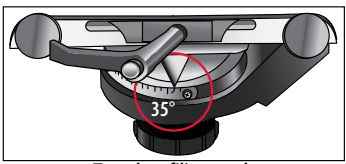
		|←X→|	A	B	C	D
	OREGON					
	16H	7/32"	35°	10°	80°	.050" 1.27 mm
	18HX	7/32"	35°	10°	80°	.050" 1.27 mm
	11BC	5/16"	35°	0°	85°	.060" 1.52 mm
	11H	5/16"	30°	0°	80°	060" 1.52 mm
	11H	5/16"	30°	0°	80°	070" 1.778 mm
	OREGON					
	16H	3/16"	35°	10°	60°	.050" 1.27 mm
	18HX	3/16"	35°	10°	60°	.050" 1.27 mm
	11BC	5/16"	35°	0°	60°	.060" 1.52 mm
	11H	5/16"	30°	0°	50°	060" 1.52 mm
	11H	5/16"	30°	0°	50°	070" 1.778 mm

11H cutters are set to .060"/1.52 mm at the factory and should be left at those settings for cold cutting conditions. In other conditions, .070"/1.788 mm will yield better cutting performance.

SHARPENING SAW CHAIN WITH A GRINDER

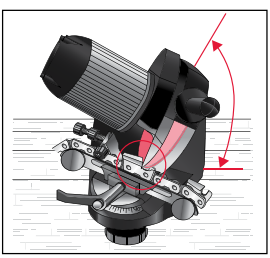
NOTE: Wear safety goggles.

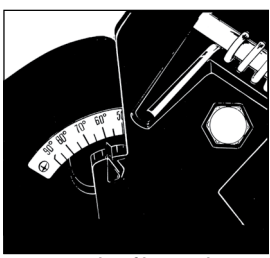
1. Set vise assembly to the proper **top plate filing angle**. See previous page for correct angles.



Top plate filing angle

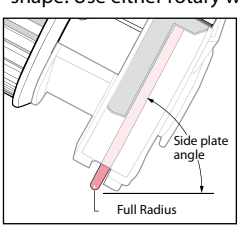
2. To set the proper grinder head angle, use the recommended **top plate cutting angle**. See previous page for correct angles.

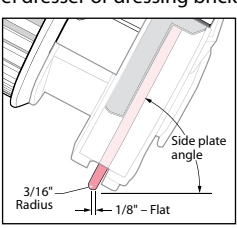


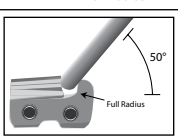


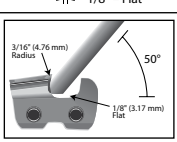
Top plate filing angle

3. Dress vitrified grinding wheel often to maintain correct shape. Use either rotary wheel dresser or dressing brick.



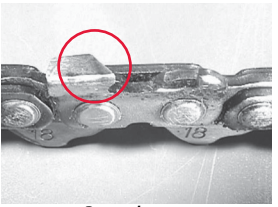






Saw Chain Maintenance

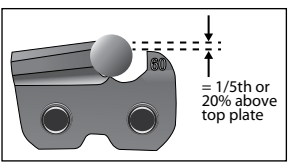
- To avoid burning cutters, use light, intermittent strokes.
- Never grind into other saw chain components.
- If damage is present on the chrome surface of top plate or side plate, grind back until damage is removed.
- Keep all cutter lengths equal.



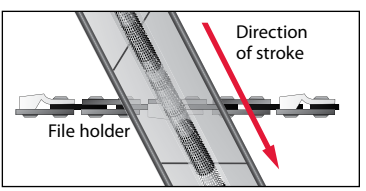
Burned cutter

SHARPENING SAW CHAIN WITH A ROUND FILE

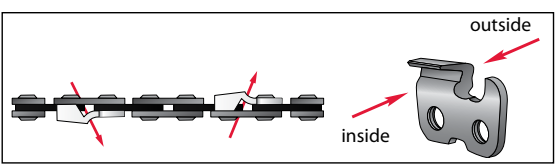
1. Be sure 1/5th or 20% of the file's diameter is always held above the cutter's top plate. Using the correct file guide is a the easiest way to hold the file in this position.



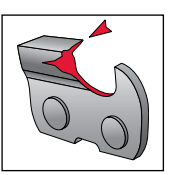
2. Keep the correct top plate filing angle line on your file guide parallel with your saw chain.



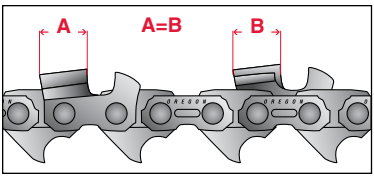
3. Sharpen cutters on one side of the saw chain first. File from the inside of each cutter to the outside. Then turn your chain saw around and repeat the process for cutters on the other side of the saw chain.



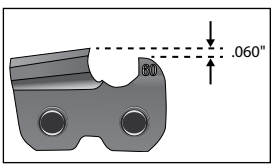
4. If damage is present on the chrome surface of top plates or side plates, file back until such damage is removed.



5. Keep all cutter lengths equal.

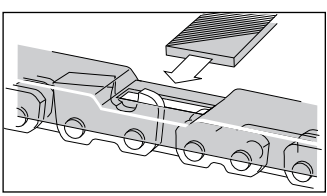


HOW TO SET DEPTH GAUGES

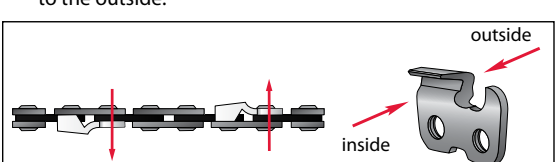


- Cutters should be sharpened before setting the depth gauge. See pages 24 through 29 for sharpening instructions.
- OREGON® Harvester saw chains have a number stamped on each depth gauge indicating the correct depth gauge setting.

1. Use a depth gauge tool with the correct built-in setting for your saw chain and check your depth gauges every three or four sharpenings.



2. Place the tool on top of your saw chain so one depth gauge protrudes through the slot in the tool.
3. If the depth gauge extends above the slot, file the depth gauge down level with the top of the tool using a flat file. Never file the depth gauge down enough to exceed the depth gauge setting specified in this manual for your OREGON® saw chain.
4. File from the inside of the round ground saw chain cutters to the outside.



Saw Chain Maintenance

OPTIONAL SHARPENING MODIFICATIONS

For optimum life and cutting speed the sharpening specifications can be modified. See page 26 for factory specifications.

Modify sharpening angles from factory specifications as noted below to optimize for specific cutting conditions.

	Top plate filing angle (A)	Side plate angle (B)	Top plate cutting angle (C)	Depth gauge setting (D)
Cutting conditions				
16H & 18HX				
Factory	35°	80°	60°	.050"
Softwood	40°	70°	60°	.050"
Hardwood	35°	80°	60°	.050"
Frozen wood	40°	85°	60°	.040"
11BC				
Factory	35°	85°	60°	.060"
Softwood	40°	75°	60°	.060"
Hardwood	35°	85°	60°	.060"
Frozen wood	40°	90°	60°	.050"
11H				
Factory	30°	80°	50°	.060"
Softwood	35°	70°	50°	.070"
Hardwood	30°	80°	50°	.070"
Frozen wood	25°	85°	50°	.060"

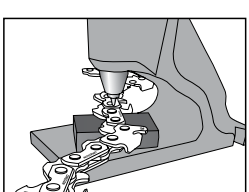
HOW TO BREAK OUT RIVETS

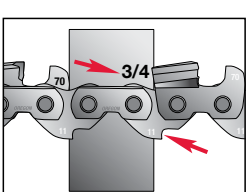
⚠WARNING: There is risk of serious injury or death to the machine operator, ground personnel and bystanders from chain shot. Chain shot occurs when a piece or pieces of cutting chain from the end of a broken saw chain in mechanized timber harvesting or processing is ejected at a high velocity. Chain shot typically originates near the drive end of the cutting system but can also originate from the guide bar tip area. Saw chain pieces usually travel in the cutting plane of the guide bar, but can deviate to either side (see illustration page 4). Although the shot cone reflects the most likely chain shot path, deflections can occur, substantially expanding where chain pieces may travel.

For maximum protection, machines should be equipped with saw chain shot guards, saw chain catchers, appropriate window enclosures, and follow recommendations contained in this handbook and your equipment's operator manuals.

Note: Wear safety goggles and gloves.

1. Select appropriate anvil. See pages 12 through 19 to determine proper pitch.
2. Select proper anvil slot number on saw chain breaker anvil which matches the drive link number on the saw chain to be broken (see Saw Chain Drive Link Number Chart below).

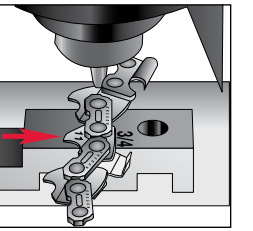




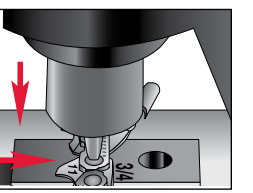
SAW CHAIN DRIVE LINK NUMBER CHART	
Anvil slot number	Drive link number
.404"	16
3/4"	11
18HX	18

Saw Chain Repair

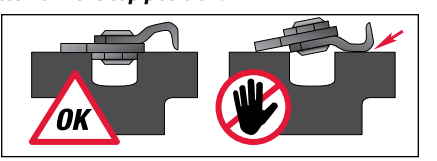
3. Insert saw chain portion for breaking into the proper slot of the saw chain anvil and push saw chain forward until bottom tie strap is flush with the far side of slot. (Drive link is then supported on both sides of slot.)



4. Position rivet head directly under punch. Pull handle down if using a bench saw chain breaker, or hammer out rivet of using a handheld punch. Do not use excessive force.

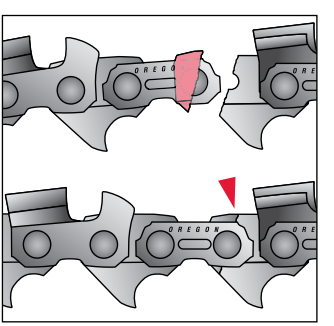


NOTE: Important– when breaking saw chain at cutter, make sure cutter is in the top position.



REMOVING RIVETS FROM BROKEN DRIVE LINKS

1. When removing rivets from broken drive links, hold the two broken segments together in their original (unbroken) positions as you tighten the saw chain link in the adjustable anvil.

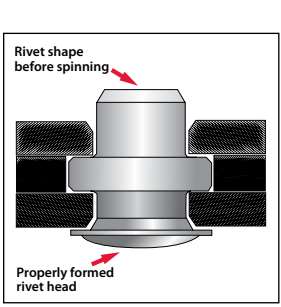


2. Repeat steps 3 and 4 from “How to Break Out Rivets.”

Special notes on joining Harvester saw chain and forming rivet heads

Rivet head shape:

- Rivet heads must be snug and secure while still allowing all joined parts to move freely.



