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User's Guide for PARALLEL® Log Saw Blades

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1. Initial Remarks: in brief but important

1.1 Introduction

We thank you for your confidence in the high quality of our circular knives for cutting tissue paper (log saw blades), brand ***PARALLEL***®. Our goal is your satisfaction. Our know-how, gained from over 140 years of manufacturing experience and excellence, is at your disposal:

- Only first class steels of German suppliers with ISO 9000 certification are used.
- The entire manufacture from the sheet metal to the final log saw blade is done in house.
- Our heat treatment for log saws achieves the optimum relation between durability and toughness.
- Straightening and tensioning is performed only by very experienced specialists.
- For getting the most from your Blecher log saw blades we offer auxiliary items like grinding wheels, matched to your cutting conditions and cooling agents for high performance saws.
- Our quality assurance system allows us to trace any customer purchase order back to when the raw material shipment was received.
- The experiences of our customers are most important to us. By maintaining continuous communication with our partners we get valuable feedback.

Our log saw blades are made to exacting standards and are of the highest quality. However, to get the very most from them, other factors have to be taken into account, such as the machines they are to be used on and the products to be cut. All technically demanding factors. It is for these reasons that we have produced this manual. Its goal is to help you create the best conditions and choose the ***PARALLEL***® knife best suited for your particular applications.

Please take a few minutes to browse through this manual. It will serve you well.

Any tolerances and other aspects of log saws and machines referred to in this manual are primarily referring to knives with outer diameter 609,6 mm (24”). At the same time, they are also true for knives with OD 810 mm (32”) and 1000 mm (39,4”), respectively.

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1.2 Definition of Terms Used in this Manual

Axial run-out	Deviation of run-out in axial direction
Bevel	Cutting area of the circular knife, measured from flange to OD of the knife
Bevel, double sided	Cutting area of the circular knife, on both sides of the knife
Bevel, single sided	Cutting area of the circular knife, on one side of the knife
Flange/machine flange	Device consisting of flange cover and hub to clamp the log saw to the drive shaft (in this area the log saw blade is face ground – flange of log saw)
Grind-in	Sharpening an unused (new) log saw prior to initial use
Grinding wheel	Device for sharpening a log saw blade on the machine, during operation
Lateral run-out	Deviation of run-out in lateral direction
Log	Item to be cut: tissue paper, toilet paper, kitchen paper, etc.
Log saw, log saw blade, circular knife	Round knives to cut logs of tissue paper
Machine	Device for cutting logs by using circular knives (manufactured mostly by Messrs. PCM [Paper Converting Machinery] or Perini)
Pre-bevel	Instant sharp front edge of the knife, for log saws always double sided, made by the knife producer but maintained by the user during operation on the machine
Shaft/drive shaft	Device to accept the log saw or the grinding wheel by means of its centre bore hole
Straightening	Manual treatment of log saw blades to eliminate distortion, twisting and other deviations to achieve a minimum lateral run-out tolerance
Straightening quality	Quality of a log saw in terms of flatness, lateral run-out and tension
Tensioning	Because of the diameter-to-width-ratio, respective precautions must be taken when manufacturing log saw blades to compensate cutting forces (cutting resistance, centrifugal forces, bending, heat load, etc.). This is achieved by the tensioning process. By means of a hydraulically loaded pair of rolls a radial roller mark is applied to the blade, with suitable pressure and at the suitable radius.
TIR	Total Indicator Run-out = indication on dial indicator when measuring run-out

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*1.3 Standard Dimensions of Log Saw Blades**

D_{mm}	S_{mm}	H_{mm}	W-Nr.	W_s	L_1	L_2	Nbl.	GewB.
609,6	4,76	68,26	1.2235	2	190	7°	4/8,5/102	4/¼“/203
609,6	4,76	68,26	1.2235	2	230	7°	4/8,5/102	4/¼“/203
609,6	4,76	68,26	1.2519	2	190	7°	4/8,5/102	4/¼“/203
609,6	4,76	68,26	1.2519	2	230	7°	4/8,5/102	4/¼“/203
609,6	4,76	68,26	1.2379	2	190	7°	4/8,5/102	4/¼“/203
609,6	4,76	68,26	1.2379	2	230	7°	4/8,5/102	4/¼“/203
609,6	4,76	68,26	1.3343	2	190	7°	4/8,5/102	4/¼“/203
609,6	4,76	68,26	1.3343	2	230	7°	4/8,5/102	4/¼“/203
609,6	4,76	82,55	1.2235	2	190	7°	4/11/108	4/¼“/203
609,6	4,76	82,55	1.2235	2	230	7°	4/11/108	4/¼“/203
609,6	4,76	82,55	1.2519	2	190	7°	4/11/108	4/¼“/203
609,6	4,76	82,55	1.2519	2	230	7°	4/11/108	4/¼“/203
609,6	4,76	82,55	1.2379	2	190	7°	4/11/108	4/¼“/203
609,6	4,76	82,55	1.2379	2	230	7°	4/11/108	4/¼“/203
609,6	4,76	82,55	1.3343	2	190	7°	4/11/108	4/¼“/203
609,6	4,76	82,55	1.3343	2	230	7°	4/11/108	4/¼“/203
810,0	6,00	60,00	1.2379	2	245	7,5°	-	4/¼“/203
1000,0	8,00	60,00	1.2379	2	340	7,5°	-	4/¼“/203

**other dimensions are available upon request*

Common criteria for all Blecher log saw blades:

	D_{mm} 609,6	D_{mm} 810	D_{mm} 1000
Hardness:	59-61 HRc (HSS DMo5 61-63 HRc)		
Axial run-out:	0,2 mm TIR		
Lateral run-out:	0,15-0,18 mm TIR	0,20-0,25 mm TIR	
Tension:	+0,3-0,4 mm	+0,1-0,4 mm	

D_{mm} OD (outside diameter) in mm
S_{mm} thickness in mm
H_{mm} centre bore hole in mm, fit H7
W-Nr. type of steel
W_s bevel, 2=double sided
L_1 length of the bevel in mm [D-(2xL_1)=flange diameter of the circular knife]
L_2 angle of pre-bevel
Nbl. quantity/diameter in mm/pitch circle diameter(pcd) in mm of pin holes
GewB. Quantity/diameter in “/pitch circle diameter (pcd) in mm of tapered holes

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Nominal analysis of steel qualities %

Steel Quality				
W.-Nr.	**1.2235**	**1.2519**	**1.2379**	**1.3343**
German symbol	80 CrV 2	110 WCrV 5	X155 CrVMo 12	S6-5-2 HSS DMo5
British symbol	-	-	BD 2	BM 2
American symbol	-	-	D 2	M 2
C	0,80-0,85	1,05-1,15	1,50-1,60	0,86-0,94
Si	0,25-0,40	0,20-0,30	0,20-0,40	<0,45
Mn	0,35-0,70	0,20-0,40	0,25-0,45	<0,40
Cr	0,50-0,70	1,10-1,30	11,00-12,00	3,80-4,50
Mo	-	-	0,65-0,85	4,70-5,20
V	0,15-0,25	-	0,90-1,10	1,70-2,00
W	-	1,20-1,40	-	6,00-6,70
Other names*	Chromavan®	Woralit®	Chromalit®	Duritan®

*Our competitors instead of the standardised names of steel are using more or less ingenious own names. For the sake of clarity we do without this.

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1.4 Safety Instructions

Caution: every time you see this sign, please follow the instructions given. This will be for your own safety.

- **Log saws are <u>always extremely sharp</u>, whether they are new or used. Unsuitable handling or use can cause serious injuries.**
- Blecher always fit their log saws with a plastic safety cover around the sharp front edge. Don't remove this safety cover unless the log saw is ready for operation. This also applies for assembly and disassembly of the knife on the machine as well as for maintenance work on the machine close to the installed knife.
- When handling log saw blades (for instance during transportation, assembly, disassembly) always be sure to wear suitable safety equipment (i.e. cutting resistant gloves, safety shoes, etc.). This will also apply if the safety cover as per item 1.4.2 is in place.
- Log saw blades may only be used for their designated application. Any other use is prohibited. Unsuitable use of log saw blades will cause serious injuries.
- Please follow the safety instructions of the machine supplier.

2. Handling of Log Saw Blades

2.1 Storage

- Unused and new log saws should always be stored lying on their faces. They may also be stored supported by a mandrel in their centre bore hole. **Never** store a circular knife standing on its pre-bevel. Even with the safety cover on, the pre-bevel is very sensitive to damage.
- Used log saws should always be marked as "used" or "worn" (i.e. with Permanent Marker) to prevent them from being taken by mistake.
- When storing new or old log saws there is always a danger of injury. Suitable precautions should always be taken when choosing storage area and method of storing.
- Blecher log saws are treated with a special oil to protect them against rust and corrosion. Nevertheless, we recommend that they are stored in a dry, enclosed and temperature controlled area or warehouse.

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When moving in and out of storage as well as during storage the safety cover around the pre-bevel (sharp front edge of the log saw) must always be in place.

2.2 Transportation

- During transportation of log saws please make sure that adequate protection against mechanical damage is provided. Even if bumps during transportation don't show visible defects, because of their close tolerances the performance of the blades can be impaired totally or at least partially.
- Although new log saw blades are protected against corrosion and rust by Blecher they must be protected against wetness and humidity during transportation.

During transportation the safety cover around the pre-bevel must always be in place.