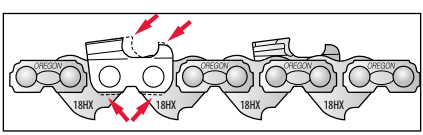
On .404" pitch 18HX, and 16H saw chains:

- Do not use a hammer to form rivet heads. Follow the instructions on pages 34 – 35.

On 3/4"-pitch 11BC and 11H saw chains:

- Avoid joining saw chain loops at the cutters. Join 3/4" saw chain loops only at the tie straps.
- For best results, OREGON® recommends that 3/4" rivets first be hit with a hammer once for good hole-fill, then spun on an OREGON® Heavy Duty Rivet Spinner for good head formation.
- Be careful to strike only the rivet when hammering rivet heads.

File new cutters back to match worn cutters and worn tie straps.

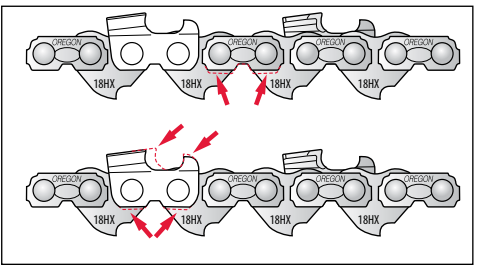


Saw Chain Repair

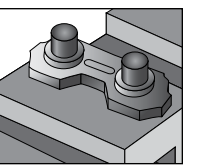
HOW TO INSTALL NEW SAW CHAIN PARTS

Note: Only use NEW OREGON® replacement parts that are the correct size and type to join and repair OREGON® saw chain. OREGON® replacement parts are not designed for use in other saw chain manufacturers' saw chain.

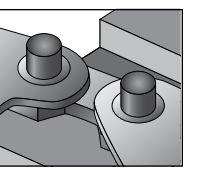
1. Remove rivets, and parts to be replaced, as shown under "How to Break Out Rivets," pages 31 – 32. **Never reassemble a saw chain with old preset tie straps — always use new preset tie straps.**
2. If needed, file off bottom of new parts to match existing worn parts. File new cutters back to match worn cutters.



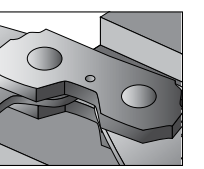
3. Place the preset tie strap on a flat outer surface of a saw chain breaker anvil. Be sure the rivets are pointing up.



4. Assemble saw chain to the preset tie strap.



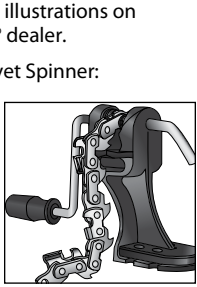
5. Assemble tie strap with brandmark or dot face up, and the notch toward the drive link tangs.



Saw Chain Troubleshooting

6. **Be sure parts are assembled in the correct location, sequence and direction.** Check the illustrations on page 8. If unsure, ask your OREGON® dealer.
7. Use OREGON® 24549 Heavy Duty Rivet Spinner:

- .404"-pitch saw chain (16H, 18HX,) use take up handle "A" and anvil "A". Do not use a hammer to assemble these saw chain types.
- 3/4"-pitch saw chain (11BC, 11H) use part number 108724. You can strike the rivet hub once to set the rivet in the tie strap.

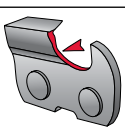


Most harvester saw chain problems are caused by:
- Excessive saw chain speed
- Excessive feed force
- Incorrect sharpening
- Lack of lubrication
- Incorrect saw chain tension

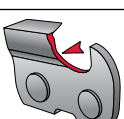
Here are the things to look for and the corrective actions you should take:

Problem

Cuts slow, cuts rough, or won't hold an edge
Look closely at your saw chain's cutters, and compare them to the illustrations that follow.

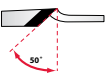


1. Light abrasive damage on side plates.
Cause: Cutters came in contact with light abrasive materials.
Symptoms: Very slow cutting
Remedy: File cutters back until all damage is removed.

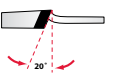


2. Severe abrasive damage on side and/ or top plates.
Cause: Cutters hit or cut material other than wood, such as rock, dirt or sand. This type of damage typically occurs when cutting close to the ground.
Symptoms: Saw chain won't cut or cuts crookedly if damage is to one side of saw chain. Possible guide bar rail damage.
Remedy: File cutters back until all damage is removed.

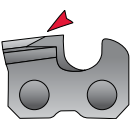
Saw Chain Troubleshooting



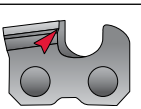
3. Too much top plate filing angle.
Cause: Excessive top plate angle while filing or grinding.
Symptoms: Cutting angle is very sharp, but dulls fast. Cutting action rough and erratic.
Remedy: Resharpen cutters while holding file at the correct top plate filing angle for saw chain. Be sure file guide is stamped with saw chain's correct top plate angle.



4. Too little top plate filing angle.
Cause: Filed or ground at less than the recommended angle.
Symptoms: Slow cutting. Requires extra effort to cut. Possible binding in cut.
Remedy: Resharpen cutters while holding file at the correct top plate filing angle for saw chain. Be sure file guide is stamped with saw chain's correct top plate angle.

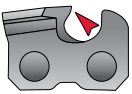


5. Too much top plate cutting angle.
Cause: File held too low or file too small. Grinders: saw chain ground at the wrong top plate cutting angle or using a wrong size grinding wheel.
Symptom: Poor stay-sharp. Rapid dulling. Cuts fast for a short time, then dulls.
Remedy: File too small or held too low. Resharpen cutters with file of correct size, held in correct position. Use correct file guide.

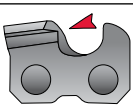


6. Too little top plate cutting angle.
Cause: File held too high or file too large. Grinders: Saw chain ground at wrong top plate cutting angle or using a wrong size grinding wheel.
Symptoms: Slow cutting. Requires extra time. Premature wear to saw chain and guide bar rails.
Remedy: File too large or held too high. Resharpen cutters with file of correct size, held in correct position. Use correct file guide.

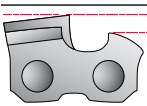
Saw Chain Troubleshooting



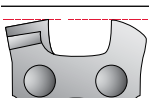
7. Too much hook in side plate.
Cause: File held too low or file too small. Grinders: Saw chain ground at wrong top-plate cutting angle, grinding wheel too small or grinding too deep into body of cutter.
Symptoms: Rough cutting. Saw chain grabs. Cutters dull quickly or won't hold cutting edge. Top plate breakage and/or saw chain stretch.
Remedy: File too small or held too low. Resharpen cutters with file of correct size, held in correct position. Use correct file guide.



8. Backslope on side plate.
Cause: File held too high or file too large. Grinders: Saw chain ground at wrong top plate cutting angle, grinding wheel too large, or grinding wheel not grinding deep enough into body of cutter.
Symptoms: Slow cutting. Requires extra time to cut. Premature wear to saw chain and guide bar rails.
Remedy: File too large or held too high. Resharpen cutters with file of correct size, held in correct position. Use correct file guide.



9. Low depth gauges.
Cause: Depth gauge never lowered.
Symptoms: Rough cutting. Saw chain grabs. Excessive wear to heel of cutters, opposing tie straps, guide bar rails. Top plate breakage and/or saw chain stretch.
Remedy: In most cases, cutters cannot be filed back enough to correct for depth gauges that are too low. Replace saw chain.



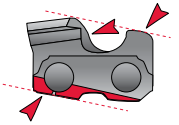
10. High depth gauges.
Cause: Depth gauges never lowered.
Symptoms: Slow cutting. Excessive wear to saw chain and guide bar rails.
Remedy: File depth gauges down to their correct height.

Note: See pages 26 – 29 for the proper filing techniques to use when performing the remedies above.

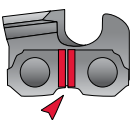
Saw Chain Troubleshooting

Problem

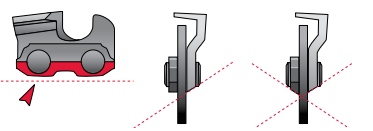
Cutters or tie straps wear heavily or break.



11. Excessive heel wear on cutters and opposite tie straps; cracks under rear rivet holes.
Cause: Forcing dull saw chain to cut. Low depth gauge settings. Lack of lubrication. Loose saw chain tension.
Symptoms: Excessive heel wear on cutters. Saw chain breakage. Excessive saw chain stretch
Remedy: Replace worn or cracked cutters and/or tie straps. Sharpen cutters properly and often. Use proper saw chain tension and plenty of lubrication.



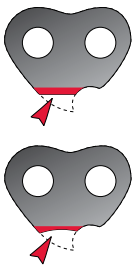
12. Tie straps between cutters, broken in the center.
Cause: Incorrect field assembly of saw chain components.
Symptoms: Broken tie straps.
Remedy: Replace broken components. See "How to Install New Saw Chain Parts" on pages 34 – 35.



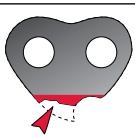
13. Bottoms of tie straps and cutters worn out of square.
Cause: Worn guide bar rails.
Symptoms: Bottoms of tie straps and cutters worn out of square.
Remedy: If saw chain is worn excessively, replace saw chain. If guide bar groove is too wide, replace guide bar. If rails are worn, dress top of guide bar to square. Maintain proper lubrication and saw chain tension. See "Guide Bar Troubleshooting" on pages 64 – 72.

Problem

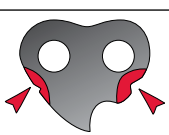
Drive links wear heavily or break.



14. Straight or concave bottoms.
Cause: Straight bottoms are due to shallow guide bar body groove. Concave bottoms are due to shallow guide bar nose groove.
Symptoms: Drive link tangs worn straight or concave. Drive links can't clean guide bar groove. Tendency to throw saw chain from guide bar.
Remedy: Replace guide bar, drive sprocket or both. Sharpen drive links or replace entire saw chain if many drive links are damaged.

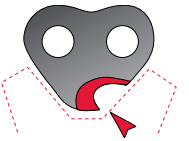


15. Battered and broken bottoms.
Cause: Worn or broken drive sprocket. Loose saw chain tension or saw chain jumping from guide bar groove. Results in damage from revolving drive sprocket.
Symptoms: Drive links are burred or nicked. Drive links may not fit in guide bar groove. Drive links can't clean guide bar groove.
Remedy: Maintain proper tension to prevent saw chain from climbing out of spur drive sprocket. Keep guide bar groove clear of debris. Replace drive sprocket if worn. Replace drive links or replace entire saw chain if many drive links are damaged.

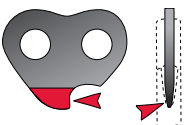


16. Peening in front or back.
Cause: Worn drive sprocket. Pin sprocket systems are known to concentrate load to back of drive link, causing premature wear.
Symptoms: Change in drive link shape. Tight joints in saw chain. Saw chain stretch. Life of saw chain shortened.
Remedy: Replace drive sprocket and/or pins. Replace saw chain. Do not attempt to run a new saw chain on an old drive sprocket, or an old saw chain on a new drive sprocket.

Saw Chain Troubleshooting

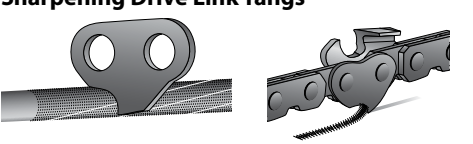


17. Drive link tang turned up.
Cause: Worn drive sprocket.
Symptoms: Drive link tangs hit bottom.
Remedy: Replace drive sprocket Sharpen drive link tangs (as shown in "Sharpening Drive Link Tangs" (see below) if possible, or replace saw chain.



18. Sides worn round or thin at bottoms.
Cause: Guide bar rails have spread, or one rail has worn low, allowing saw chain to lean over. Improper sharpening angles. One side of saw chain dull. Use of .063" gauge saw chain in .080" guide bar.
Symptoms: Saw chain cuts crookedly. Accelerated guide bar rail and saw chain wear.
Remedy: Ensure guide bar and saw chain gauge match. Sharpen cutters frequently, use recommended angles. Have guide bar rails serviced by dealer, or if possible dress guide bar rails square. If guide bar groove is spread too wide, replace guide bar. If saw chain wear is extensive, replace saw chain.

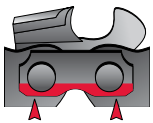
Sharpening Drive Link Tangs

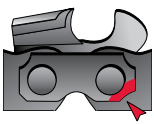


Pointed drive link tangs help remove chips and debris from your guide bar groove. Sharpen damaged tangs back to original shape with a round file.

Problem

Saw chain has tight joints.





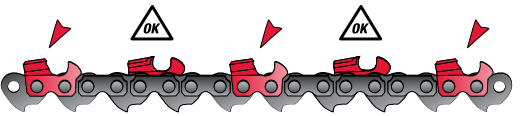
19. Peening on bottom or front of cutters and tie straps.
Cause: Improper saw chain tension or a worn out drive sprocket.
Symptoms: Saw chain stretch or saw chain breakage.
Remedy: Saw chain with tight joints cannot be repaired. Replace the saw chain and maintain proper tension. Replace the rim drive sprocket if worn.

20. Peening in notches of cutters and tie straps.
Cause: Worn spur drive sprocket.
Symptoms: Saw chain stretch or saw chain breakage.
Remedy: Replace the spur drive sprocket. Replace the saw chain. Always maintain proper tension and do not run saw chain on a worn drive sprocket.

Saw Chain Troubleshooting

Problem

Saw chain cuts crookedly/leans to one side/cuts unevenly



21. Damage to cutters on one side of saw chain.
Cause: Cutters on one side of saw chain damaged by hitting the saw box or the ground/debris.
Symptoms: Guide bar and saw chain bind in cut. Could result in guide bar and saw chain breakage when removing guide bar from tree. Uneven guide bar rail wear.
Remedy: File cutters back enough to remove all damage. Square up guide bar rails if uneven.

22. Different cutter top-plate lengths
Cause: Inconsistent sharpening.
Symptoms: Guide bar and saw chain bind in cut. Could result in guide bar and saw chain breakage when removing guide bar from tree. Uneven guide bar rail wear.
Remedy: File cutters back to even cutter top plate lengths. Square up guide bar rails if uneven.

GUIDE BAR MOUNT TYPES AND DRIVE SPROCKET TOOTH COUNTS

.404"		3/4"	
Guide Bar Mount Type	Drive Sprocket Tooth Count	Guide Bar Mount Type	Drive Sprocket Tooth Count
B	13 – 16	C	7
D	17 – 18	E	9
L	11 – 13	F	8 – 9
M	8 – 10	H	21
N	14 – 16	J	8
Y	13	K	7 – 8
		P	15
		T	9 – 10
		V	9 – 10

.404" GUIDE BAR MOUNTS

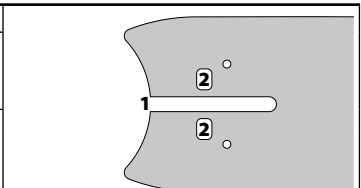
D104

Drive sprocket tooth count: 17, 18

Dimensions:

❶ = .394" x 3.338"

❷ = .404" x .555"



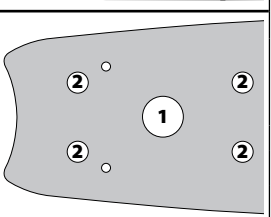
L003

Drive sprocket tooth count: 11, 12, 13

Dimensions:

❶ = 7/8" (.875")

❷ = .448"



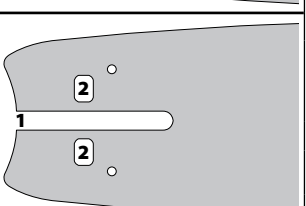
L104

Drive sprocket tooth count: 11, 12, 13

Dimensions:

❶ = .394" (10mm) x 3.338"

❷ = .555" x .404"



Guide Bar Mounts

.404" GUIDE BAR MOUNTS, cont.

L114

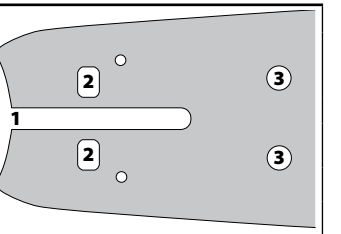
Drive sprocket tooth count: 11, 12, 13

Dimensions:

❶ = .394" (10mm) x 3.338"

❷ = .555" x .404"

❸ = .435"



L148

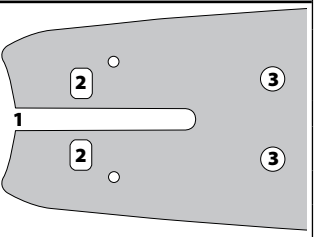
Drive sprocket tooth count: 11, 12, 13

Dimensions:

❶ = .394" (10mm) x 3.338"

❷ = .555" x .404"

❸ = .435"



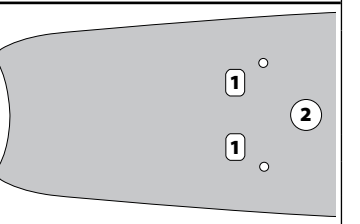
L205

Drive sprocket tooth count: 11, 12, 13

Dimensions:

❶ = .555" x .404"

❷ = .640"



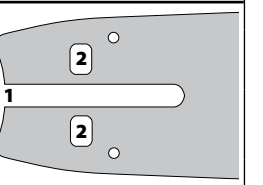
M104

Drive sprocket tooth count: 8, 9, 10

Dimensions:

❶ = .394" (10mm) x 3.338"

❷ = .555" x .404"



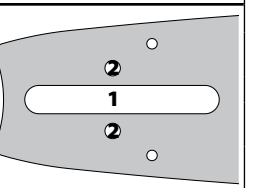
M226

Drive sprocket tooth count: 8, 9, 10

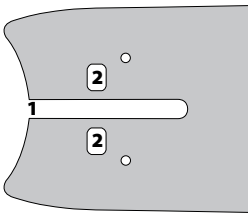
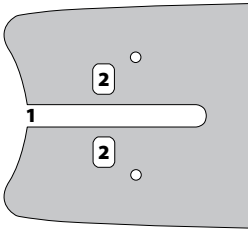
Dimensions:

❶ = .570" x 3.914"

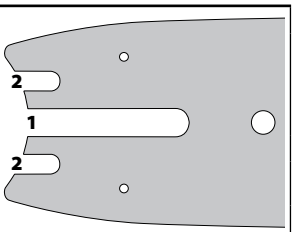
❷ = .311" radius



.404" GUIDE BAR MOUNTS, cont.

N104 Drive sprocket tooth count: 14, 15, 16 Dimensions: ❶ = .394" (10mm) x 3.338" ❷ = .555" x .404"	
N114 Drive sprocket tooth count: 14, 15, 16 Dimensions: ❶ = .394" (10mm) x 3.338" ❷ = .555" x .404" ❸ = .435"	
Y104 Drive sprocket tooth count: 13 Dimensions: ❶ = .394" (10mm) x 3.338" ❷ = .555" x .404"	

.404" JET-FIT® GUIDE BAR MOUNTS

B149 Drive sprocket tooth count: 13, 14, 15, 16 Dimensions: ❶ = .581" (15mm) x 3.406" ❷ = .413" x .848"	

Guide Bar Mounts

.404" JET-FIT® GUIDE BAR MOUNTS, cont.

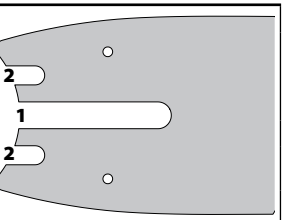
B163

Drive sprocket tooth count: 13, 14, 15, 16

Dimensions:

❶ = .581" (15mm) x 3.406"

❷ = .413" x .838"



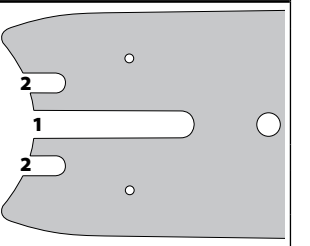
D149

Drive sprocket tooth count: 17, 18

Dimensions:

❶ = .581" (15mm) x 3.406"

❷ = .413" x .814"



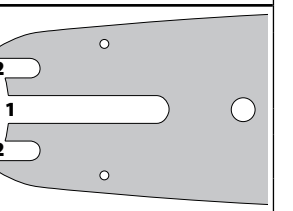
L149

Drive sprocket tooth count: 11, 12, 13

Dimensions:

❶ = .581" (15mm) x 3.406"

❷ = .413" x .814"



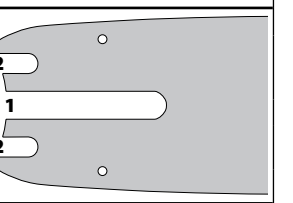
L163

Drive sprocket tooth count: 11, 12, 13

Dimensions:

❶ = .581" (15mm) x 3.406"

❷ = .413" x .814"



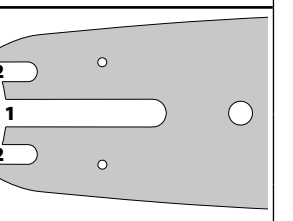
L172

Drive sprocket tooth count: 11, 12, 13

Dimensions:

❶ = .581" (15mm) x 3.406"

❷ = .413" x .814"



NOTE: Not interchangeable with 149 or 163 mounts

3/4" GUIDE BAR MOUNTS

C159

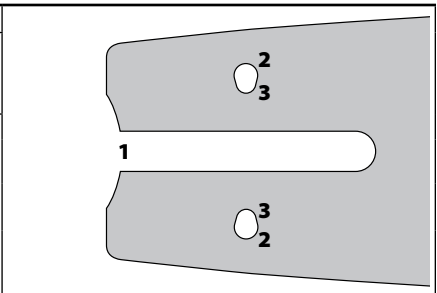
Drive sprocket tooth count: 7

Dimensions:

❶ = .635" x 4.502"

❷ = .190" radius

❸ = .151" radius



C211

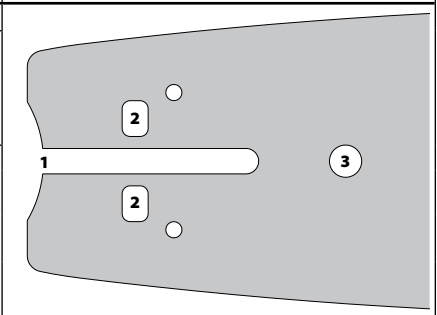
Drive sprocket tooth count: 7

Dimensions:

❶ = .394" x 3.338"

❷ = .404" x .555"

❸ = .500" radius



F212

Drive sprocket tooth count: 8, 9

Dimensions:

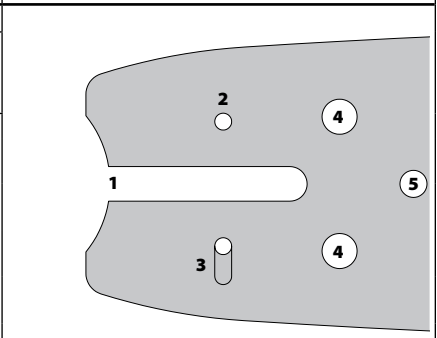
❶ = .640" x 3.640"

❷ = .313" radius

❸ = .313" x .867"

❹ = .648" radius

❺ = .500" radius



Guide Bar Mounts

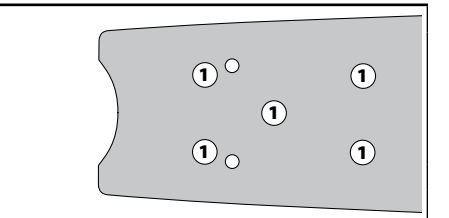
3/4" GUIDE BAR MOUNTS, cont.