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2.3 Assembly/Disassembly

- Blecher log saw blades are manufactured to closest tolerances which can only be maintained at room temperature. If not stored at room temperature they must be given sufficient time to gain room temperature prior to fitting them to the machine.
- During assembly and disassembly of a log saw blade the machine must be isolated from the power supply system and protected against unintentional supply of current.
- Please follow the instructions of the machine manufacturer, especially their safety instructions.
- Suitable tools must be used only for assembly and disassembly.
- Please look for perfect cleanness during assembly. Machine flange cover, hub and shaft need to be carefully cleaned prior to fitting a new knife.
- Blecher log saw blades are covered with an oil film to protect against corrosion and rust. This oil film needs to be carefully removed from the blade prior to fitting it to the machine. All bore holes of the knife need to be perfectly clean.
- If available use a suitable manipulator for handling the log saw during assembly and disassembly. If you have to handle it manually you may only hold the blade inside the centre bore hole. Don't hold it at the pre-bevel! Even with safety cover in place and wearing gloves the knife because of its sharpness might cut your hands and fingers.
- Check run-out of shaft and hub with a precision dial indicator. Run-out must correspond to manufacturer's indications. We recommend a max. allowable lateral run-out of $\leq$ 0,01 mm TIR (0,0004") for the hub.
  Caution: lateral run-out of the hub increases proportionally to the lateral run-out of the log saw (measured at its pre-bevel). Any run-out of the hub > 0,01 mm will produce bad quality cuts, excessive dust and reduce the life of the blade.
- Shaft, hub and flange cover are to be inspected for damage after disassembly of the worn knife and prior to assembly of the new knife. These can cause the lateral run-out of the flange to increase (see above).
- Check the shaft for bad bearings.
- Insure proper arrangement of the grinding wheels (in accordance to machine maker's instructions). The angle of the grinding wheel to log saw blade needs to be 7°, total angle 14°. Inspect wheel shafts for bad bearings.
- Move your finger along the surface of the grinding wheel. If you feel a "smooth" surface the grinding wheel is loaded and must be dressed. The grinding wheel manufacturers offer suitable means for this purpose (dressing stick). If the grinding layer is exhausted the wheels are to be replaced.

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During assembly and disassembly the safety cover around the pre-bevel always needs to be in place. Make sure to wear suitable safety equipment (cutting resistant gloves, safety shoes, etc.)

2.4 Initial Sharpening for Commissioning of a New Log Saw Blade

- The initial sharpening of a new blade is essential to gain the required sharpness for a good quality cut. We as the blade makers could certainly grind the pre-bevel ready for use. Our experience shows, however, that a pre-bevel ready for cutting is most sensitive to damage, especially during transport or assembly (in spite of the safety cover). But a damaged pre-bevel cannot be repaired by the user as the conditions on the machine to do this are not sufficient.
- Therefore initial sharpening is required prior to using a new blade.
- At first put all hoods and covers of the machine in place and remove the safety cover from the knife.
- Under no circumstances sharpen the blade other than with kiss-grinding. Extended dwell times will destroy the pre-bevel. **Increased frequency will produce much better grinding results than increased dwell times.** Provide a sufficient delay between the grinding cycles to allow the grinding wheels to slow down and the pre-bevel to cool down.
- Faults during grinding-in can lead to inferior cutting results and can even make the blade unusable (see comments in chapter 3.).

2.5 Sharpening the Log Saw Blade During Use.

- Under no circumstances sharpen the blade other than with kiss-grinding. Extended dwell times will destroy the pre-bevel. **Increased frequency will produce much better grinding results than increased dwell times.** Provide a sufficient delay between the grinding cycles to allow the grinding wheels to slow down and the pre-bevel to cool down.
- Equally important is to avoid too many cuts between grinding cycles. It is better to sharpen a less blunt knife with fewer grinding wheel contacts than a blunt knife with more contacts and increased dwell times.
- Faults during sharpening can lead to inferior cutting results and can even make the blade unusable (see comments in chapter 3.).

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2.6 What to Do With Worn Blades

- Even worn knives are sharp and can cause injuries.
- Log saw blades are made of high quality steel. Worn blades therefore should be recycled as scrap steel.

Even worn knives are sharp! They must be fitted with a safety cover around the pre-bevel.

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3. Trouble Shooting Guide

Below you will find a table that lists all known and essential kinds of trouble that can happen when operating log saw blades. Together with this you will find their possible causes (in the order of their probability) and recommendations on how to clear them.

3.1 For Your Fast Understanding

Kind of Trouble	Cause of Trouble	What to do
Lifetime of log saw blade too short	1. Poor paper quality	- Look for changes in paper quality - Compare savings in paper quality with additional expenses for a bigger consumption of knives
	2. Faulty grinding	- Check grinding wheels for their condition, if loaded dress them - Reduce number of cuts between grinding cycles - Reduce dwell time and increase frequency
	3. Faults in the grinding system	- Check grinding wheels for wear and replace them - Check grinding wheels for right grit and/or composition and replace them - Check adjustment of grinding wheels and correct it if necessary - Check bearings of grinding wheels and replace them - Check contact pressure of grinding wheels for excessive air pressure or too heavy leaf springs and correct it

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	4. Condition of drive shaft	- Check for run-out and correct it or replace it - Check bearings and replace them, if necessary
	5. Condition of hub	- Check hub for lateral run-out and correct or replace it, if necessary
Development of dust/ragged log edges	1. Poor paper quality or abrasive core stock	- Look for changes in paper quality and core stock quality - Compare savings in paper quality or core stock with additional expenses for a bigger consumption of knives
	2. Pre-bevel of log saw blade blunt/not symmetrical	- Grind pre-bevel - Check pre-bevel is symmetrical 7°/side and adjust grinding wheels if necessary - Check if blade is perfectly round or eccentric (octagonally shaped). An octagonally shaped circular knife is either worn or victim of faults during sharpening resp. in the grinding system - Look for damages at the pre-bevel (cannot be corrected by the user)
	3. Flapping (tip-whipping) of the blade during cutting	- Check blade for lateral run-out (can only be corrected by the blade maker) - Check lateral run-out of hub and correct it - Discuss bevel geometry with the blade maker in respect of density and diameter of log