J134

Drive sprocket tooth count: 8

Dimensions:

❶ = .562"



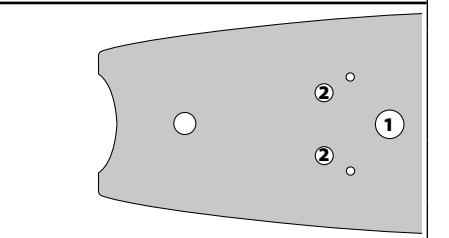
K205

Drive sprocket tooth count: 7, 8

Dimensions:

❶ = .645"

❷ = .410"



K225

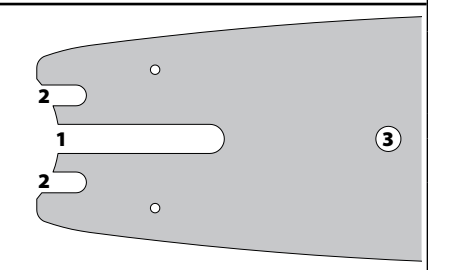
Drive sprocket tooth count: 7, 8

Dimensions:

❶ = .581" x 3.288"

❷ = .413" x .889"

❸ = .500" radius



T043 RSN

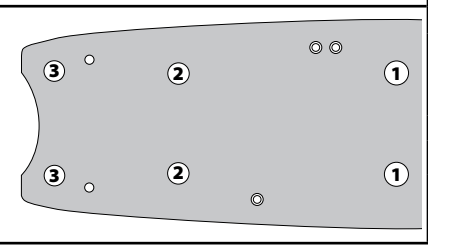
Drive sprocket tooth count: 9, 10

Dimensions:

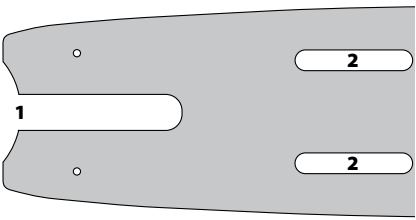
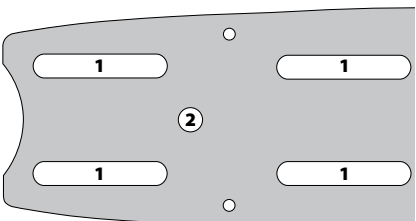
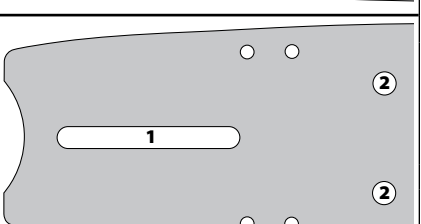
❶ = .609"

❷ = .562"

❸ = .531"

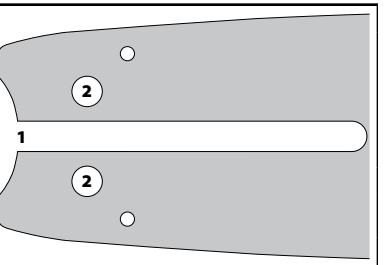
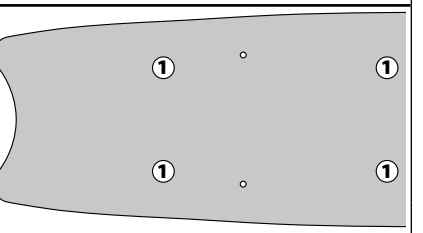
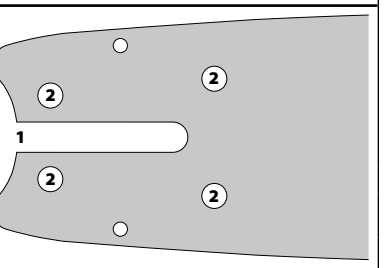
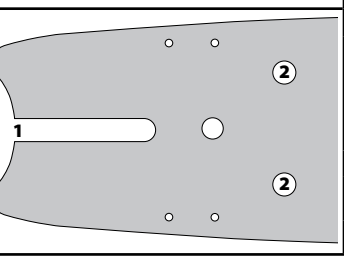


3/4" GUIDE BAR MOUNTS, cont.

T130 Drive sprocket tooth count: 9, 10 Dimensions: ❶ = .875" x 4.054" ❷ = .531" x 3"	
T132 Drive sprocket tooth count: 9, 10 Dimensions: ❶ = .531" x 3.064" ❷ = .562"	
T133 Drive sprocket tooth count: 9, 10 Dimensions: ❶ = .515" x 4.129" ❷ = .515"	

Guide Bar Mounts

3/4" GUIDE BAR MOUNTS, cont.

T138 Drive sprocket tooth count: 9, 10 Dimensions: ❶ = .635" x 7.410" ❷ = .650"	
T145 Drive sprocket tooth count: 9, 10 Dimensions: ❶ = .570"	
T146 Drive sprocket tooth count: 9, 10 Dimensions: ❶ = .637" x 3.627" ❷ = .531"	
T151 Drive sprocket tooth count: 9, 10 Dimensions: ❶ = .535" x 3.226" ❷ = .531"	

3/4" GUIDE BAR MOUNTS, cont.

T152

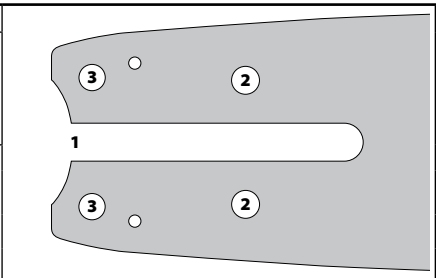
Drive sprocket tooth count: 9, 10

Dimensions:

❶ = .760" x 5.910"

❷ = .562"

❸ = .531"



T161

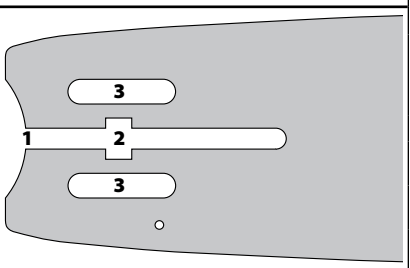
Drive sprocket tooth count: 9, 10

Dimensions:

❶ = .447" x 5.500"

❷ = .880" x .568"

❸ = .531" x 2.281"



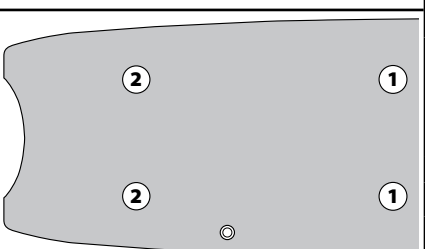
T168

Drive sprocket tooth count: 9, 10

Dimensions:

❶ = .609"

❷ = .562"



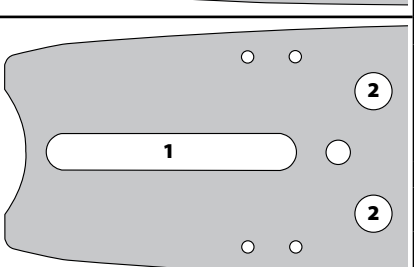
T190

Drive sprocket tooth count: 9, 10

Dimensions:

❶ = .760" x 5.25"

❷ = .760"



Guide Bar Mounts

3/4" GUIDE BAR MOUNTS, cont.

T208

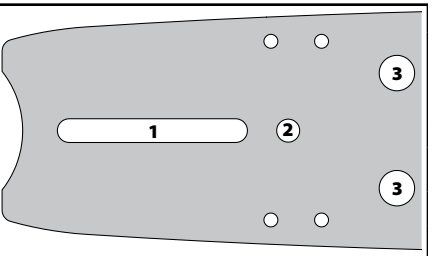
Drive sprocket tooth count: 9, 10

Dimensions:

❶ = .515" x 4.129"

❷ = .500"

❸ = .770"



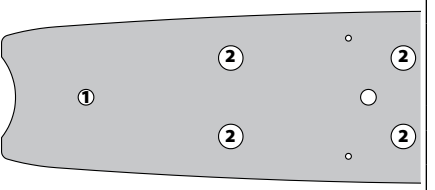
T210

Drive sprocket tooth count: 9, 10

Dimensions:

❶ = .500"

❷ = .782"



T217

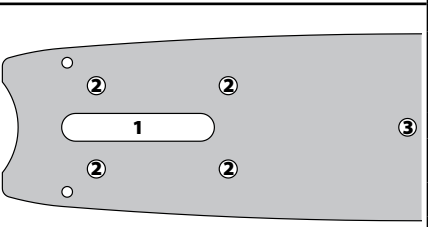
Drive sprocket tooth count: 9, 10

Dimensions:

❶ = .787" x 4.330"

❷ = .512"

❸ = .500"



T219

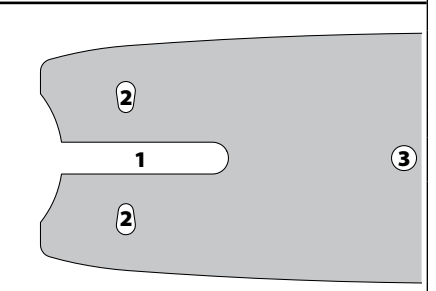
Drive sprocket tooth count: 9, 10

Dimensions:

❶ = .635" x 3.312"

❷ = .380" radius x .302" radius x .620"

❸ = .500"



3/4" GUIDE BAR MOUNTS, cont.