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Angular cuts	1. Pre-bevel is not symmetric	- Check pre-bevel for being symmetrically 7°/side and adjust grinding wheels if necessary
	2. Cutting speed and feed speed too slow	- Compare actual values with machine maker's recommendation and correct them
	3. Density of log too big	- Discuss bevel geometry with the blade maker in respect of density and diameter of log
	4. Depth of cut is not sufficient	- Cutting depth should be adjusted in a way that the log saw blade overlaps the bottom end of the log clamping tube by ca. 6-7mm
Log or core crushing	1. Pre-bevel of log saw blade blunt	- Sharpen the blade
	2. Blade worn (out of round, stop signed)	- Install new log saw blade
	3. Density of log too big	- Discuss bevel geometry with the blade maker in respect of density and diameter of log)
	4. Thickness of core too big	- Check if log can be wound on cores with less wall thickness
Fire in the machine	1. Sparks shooting during grinding	- Check grinding conditions - Reduce development of dust - Clean the machine more frequent
Log saw blade eccentric, octagonally shaped	1. Blade worn	- Blade diameter too small, pre-bevel gets longer and is more difficult to grind, install new blade
	2. Blade is being overheated during grinding	- Check grinding conditions

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3.2 Quality of Paper and Core Stock

Quite often we are facing changes in log saw blade life, which cannot be explained beforehand. Then, however, we usually find changes in the quality of the paper or core stock. Here factors such as the addition of recycled paper etc. play an important role. If such changes are not wanted, of course, their causes must be found and solved.

Even more important is pollution by abrasive materials, e.g. sand. This inevitably will lead to increased log saw blade consumption. Here, too, their causes must be found and solved.

In both cases expenses to improve the raw material supply can become necessary. Then you will have to compare this with increased blade consumption and increased machine down times for blade replacement. Viewed from the standpoint of the blade manufacturer the only option to compensate for this is to offer a better steel quality for the knife. But this, too, will increase expenses.

Another impact on cutting quality and lifetime of the blade is caused by the density of the log: the more dense the log is wound, the bigger of course the cutting resistance. Please contact Blecher in such cases. Our recommendations then will include the following aspects:

- Tension of log saw blade
- Length of the bevel (the longer the bevel the smaller and consequently weaker the cross-cut/thickness of the blade behind the pre-bevel)
- Use of proper grinding wheels – can be provided by Blecher
- Use of proper cooling agent – can be provided by Blecher
- Diameter of blade (a reduced diameter of the blade e.g. 550-560 mm produced by using it for a different, softer product before will increase its stability)
- In particular “hard” cases we recommend to equip the blade with a single sided bevel only, to increase its stability even more.

3.3 Grinding System, Faults During Grinding/Sharpening

After the paper and core stock quality this is the most frequent cause for reduced log saw blade life. You cannot put sufficient emphasis on careful grinding as the conditions for proper sharpening on the machine are extremely unfavourable.

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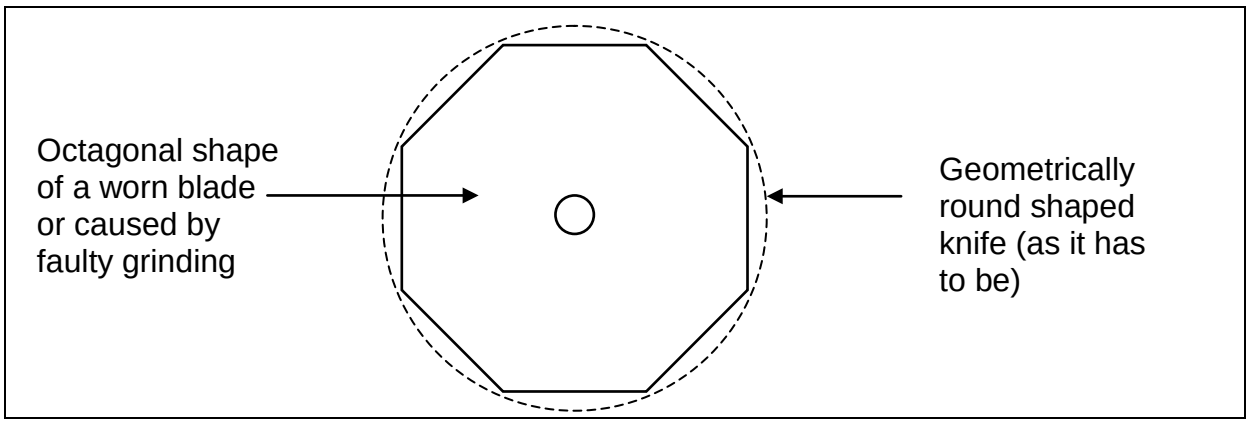
The advantage of being able to sharpen the blade during operation comes with the disadvantage that you can dry grind only, i.e. without using appropriate cooling. The following chain reaction will be caused if only one of the **other grinding factors** are out of their optimum:

- Dry grinding produces a lot of heat that needs to be taken by the blade.
- Physically, however, heat causes a body to expand, even the best log saw blade in the world won't be excluded from this.
- The direction for expansion of a log saw blade under heat is pre-determined to a certain extent. The diameter cannot "grow", the resistance there will be too high, the blade would have to crack or break. Therefore the blade "grows" in lateral direction.
- Now this lateral expansion will produce a burr at the front edge of the pre-bevel that moves from side to side under load of the grinding wheels.
- These burrs created on both sides of the pre-bevel front edge are being ground "away" leaving bulges shaped as scallops behind: the log saw blade is eccentric, it looks like an octagon.
- An eccentric circular knife can no longer produce good quality cuts.

The knowledge of these factors is extremely important to appreciate the necessity of keeping all **other grinding factors** to their optimum condition. Every user knows a stop signed log saw blade when it is worn. Blecher blades with OD 609,6 mm (24") are commonly used down to diameters between 445-490mm (17,5-19,3") depending on products to be cut.



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Another warning to look carefully at the grinding conditions will be if you experience excessive dusting. Excessive dust is mostly caused by worn or faulty ground log saw blades.

Watch for excessive sparks shooting from the grinding wheels when sharpening. There is a major fault you must find and solve!

Caution: Danger of Fires

(because of dust being ignited by sparks)

Caution: if log saw blades cannot be sharpened in the usual way there is fault you have to find and solve! Excessive grinding will not solve it and probably only hide the problem. Overgrinding in most cases will make the blade unusable.

Which are the **other grinding factors**?

Settings of the Grinding System

Look for these parameters:

- *Number of cuts between grinding cycles*: if the number of cuts is too large, the blade will become too blunt. The more you need to grind. Especially for grinding, however, it is true to say: less will be more!
- *Dwell time/time span during which the grinding wheels sit on the knife*: again: less will be more! Frequent short contacts produce less heat than a long one. In addition think of the following aspect: the grinding effect, i.e. removal of material from the pre-bevel is only made by the differential speed between grinding wheel and log saw blade (the rotating blade usually accelerates the grinding wheels when they hit each other). The longer the grinding wheels sit on the pre-bevel, the smaller the differential speed and amount of removed material. Finally the wheels will only rub on the pre-bevel and produce only heat without removing any material.
- *Contact pressure of grinding wheels on pre-bevel*: depending on machine brand the contact pressure is applied pneumatically or by means of leaf springs. Excessive contact pressure will produce unnecessary heat without improving material removal. Therefore we recommend to inspect and maintain the contact pressure regularly. In case of repairs only install spare parts specified by the machine maker. This will maintain the optimum contact pressure.

- *Adjustment of grinding wheels*: incorrect adjustment of grinding wheels will cause faulty grinding of the pre-bevel and make it asymmetrical. Reduced life and angular cuts will result. It is also important for both grinding wheels to contact the pre-bevel at the same time. Setting of the grinding wheels is usually already done by the machine manufacturer and may not be changed by the user. Nevertheless we recommend inspections from time to time with suitable gauges (e.g. feeler gauge). The wheels must be arranged at an angle of 7° to the log saw blade (or 14° to each other). For log saws with 810 or 1000mm diameter resp., these angles are 7,5° and 15°. Please compare with the instructions given in the machine makers manual.

Condition of Grinding Wheels

It is logical that worn grinding wheels are unable to do their job. They need to be replaced. New grinding wheels must be true when fitted. Ask your supplier to check this.

But even with a sufficient layer of grit trouble may occur, mostly caused by the grinding wheels being loaded. This includes glue (from the glue spots of the core and the log) which adheres to the log saw blade when cutting and accumulates on the grinding wheels as well as smallest steel particles from the grinding process itself. With the crystals (that only do the grinding job) being blocked-up by this the grinding wheels appear to be blunt, you can feel a smooth surface when moving your finger over it. Blunt wheels, however, will only produce heat, no grinding. Therefore we recommend to dress the grinding wheels at least once per shift. The grinding wheel manufacturers offer suitable means for this job (dressing stick).

Also please watch for the suitability of the grit and its composition. Nowadays CBN (Borazon) wheels usually are applied. Reputable manufacturers of such grinding wheels are for instance Messrs. Tyrolit (Austria), Dessau (USA), Krebs & Riedel (Germany) – and Blecher.

Check the bearings of the grinding wheels regularly for wear (its ability to move freely without snags). Worn or damaged bearings make the grinding system useless. Only use quality bearings supplied by the machine manufacturer as spares.

Last but not least look for the run-out of the grinding wheels. Measure it with a precision dial indicator. Lateral run-out should not exceed 0,2mm TIR. If dressing does not improve lateral run-out, most probably the bearings are worn.