T221

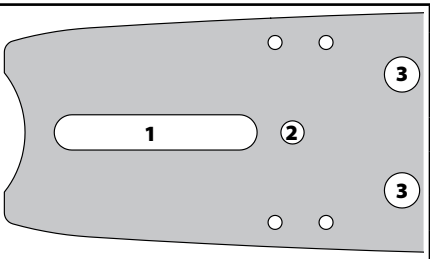
Drive sprocket tooth count: 9, 10

Dimensions:

❶ = .760" x 4.374"

❷ = .500"

❸ = .760"



T222

Drive sprocket tooth count: 9, 10

Dimensions:

❶ = .500"

❷ = .679"

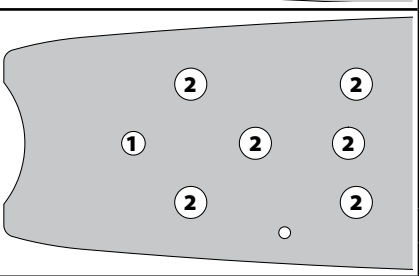
T223

Drive sprocket tooth count: 9, 10

Dimensions:

❶ = .500"

❷ = .679"



T227

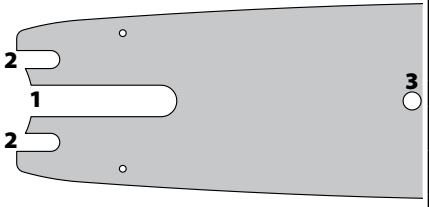
Drive sprocket tooth count: 9, 10

Dimensions:

❶ = .875" x 4.000"

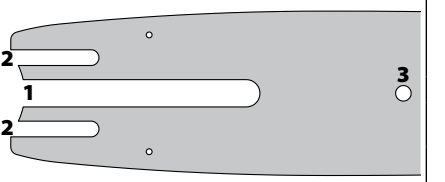
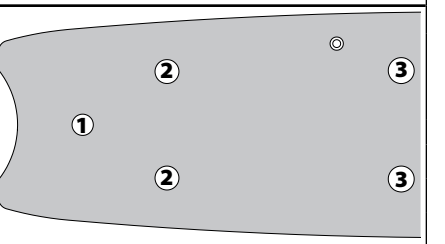
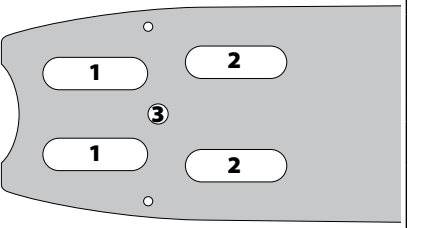
❷ = .500" x 1.196"

❸ = .500"



Guide Bar Mounts

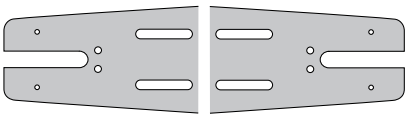
3/4" GUIDE BAR MOUNTS, cont.

T229 Drive sprocket tooth count: 9, 10 Dimensions: ❶ = .880" x 7.584" ❷ = .506" x 2.842" ❸ = .500"	
T230 Drive sprocket tooth count: 9, 10 Dimensions: ❶ = .500" ❷ = .562" ❸ = .609"	
V127 Drive sprocket tooth count: 9, 10 Dimensions: ❶ = .812" x 2.577" ❷ = .812" x 2.453" ❸ = .500"	

SYMMETRICAL TWO-ENDED GUIDE BAR MOUNTS

9135

Drive sprocket tooth count: 9, 10

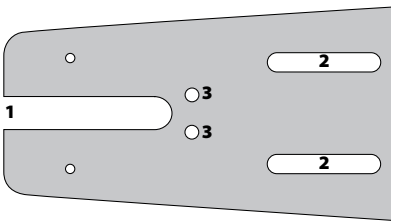


Dimensions:

❶ = .906" x 4.500"

❷ = .531" x 3.000"

❸ = .375"



9136

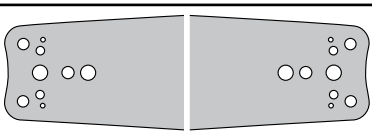
Drive sprocket tooth count: 9, 10

Dimensions:

❶ = .516"

9137

Drive sprocket tooth count: 9, 10



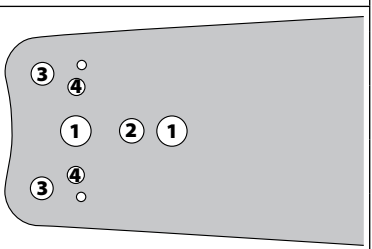
Dimensions:

❶ = .687"

❷ = .553"

❸ = .512"

❹ = .384"

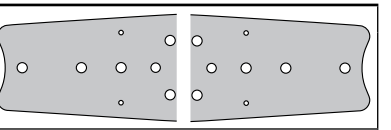


Guide Bar Mounts

SYMMETRICAL TWO-ENDED GUIDE BAR MOUNTS, cont.

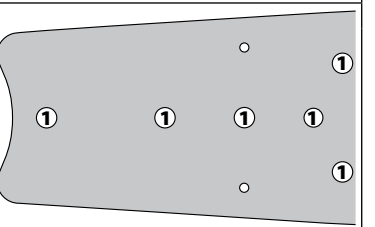
9164

Drive sprocket tooth count: 9, 10



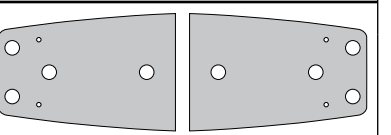
Dimensions:

❶ = .531"



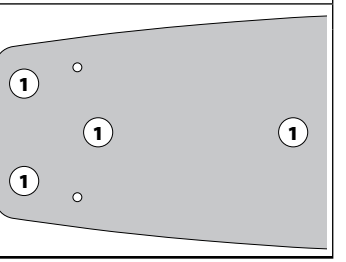
E214

Drive sprocket tooth count: 9, 10



Dimensions:

❶ = .781"



3/4" ASYMMETRICAL DOUBLE-ENDED MOUNTS

9155

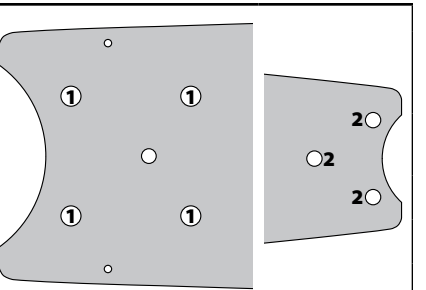
Drive sprocket tooth count: 15

Sprocket end dimension:

❶ = 4 at .656"

Idler end dimension:

❷ = 3 at .531"



3/4" ASYMMETRICAL DOUBLE-ENDED GUIDE BAR MOUNTS, cont.

9191

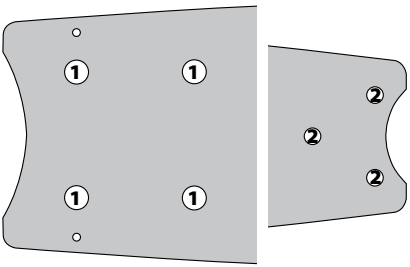
Drive sprocket tooth count: 14

Sprocket end dimension:

❶ = 4 at .760"

Idler end dimension:

❷ = 3 at .531"



H175

Drive sprocket tooth count: 21

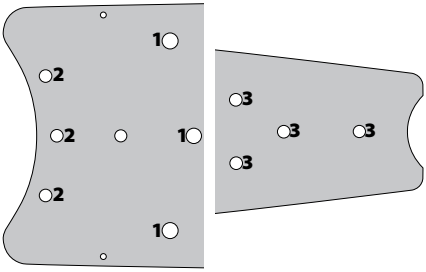
Sprocket end dimension:

❶ = 3 at .656"

❷ = 3 at .531"

Idler end dimension:

❸ = 4 at .531"



P207

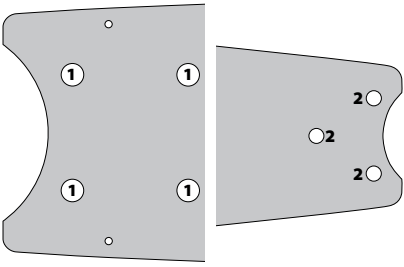
Drive sprocket tooth count: 15

Sprocket end dimension:

❶ = 4 at .781"

Idler end dimension:

❷ = 3 at .531"

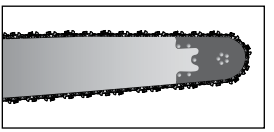


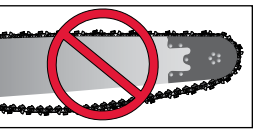
OREGON® Guide Bar Maintenance

For proper mounting of your guide bar, refer to the operator's manual for your harvesting equipment.

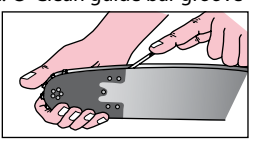
Basic Guide Bar Maintenance Tasks	
▲ Before each use	● Daily
■ Often (Hourly, or at refueling)	◆ Weekly, periodically

1. ▲ ■ Saw chain tensioning

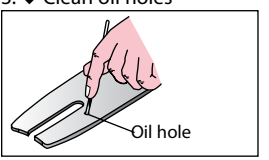




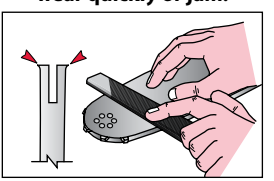
2. ● Clean guide bar groove



3. ◆ Clean oil holes

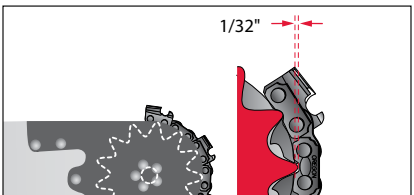


4. ◆ Dress the rail. **NOTE: Note: If using a grinding wheel, direct debris towards tail, then clean out grooves. Grinding debris can cause the nose components to wear quickly or jam.**



OREGON® Bar Rail Dresser, p/n 111589 makes it easy to remove effects of normal wear and remove minor damage.

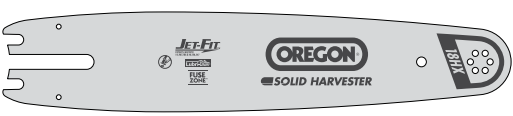
5. ◆ On sprocket-nose guide bars, check for clearance around the guide bar's tip between the tops of rails and the bottoms of cutters or tie straps. Replace nose sprockets before cutters or tie straps contact the guide bar rails.



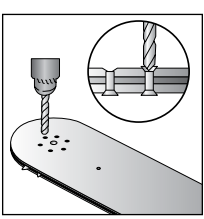
REPLACING OREGON® HARVESTER NOSE SPROCKETS

Note: Wear safety goggles and gloves.

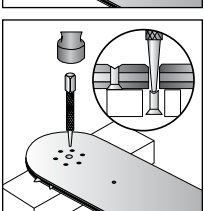
Select a new Harvester nose sprocket with the gauge for your guide bar and saw chain.



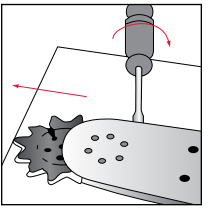
1. Using a 1/4" drill bit, drill out head from each of the nose sprocket rivets.



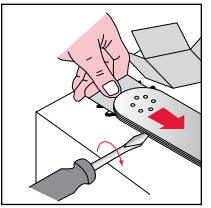
2. Punch out the remainder of the rivets. Use a punch narrow enough to keep from damaging the rivet holes in the nose of the guide bar.