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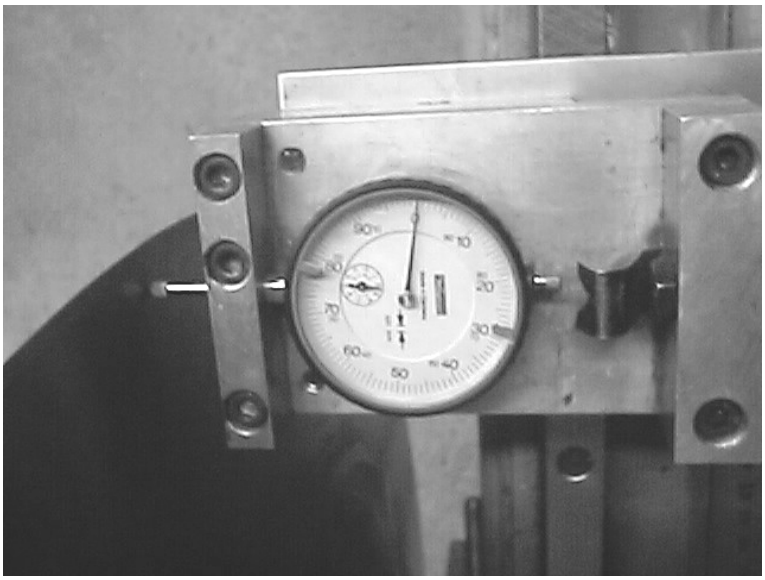
3.4 Condition of Machine (Shaft, Hub, Speeds, Cutting Depth)

Here, too, preventive maintenance helps to avoid trouble. Attentive observation by the operator doing regular checks with only little effort already means a lot. Essentially the following should be watched for:

Drive Shaft to Accept the Log Saw Blade

Checking its rotation and closeness of tolerance reveals premature wear of bearings.

Over the years the shaft could have been damaged, which causes the run-out to increase and makes precise sharpening of the blade impossible. For this purpose a precision dial indicator will be required.



Precision Dial Indicator, mounted to a Test Stand

Machine Hubs

Blecher log saw blades have a higher hardness than the machine hub. When fitting the knife during assembly cuts and scratches may occur on the hub which you can feel with your finger. These small damages may accumulate over the years and be made worse by a crust of glue and dirt. This causes lateral run-out of the hub. Therefore we recommend regular checks: feel with your hand for dirt and measure run-out with a precision dial indicator.

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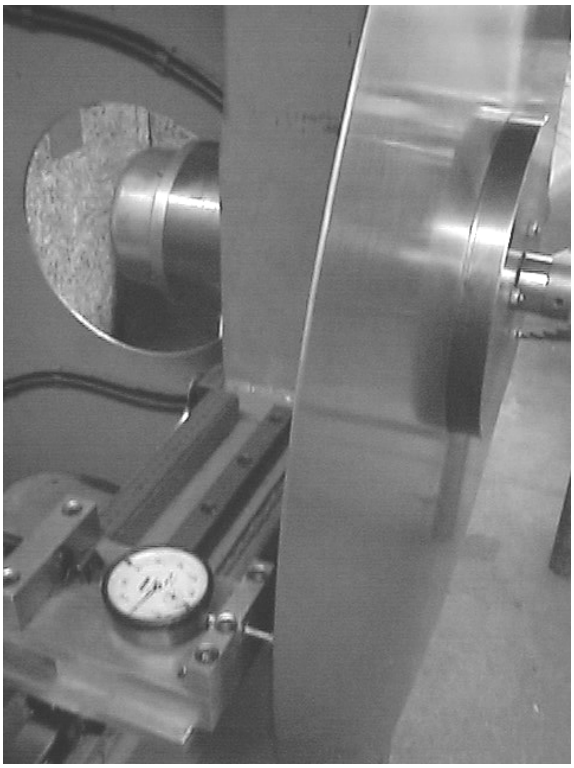
Run-out of the hub should be **<0,01mm TIR**. If it is more, clean the hub carefully. If this does not improve the result, the hub and flange cover need to be repaired or replaced. Don't allow the hub run-out to be ≥0,01mm TIR – this will make the lateral run-out of the blade too big. The blade will appear to move "flapping", it won't be able to produce good quality cutting anymore (excessive dust and ragged edges) and you won't be able to sharpen it properly any longer.

We at Blecher straighten the log saw blades to closest tolerances (see chapter 2). The test flanges we are using for this purpose are regularly inspected and have a lateral run-out of virtually 0. Any lateral run-out of the hub >0 will proportionally increase the run-out of the blade.

Example:

Diameter of hub: 150 mm
Lateral run-out of hub: 0,1 mm
Diameter log saw blade: 609,6 mm
Lateral run-out of log saw blade: 0,15 mm (measured at Blecher with test flange)
Resulting run-out of log saw blade installed to the hub: 0,96 mm!!



Ideal Condition:
Log Saw Blade on Test Stand
with minimum lateral run-out

Also make sure that the hub is equipped with a sufficient undercut between clamping ring (centrically arranged ring at hub and flange cover with a width of ca. 6-7 mm that

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clamps the log saw blade in place) and hub/flange cover centre. The undercut will be sufficient if the clearance between centre of hub and centre of flange cover is between 1,0 – 1,5 mm. If it falls below that value (e.g. because of reworking the hub and flange cover) the clamping surface is no longer defined and may go beyond the clamping ring - this inevitably will increase lateral run-out of the log saw blade installed to such a hub.

Hub with sufficient undercut between centre and clamping ring

Cutting Velocities

Blecher log saw blades are designed for cutting velocities developed by the machine manufacturers jointly with the users. If actual speeds deviate from this (as detailled in machine maker's manual) don't expect good cutting results. The blade can get too hot, will bend or flex and at the end it will lose its tension. The cuts get ragged, the logs may be crushed and excessive dust will be produced. The operator assumes that the knife is blunt. By cutting speeds we mean rpm of the blade and feeding speed.

Cutting Depth

To perform a good quality cut the log saw blade not only needs to penetrate the log but also to leave the log again on its other side. If this is not sufficiently achieved the cut won't be good. Please consult machine maker's manual to check and eventually correct adjustments. Following our experience the bevel should show up ca. 6-7mm from underneath the slot of the log clamping tube.

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3.5 Quality of the Log Saw Blade

Because of unsuitable transportation or faulty handling the following quality aspects of log saw blades could be impaired:

- Lateral run-out
- Tension
- Damages to the pre-bevel
- Blade is eccentric or octagonally shaped

These quality aspects cannot be repaired by the user. Such a blade may no longer be used. If at all possible, a repair can only be performed by the blade manufacturer.

4. Recommendations for Fast Trouble Shooting

In cases of severe problems, we recommend to follow the list above for a systematic search for the trouble. Probably more than one of the symptoms apply. To prevent problems occurring, we recommend you to collect data on log saw blades and grinding wheels being used. If you enter such data into a form or even better a suitable computer program (e.g. Microsoft Excel) you will always be able to recognise deviations and to take corrective measures. To develop an action plan for improvements, such a data base is even more important. Please contact Blecher if you need assistance to analyse your data.

The data base should include but not be limited to the following information:

- Machine (no. of lanes i.e. 2-, 3- or 4-lane and no. of blades installed i.e. 1 or 2)
- Blecher order no. (reference for each shipment)
- Blecher part no. (of the log saw blade being used for clear identification)
- Fitted by: (name of the person who fitted the blade)
- Fitted on: (date/time when the blade was fitted)
- Dismounted by: (name of the person who dismounted the blade)
- Dismounted on: (date/time when the blade was dismounted)
- ∅ after disassembly: (diameter of the blade after disassembly)
- Condition of blade after disassembly (eccentric/octagonal)
- Time to grind-in (required time span to initially sharpen the blade when it had been new)
- No of strokes/cuts per minute
- Grinding cycles (no. of cuts between grinding, no. of grinding contacts per grinding cycle, no. of grinding contacts before re-adjusting grinding wheels)
- Contact pressure of grinding wheels (if available)
- Grinding wheel (maker, type, lot no.)
- Machine and grinding system being checked (yes/no, who did it and when)
- Product (what product was cut: no. of sheets, paper quality, density of logs)
- No. of cuts (or equivalent value to compare life)
- Remarks (e.g. reason for dismounting the blade, observations during assembly/disassembly)

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5. Support from Blecher for Fast Trouble Shooting

In cases of severe trouble we offer you our support for speedy trouble shooting. In order to work out suitable recommendations we, however, need some information from you. Please fill in the attached questionnaire as detailed as possible and send it to the following fax number:

domestic: 02191/39878
international: ++49/2191/39878

Or for the USA contact:

Haas Saw & Supply

South Carolina Office
1523 Rose Drive
Summerville, SC 29483
Phone: 843-875-8005
Fax: 843-875-9010
Toll-Free: 1-800-633-7769

North Carolina Office
637 McWay Drive
High Point, NC 27263
Phone: 336-861-5300
Fax: 336-861-2300

We shall help you as fast as we can.

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Attachment: Customer Report

1. Customer:			
2. Status:	2.1 purchase order: ☐ inquiry: ☐	2.2 No.:	
3. Quantity	3.1 actual demand: pieces	3.2 annual demand: pieces	
4. Dimensions:	4.1 diameter: mm	4.2 thickness: mm	4.3 bore hole: mm
	4.4 pin holes: $pieces_1$ $pieces_2$ $pieces_3$	4.5 diameter: mm_1 mm_2 mm_3	4.6 pitch circle diameter: mm_1 mm_2 mm_3
	4.7 tapped holes: pieces	4.8 diameter: " or mm	4.9 pitch circle diameter: mm
	4.10 bevel -sided, mm length	4.11 pre-bevel:	
	4.12 flange diameter: mm	4.13 steel quality:	4.14 coating:
5. Application:	5.1 machine maker and no. of lanes	5.2 machine type:	
	5.3 maker of grinding wheel:	5.4 type of grinding wheel:	
	5.5 type of paper rolls:	5.6 paper tube:	
	5.7 cooling agent:	5.8 qty. (coolant): l/min	5.9 no. of strokes: /min
6. Trouble:	6.1 vibrations:	6.2 condition of machine flange:	
	6.3 damage to bevel:	6.4 deviation of cutting groove:	
	6.5 no. of strokes before re-grinding: strokes	6.6 feed of grinding wheels after: grinding cycles	
	6.7 duration of grinding: s	6.8 sparks during grinding:	

space for sketches and comments:

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Hints to complete this questionnaire:

We did our best to create this questionnaire in such a way, that the individual items are self explanatory. In case of any doubt please read the below notes:

General:
If you wish to send us an inquiry or a purchase order please answer at least items 1.-4.
If you wish our advice about a suitable tool for your application please fill in your answers to item 5 additionally.
If you wish to receive our recommendation to solve eventually existing trouble, please fill in your answers to item 6. additionally.
At the bottom end of the questionnaire you will find additional space for sketches and comments.

1. Customer:
Please enter your name, your company and your fax number or e-mail address to which we can direct our response.

2. Status:
2.1 Please tic if you wish to send us a purchase order or an inquiry.
2.2 Here you can give us your reference no.

3. Quantity:
3.1 Please enter your actual demand on the respective type of blade.
3.2 Please enter your annual demand on the respective type of blade (possibly estimated).

4. Dimensions:
4.1-4.3 Kindly specify outside diameter, thickness and diameter of centre bore hole in mm of the required blade (to convert from inches to mm multiply by 25,4).
4.4-4.6 If pin holes or side holes are requested, please enter quantity, diameter and up to 3 different pitch circle diameters (in mm).
4.7-4.9 The usual tapered holes (for the handling device) are 4 pieces with a diameter of ¼" located on a pitch circle diameter of 203 mm.
4.10-4.12 Usually log saw blades are made with a 2-sided bevel of 190 or 230 mm length (for D=610mm), 245 mm length (for D=810mm) or 340 mm length (for D=1000mm) and with a pre-bevel of 7,5°. The flange diameter results from the bevel length and is typically 230 mm (D=610, bevel=190), 150 mm (D=610, bevel 230) or 320 mm (D=810 and D=1000).
4.13 What steel quality shall the blades be made of (1.2235, 1.2519, 1.2379, 1.3343, etc.)
4.14 Please specify, if a coating is required for the blade (e.g. without [standard], hard chromium, teflon®, TiN, etc.)

5. Application:
5.1-5.2 Please enter the name of the machine manufacturer, with how many lanes (1-4) is it equipped and if the orbital log cutting device is equipped with one or two blades.
5.3-5.4 What type of grinding wheels are you using (it's typically CBN/Borazon) and from what manufacturer?
5.5 What is the quality of the paper to be cut: tissue (soft wound), crepe (soft or high density) or recycling paper (soft or high density)?
5.6 Does the paper tube/sleeve consist of one, two or three layers?
5.7-5.8 Are you cooling during cutting? If so, what cooling agent are you using (paraffin, oil, emulsion) and what quantity?

6. Trouble:
6.1 Do you observe any vibrations during cutting. If yes, are these coming from the machine, from the saw blade or from both?
6.2 Did you check the machine hub/flange for damages and is the run-out <0,01 mm TIR?
6.3 Do you observe any damages or cracks of the pre-bevel? Is the blade perfectly round or with multiple edges (octagonal)?
6.4 Is the cutting groove straight or does it deviate horizontally or vertically?
6.5 How many strokes/cuts are performed between (automatic) grinding/sharpening?
6.6 After how many grinding cycles are the grinding wheels (automatically) re-adjusted?
6.7 How long takes a grinding cycle (duration in seconds or no. of strokes/cuts)?
6.8 Do you observe sparks during grinding? If yes, would you consider the amount of sparks reasonable or too many?

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Attachment: Test Record for Blecher Log Saw Blade

Action	**Blade #**	**Blade #**	**Blade #**
blade fitted to machine	by (name): date:	by (name): date:	by (name): date:
side run-out of hub checked to be <0,01mm	yes no	yes no	yes no
grinding assembly checked	yes no	yes no	yes no
product being cut	quality: no. of layers: no. of sheets: diameter:	quality: no. of layers: no. of sheets: diameter:	quality: no. of layers: no. of sheets: diameter:
no. of lanes/machine	1 2 3 4	1 2 3 4	1 2 3 4
no. of strokes/minute			
initial grinding of new blade in seconds			
no. of strokes between re-grinding			
duration of re-grinding in seconds			
no. of re-grinds between re-adjustment of grinding wheels			
type and make of grinding wheels			
grinding wheel feed	manual: automatic:	manual: automatic:	manual: automatic:
cooling/lubrication	with/type?: without:	with/type?: without:	with/type?: without:
blade taken from machine	by (name): date:	by (name): date:	by (name): date:
condition of blade after being taken from m/c	round multiple edges	round multiple edges	round multiple edges
diameter of blade after being taken from m/c			
total no. of strokes/cuts achieved			
remarks			