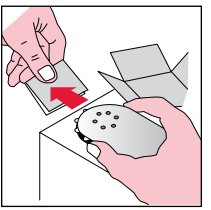
OREGON® Guide Bar Maintenance



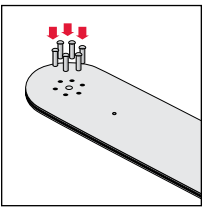
3. Use a small screwdriver to spread the guide bar nose rails just enough to remove the old nose sprocket. Clean debris from the sprocket area.



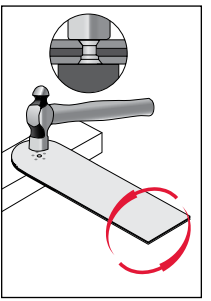
4. Inside the nose sprocket package you'll find the new sprocket wrapped in a tissue. Be careful to keep the sprocket inside the tissue as you remove it from the package–bearings are easily lost. Slide the tissue and the new sprocket, together, into the guide bar's nose.



5. Once fully inside the nose, hold the nose sprocket in place, then remove the tissue.



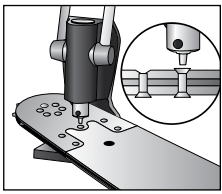
6. Align the sprocket's inner race holes with the holes in the guide bar nose. Insert rivets into each hole through the guide bar. On used guide bars the nose rails may tend to spread apart. Use a small clamp to hold the nose rails together when inserting and securing the rivets.



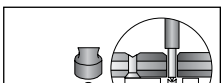
7. With the guide bar and rivets solidly supported on a strong, flat metal surface, carefully peen the rivet heads down with the flat end of a hammer. Be careful to hit only the rivet head. Do not hit the guide bar body — this will pinch the nose sprocket. Rivet heads must be snug and secure while still allowing the drive sprocket to turn freely.

REPLACING OREGON® HARVESTER NOSE SPROCKETS WITH REPLACEMENT NOSE KITS

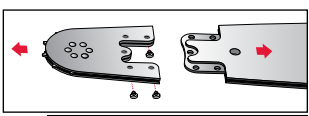
1. Using the OREGON® heavy-duty chain breaker #24548, break out the bar tip attachment rivets.



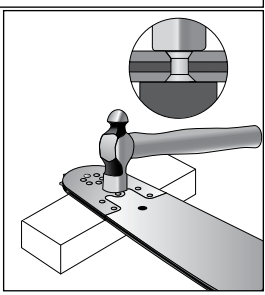
2. Break out the remaining rivets. Use a punch narrow enough to keep from damaging the rivet holes in the nose of the guide bar.



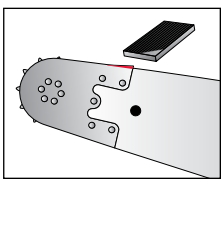
3. Remove the old nose. Clean the guide bar's attachment area. Insert the rivets through the underside of the nose.



4. With the guide bar body, nose, and rivet solidly supported on a strong flat metal surface, peen the rivet's head down with the flat end of a hammer. Do not hit the guide bar body, hit only the rivet head. To check installation, grip the guide bar body in one hand, and twist. Nose and body should feel like a single, solid piece. If not (if any movement in the nose guide bar joint area is felt, or if any clicking sound from the same area is heard), tighten the rivet with a few more hammer strokes.



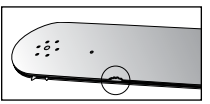
5. File down the rails of the new nose to align with the rails of the old guide bar body.



OREGON® Guide Bar Maintenance

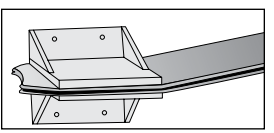
STRAIGHTENING OREGON® HARVESTER GUIDE BARS

Note: Wear safety goggles and gloves.



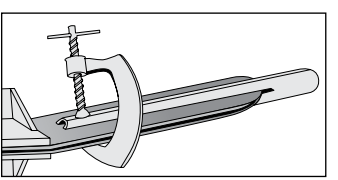
BROKEN GUIDE BAR RAILS

Check the guide bar for broken rails. If broken rails are found, it's likely the guide bar won't function well even if it is straightened.



BENT GUIDE BARS

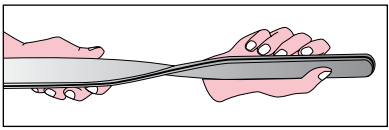
If the guide bar is bent, place it between two rigidly held parallel plates (a guide bar and drive link thickness apart) with the bent area aligned at the edge of the plates.



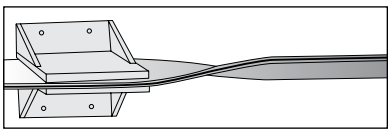
Attach clamping bar to the guide bar extending from plates and proceed to remove the bend in the guide bar. The guide bar will have to be bent in the opposite direction to get it straight.

TWISTED GUIDE BARS

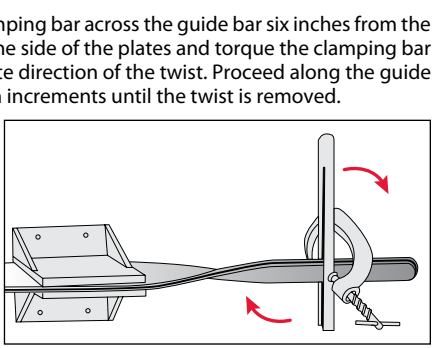
Sight down the guide bar to identify which way it's twisted.



Place the guide bar between the plates so that the twisted section just protrudes form the plates.

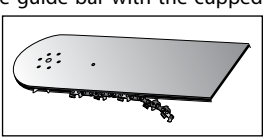


Place the clamping bar across the guide bar six inches from the opening on the side of the plates and torque the clamping bar in the opposite direction of the twist. Proceed along the guide bar in six-inch increments until the twist is removed.

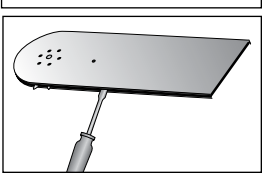


Remove the guide bar from the bar straightening tool and place it on a hard working surface. Insert a piece of metal (the same width as the guide bar groove) where the guide bar was bent. Hammer any small kinks out of the bent section. Take care to keep the groove width tool in place so the rails cannot be hammered shut. Hammer the guide bar with the cupped side down.

Slide cutting saw chain into the guide bar groove. Make sure that there are no pinch points between the rails.

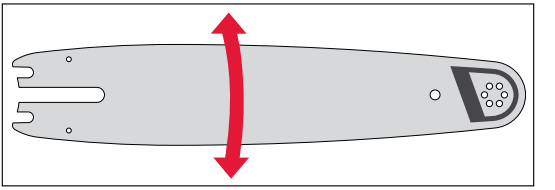


Open up the rails with a screw driver at pinch points.



OREGON® Guide Bar Troubleshooting

TORQUE-TO-FAILURE INFORMATION

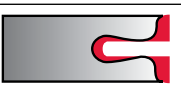


Guide Bar Type	Pitch/Gauge	Guide Bar Mount (Tail) Type	Average Torque-to-Failure
OREGON® Solid Harvester Bar	.404"/.080"	B	5200 ft.-lbs. 7050 N-m
		L	4800 ft.-lbs. 6500 N-m

Most guide bar problems occur in the guide bar rails and are caused by four things: lack of lubrication, incorrect saw chain tension, accidents, or irregular operation techniques which pinch the rails or push the drive links sideways against the guide bar rails. Here are the things you should look for and the corrective actions you should take.

Problem

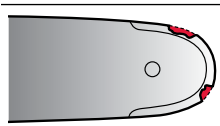
Rail conditions



1. Rails are worn down, groove becomes shallow.
Cause: Normal wear on rails.
Symptoms: Chain rides on groove bottom causing drive link damage, chain leans during cutting.
Remedy: Guide bar is at end of life, replace guide bar. If wear occurs too quickly, check for proper lubrication, chain sharpness, guide bar feed load.

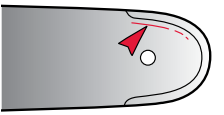
2. Outside edge of rails develop wire edges.
Cause: Normal wear on rails.
Symptoms: Left alone, wire edges can break off and chip away rail material.
Remedy: Use flat file or grinder to square up guide bar's rails and remove wire edges. If wire edges develop too quickly, check for proper lubrication, saw chain sharpness and guide bar feed load.
Note: If using a grinding wheel, direct debris towards tail, then clean out grooves. Grinding debris can cause nose components to wear quickly or jam.

3. Rail on one side is worn thin.
Cause: Damaged or dull cutters on one side (see saw chain section). Saw chain leaning over in a worn groove or using a .063" gauge saw chain in a .080" gauge guide bar.
Symptoms: Incomplete cuts, leading cuts, guide bar bound in the cut.
Remedy: Replace guide bar, check for correct saw chain gauge, replace saw chain if it continues to cut crooked after sharpening (see Saw Chain section).



4. Rails around tip of solid-nose guide bars show small cracks or broken-out sections.
Cause: Accidents or irregular operating techniques which push drive links sideways or place excessive pressure on side of nose can cause breaks or cracks.
Symptoms: Damage to tie straps and cutters, saw chain throws, short guide bar life.
Remedy: Your dealer may be able to repair minor damage on a relatively new guide bar.

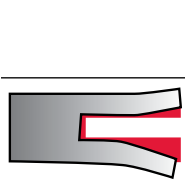
OREGON® Guide Bar Troubleshooting



5. Rails around the tip of solid-nose guide bars are split at the bottom of the guide bar groove.
Cause: Accidents or irregular operating techniques which push drive links sideways or place excessive pressure on side of nose can cause breaks or cracks.
Symptoms: Rails spread and chain rides on groove bottom causing drive link damage and saw chain leans during cutting.
Remedy: Your dealer may be able to repair minor damage on a relatively new guide bar.

6. Rails along the guide bar body or around the tip of sprocket nose guide bars show blue discoloration.
Cause: Pinched rails, lack of lubrication, or accidents and cutting techniques which can push drive links sideways in the groove creating extreme friction-generated heat.
Symptoms: Blue spots on rails indicate temperatures reaching 600° F (315° C) and rail softening. Rails wear quickly. Saw chain drive link damage.
Remedy: Replace guide bar and saw chain.

7. Blue spots at the tail of guide bar.
Cause: Misaligned drive sprocket or rails pinched because debris not removed from saw pad or guide bar when guide bar was installed.
Symptoms: Blue spots on rails indicate temperatures reaching 600° F (315° C) and softened rails. Rails wear quickly. Saw chain drive link damage.
Remedy: Realign drive sprocket and guide bar using proper shims. Clean guide bar and saw pad when installing a guide bar. Replace saw chain.



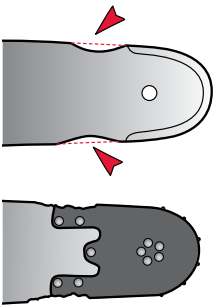
8. Spread rails.
Cause: (1) Saw chain was struck broadside by tree, log, or branch stub. (2) Saw chain was pushed sideways, forcing drive links to pry guide bar rails apart.
Symptoms: Guide bar will not enter log during cut or cannot make complete cut.
Remedy: (1) Hammer rails together with a drive link in groove as spacer. Adjust saw return to allow guide bar to go farther into saw box. Sharpen delimbing knives. Avoid moving tree/log when guide bar and saw chain are out of saw box. (2) Reduce guide bar feed speed.

OREGON® Guide Bar Troubleshooting

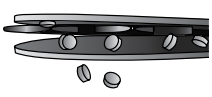
9. Rail chipping in middle of guide bar.
Cause: Excessive pressure on guide bar, excessive guide bar feed speed, cold conditions, lack of lubrication, aggressive saw chain cutting in frozen wood.
Symptoms: Damage to saw chain and reduced guide bar life.
Remedy: Replace guide bar if rail wear is extensive. Decreased guide bar feed force when cutting consists mostly of small-diameter trees. Increase lubrication, especially in cold conditions. Reduce aggressiveness of saw chain when cutting frozen wood.

10. Rail on one side worn low.
Cause: Damaged or dull cutters on one side, or saw chain leaning over in a worn groove, or using .063" saw chain in .080" guide bar. **Most often one short rail is caused by cutters contacting rocks on one side of saw chain, usually the cutters closest to the ground.**
Symptoms: Incomplete cuts, leading cuts, guide bar bound in the cut.
Remedy: Replace guide bar. Replace saw chain saw continues to cut crookedly after sharpening (see Saw Chain section).

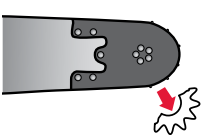
Problem
Guide Bar Nose Failures



11. Chipped rails or excessive rail wear just behind hard stellite on solid nose guide bars, or near the nose on sprocket nose guide bars.
Cause: Loose saw chain tension.
Symptoms: Saw chain damage, saw chain throwing, shortened guide bar life.
Remedy: Use proper saw chain tension ad invert guide bar on saw periodically to distribute wear.

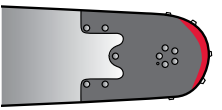


12. Rails in tip of sprocket-nose guide bar spread, allowing loss of bearings.
Cause: Accidents or irregular operating techniques twist the nose or push drive links sideways against the nose's rails.
Symptoms: Sprocket breakage.
Remedy: Replace sprocket components. Keep guide bar nose away from objects not intended for cutting.

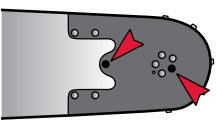


13. Sprocket in sprocket nose guide bar breaks.
Cause: High saw chain tension, accidents, saw chain broadsided by log pulling saw chain out of guide bar rails.
Symptoms: Guide bar nose sprocket no longer functions.
Remedy: Replace sprocket components. Use proper saw chain tension.

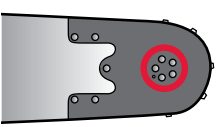
OREGON® Guide Bar Troubleshooting



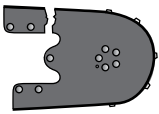
14. Nose burned at tip from saw chain sliding on rails of sprocket nose guide bar, or from the sprocket being recessed into the tip.
Cause: High saw chain tension from automatic saw chain tensioners.
Symptoms: Nose breakage from bearings wearing quickly and jamming.
Remedy: Decrease the tension applied by automatic saw chain tensioner.



15. Loose or missing nose/ attachment rivets.
Cause: Guide bar tip flexing during operation from difficult cutting conditions, accidents.
Symptoms: Rivets continue to loosen until laminates spread and bearings are lost.
Remedy: Check rivets every 100 machine hours. Rehammer loose rivets and replace rivets if rivet head is missing. Always use new rivets.

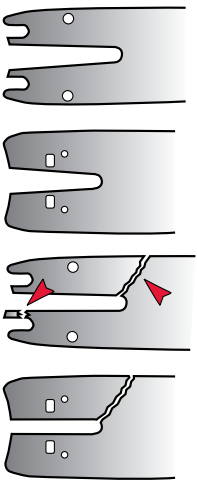


16. Burn ring around nose rivets.
Cause: Bearings overheated.
Symptoms: Premature breakage, jamming, wearing of sprocket nose components.
Remedy: Check for proper oil flow rates. Saw chips will plug oil line or guide bar oil hole. Clean out guide bar oil hole daily Install wire mesh screen on oil tank filler spout to prevent chips from getting into tank.



17. Tabs on replaceable nose sprocket (RSN) break off.
Cause: Accidental bending of nose.
Symptoms: RSN no longer functions.
Remedy: Install new RSN. Avoid bending RSN.

Problem
Guide Bar Mount Failures

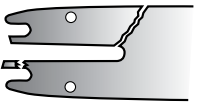


18. Spread or broken guide bar mounting slot.
Cause: Holding pins/bolts were not inserted into guide bar mount holes. Guide bar is not properly supported when minor accidents or pinches occur.
Symptoms: Guide bar mount slot spreads or guide bar breaks at the slot prematurely. **If Jet-Fit guide bar fails from tip of middle slot to side as shown without small tab also breaking, then pins are missing or broken off.**
Remedy: Replace broken guide bars and use the holding pins/bolts originally supplied with guide bar holder. When purchasing new harvester head, consider purchasing head compatible with OREGON® Jet-Fit® guide bars.

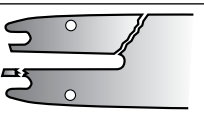
OREGON® Guide Bar Troubleshooting

Problem

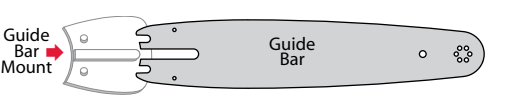
Jet -Fit® Guide Bar Mount Failures



19. Chronic or frequent guide bar mount breakage on Jet-Fit® guide bars when no accident has occurred.
Cause: (1) Guide bar retraction speed too fast. (2) Forward guide bar-sweep speed too fast, causing guide bar holder to stop quickly at end of its rotation.
In either case, inertia of guide bar causes it to over-rotate in the guide bar mount, putting excessive stress on the guide bar mount.
Symptoms: (1) Guide bar breakage without guide bar being involved in accident. (2) Unexplained guide bar mount breakage.
Remedy: Reduce pressure, or flow, to cylinder that sweeps guide bar forward, out of saw box, or retracts guide back into the saw box.



20. Occasional failure of Jet-Fit® guide bars when accidents occur.
Cause: Guide bar becomes stuck in the cut, or accident occurs causing guide bar to become stuck.
Symptoms: Force required to dislodge guide bar approaches strength of guide bar holder, during which guide bar mount breaks.
Remedy: In this case, Jet-Fit® guide bar breaks as designed to prevent damage to expensive guide bar mount shown in the illustration below.



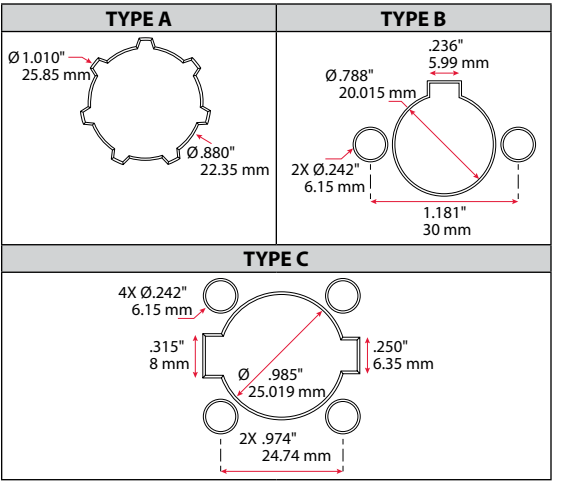
OREGON® Drive Sprockets

Your drive sprocket is an integral component of your "cutting system," transferring the power from your harvester to your saw chain to drive it around your guide bar. Your drive sprocket, saw chain and guide bar work as a team, they will wear as a team, and should be inspected and maintained as a team.

Type	Advantages	Disadvantages
SPUR 	• No saw chain alignment problem unless drive sprocket is worn. • Less expensive.	• No side support. • Damages saw chain if thrown.
RIM 	• Best saw chain support for cutters and tie straps.	• Needs to align with guide bar.*
	*Check the alignment of your rim drive sprocket regularly and use shims to adjust the rim's position into correct alignment. See page 74 for more information on drive sprocket alignment.	
RIM HarvesterLok™ 	• Uniform pressure eliminates distortion, warping • Fittings for smaller shafts. • Keyless hub • Hex-head set screws for quick installation, adjustment and removal in the field. • No space between drive sprocket and shaft gives zero backlash.	• Drive sprocket must be aligned to drive shaft to prevent damage to saw chain, guide bar and drive sprocket.
PIN	• Replaceable pins.	• Concentrates loads on back of drive link. • May cause drive link chipping.

OREGON® Drive Sprockets

COMMON DRIVE SHAFT CONFIGURATIONS - .404"



DRIVE SPROCKET ALIGNMENT

To prevent damage to the guide bar, saw chain and drive shaft, the drive sprocket must be aligned with the guide bar's groove.

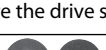
We recommend using the OREGON® Multi-Purpose Tool & Stretch Gauge, available in both 3/4" and .404" pitch. This handy tool is a beneficial assistant to any logger performing many common maintenance tasks, not just drive sprocket alignment.

533700 3/4" pitch
Harvester Multi-Purpose Tool

533689 .404" pitch
Harvester Multi-Purpose Tool

1. Mount guide bar on harvester's head.
2. Use the OREGON® Multi-Purpose Tool that matches your saw chain pitch.
3. Place the Multi-Purpose Tool in the guide bar's groove and slide it back until it extends to the drive sprocket.

4. Adjust the drive sprocket's position on the drive shaft until it is centered on the Multi-Purpose Tool.
5. Install shims as necessary to keep the drive sprocket in this centered, aligned position.
6. Secure the drive sprocket in place.

 Shim; OR-B050 • 0.5 mm	 Shim; OR-C050 • 0.5 mm
 Shim; OR-B100 • 1.0 mm	 Shim; OR-C100 • 1.0 mm

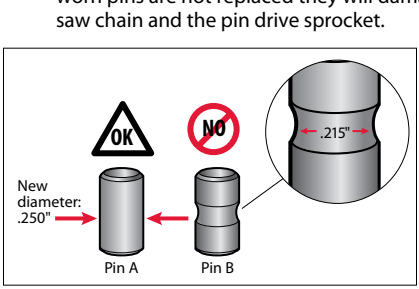
DRIVE SPROCKET REPLACEMENT

- With .404"-pitch saw chains, install a new drive sprocket at the maximum of each 10 chains, or when wear depth on the surface of your drive sprocket reaches .025" (0.6 mm), or when damage occurs.
- With 3/4"-pitch saw chains, install a new drive sprocket after a maximum of 2000 hours or more frequently if excessive wear or damage occurs.

To prevent damage to the guide bar, saw chain and drive shaft, the drive sprocket must be aligned with the guide bar's groove.

INSPECTING AND REPLACING 3/4" DRIVE SPROCKETS

When to replace drive sprocket pins: Check the pins on your drive sprocket periodically for wear. The pins should be changed when wear of .017" deep is evident. The diameter of the pin should not be less than .215" when measured across the worn part of the pin (see pin B). If the worn pins are not replaced they will damage the saw chain and the pin drive sprocket.



OREGON® Drive Sprockets

When to replace spur drive sprockets: Spur drive sprockets should be replaced when wear depth reaches .025" on the spur teeth. Using an overly worn drive sprocket will cause damage to the saw chain chassis, including tie strap burrs and peened drive links; these can lead to saw chain breakage.

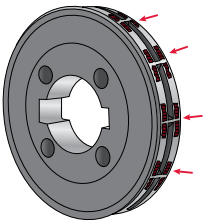
When to replace rim drive and HarvesterLok™ rim drive sprockets: Rim drive sprockets should be replaced when wear depth reaches .025" on the rim surface, or when the rim drive sprocket's tooth tips are worn below the drive sprocket's outer diameter (the rim surface). Using an overly worn drive sprocket will cause damage to the saw chain chassis, including tie strap burrs and peened drive links; these can lead to saw chain breakage.

DRIVE SPROCKET TROUBLESHOOTING

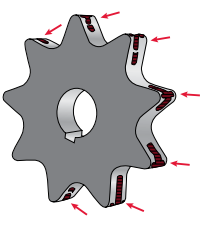
Your drive sprocket, the third member of the cutting team, deserves regular attention and maintenance just like your guide bar and saw chain. A misused drive sprocket can cause unnecessary patterns of saw chain wear, which can damage the guide bar and reduce the life of all three components. A damaged drive sprocket cannot be repaired, it can only be inspected and replaced.

NOTE: A new saw chain can be ruined if installed on a worn rim or spur drive sprocket. Check the wear on your rim drive sprocket or spur drive sprocket daily, and before each session of use. If worn, replace the drive sprocket before installing a new saw chain. In abrasive conditions, wear will increase. Here are the things you should look for, and the corrective actions you should take.

Problem



1. Worn rim drive sprocket
Cause: Use beyond service life causing excessive wear on outer and inner surfaces of rim drive sprocket.
Symptoms: Saw chain breakage. Drive link wear, breakage.
Remedy: Replace rim drive sprocket

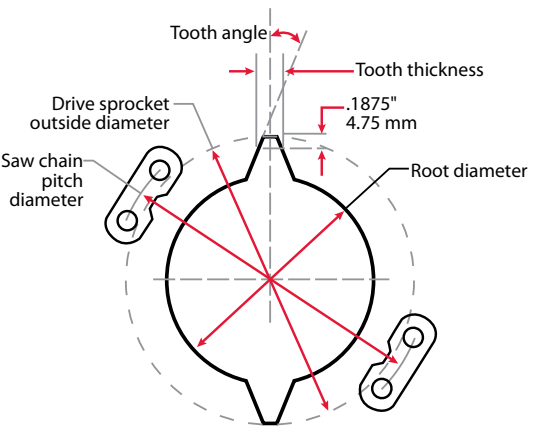


2. Worn spur drive sprocket
Cause: Use beyond service life causing excessive wear on tips of drive sprocket teeth, and between teeth.
Symptoms: Saw chain breakage. Drive link wear, breakage.
Remedy: Replace spur drive sprocket.

OREGON® Drive Sprockets

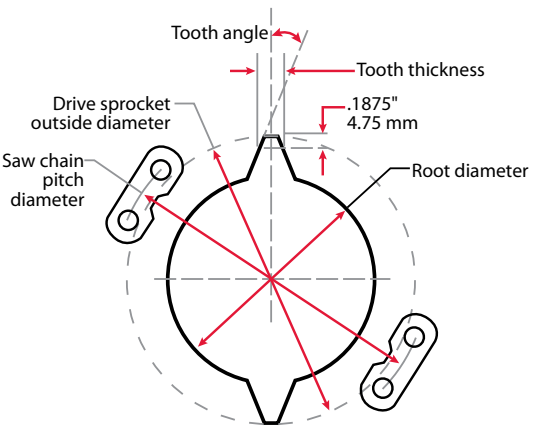
DESIGN INFORMATION
Spur Drive Sprocket .404" pitch (16H, 18HX)

Tooth Count	Tooth Angle	Drive Sprocket Outside Diameter ± .005" / 13 mm		Drive Sprocket Root Diameter ± .005" / 13 mm		Tooth Thickness at .1875" / 4.75 mm Dim. ± .005" / 13 mm		Saw Chain Pitch Diameter		Revolutions ft. / m	
		in.	mm	in.	mm	in.	mm	in.	mm	ft.	m
9	20	2.103	53.42	1.406	35.71	.212	5.38	2.338	59.39	1.650	5.41
10	22	2.364	60.05	1.666	42.32	.229	5.82	2.600	66.04	1.480	4.86
11	23.64	2.625	66.68	1.927	48.95	.244	6.20	2.854	72.49	1.350	4.43
12	25	2.885	73.28	2.187	55.55	.256	6.50	3.111	79.02	1.230	4.04
13	26.15	3.145	79.88	2.447	62.15	.266	6.76	3.369	85.57	1.140	3.74
14	27.14	3.405	86.49	2.707	68.76	.275	6.99	3.628	92.15	1.060	3.48
15	28	3.664	93.07	2.966	75.34	.282	7.16	3.885	98.68	.987	3.24
16	28.75	3.924	99.67	3.226	81.94	.289	7.34	4.144	105.26	.925	3.03
17	29.41	4.183	106.25	3.485	88.52	.295	7.49	4.402	111.81	.870	2.85
18	30	4.442	112.83	3.744	95.10	.300	7.62	4.660	118.36	.822	2.70
19	30.53	4.701	119.41	4.004	101.70	.305	7.75	4.918	124.92	.779	2.56
20	31	4.961	126.01	4.263	108.28	.309	7.85	5.177	131.50	.740	2.43
21	31.43	5.220	132.59	4.522	114.86	.313	7.95	5.435	138.05	.700	2.30
22	31.82	5.479	139.17	4.781	121.44	.317	8.05	5.693	144.60	.670	2.20



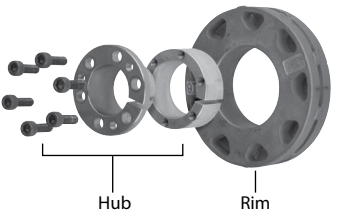
DESIGN INFORMATION
Spur Drive Sprocket 3/4" pitch (11BC, 11H)

Tooth Count	Tooth Angle	Sprocket Outside Diameter ± .005" / 13 mm		Drive Sprocket Root Diameter ± .005" / 13 mm		Tooth Thickness at .1875" / 4.75 mm Dim. ± .005" / 13 mm		Saw Chain Pitch Diameter		Revolutions ft. / m	
		in.	mm	in.	mm	in.	mm	in.	mm	ft.	m
7	19.29	3.120	79.25	2.065	52.45	.303	7.70	3.544	90.62	1.100	3.61
8	22.5	3.627	92.13	2.571	65.30	.331	8.41	4.036	102.51	.959	3.15
9	25	4.131	104.93	3.036	77.11	.353	8.97	4.532	115.11	.852	2.80
10	27	4.635	117.73	3.539	89.89	.370	9.40	5.027	127.69	.767	2.52
11	28.64	5.137	130.48	4.042	102.67	.383	9.73	5.522	140.26	.697	2.29
12	30	5.639	143,23	4.543	115.39	.394	10.01	6.018	152.86	.639	2.10
13	31.15	6.141	155.98	5.045	128.14	.403	10.24	6.516	165.51	.590	1.94
14	32.14	6.642	168.71	5.546	140.87	.411	10.44	7.012	178.10	.548	1.80
15	33	7.142	181.41	6.047	153.59	.418	10.62	7.509	190.73	.511	1.68
16	33.75	7.643	194.13	6.547	166.29	.424	10.77	8.007	203.38	.479	1.57
17	34.41	8.143	206.83	7.047	178.99	.429	10.90	8.504	216.00	.451	1.48
18	35	8.643	219.53	7.548	191.72	.430	10.92	9.001	228.63	.436	1.43
19	35.53	9.143	232.23	8.048	204.42	.437	11.10	9.499	241.27	.404	1.33
20	36	9.643	244.93	8.547	217.09	.441	11.20	9.997	253.92	.384	1.26
21	36.43	10.142	257.63	9.047	229.79	.444	11.28	10.495	266.57	.365	1.20
22	36.82	10.643	270.33	9.547	242.49	.447	11.35	10.994	279.25	.349	1.14



OREGON® Drive Sprockets

HARVESTERLOK™ INFORMATION



COMPLETE HARVESTERLOK™ SYSTEMS			
PART NO.	**BORE**	**RIM NO.**	**HUB NO.**
OR9-HL1-14	7/8"	OR9-HL1	HL1-14
OR9-HL1-15	15/16"	OR9-HL1	HL1-15
OR9-HL1-16	1"	OR9-HL1	HL1-16
OR9-HL1-18	1-1/8"	OR9-HL1	HL1-18
OR9-HL1-20	1-1/4"	OR9-HL1	HL1-20
OR9-HL1-30	30 mm	OR9-HL1	HL1-30

HARVESTERLOK™ RIMS	
PART NO.	**TOOTH COUNT**
OR9-HL1	9
OR10-HL1	10

HARVESTERLOK™ HUBS	
PART NO.	**BORE**
HL1-14	7/8"
HL1-15	15/16"
HL1-16	1"
HL1-18	1-1/8"
HL1-20	1-1/4"
HL1-30	30 mm

CHAIN CATCHER	
PART NO.	**DESCRIPTION**
HL1-CC	For HL1 Systems

Hydraulic Pump Information

DEFINITIONS					
Hp	=	Horsepower	**eff.**	=	Efficiency
RPM	=	Revolutions per minute	**psi**	=	Pounds per square inch
d	=	Displacement, cubic inches	**GPM**	=	Displacement, cubic inches
T	=	Torque			

PUMP CALCULATIONS	
$\textbf{Hp} = \frac{\text{GPM x psi}}{\text{1714 x eff. (pump)}}$	$\textbf{or Hp} = \frac{\text{.000583 x GPM x psi}}{\text{eff. (pump)}}$
$\textbf{Hp} = \frac{\text{T x RPM}}{\text{5252}}$ Torque (lb.-ft.)	$\textbf{or Hp} = \frac{\text{T x RPM}}{\text{63025}}$ Torque (lb.-ft.)
$\textbf{Hp} = \frac{\text{volts x amperes}}{\text{745.7}}$	

PUMP OUTPUT FLOW	
$\textbf{GPM} = \frac{\text{RPM x d}}{\text{231 cu. in.}}$	**1 gal.** = 231 cu. in.

Notes

Harvester Head (Mfg./Model):

Guide Bar Part Number:

Saw Chain (Part Number/Size):

Drive Sprocket (Pitch/Tooth Count):

Notes

This Timber Harvesting Handbook supersedes and replaces all previous OREGON® Timber Harvesting Handbooks.

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