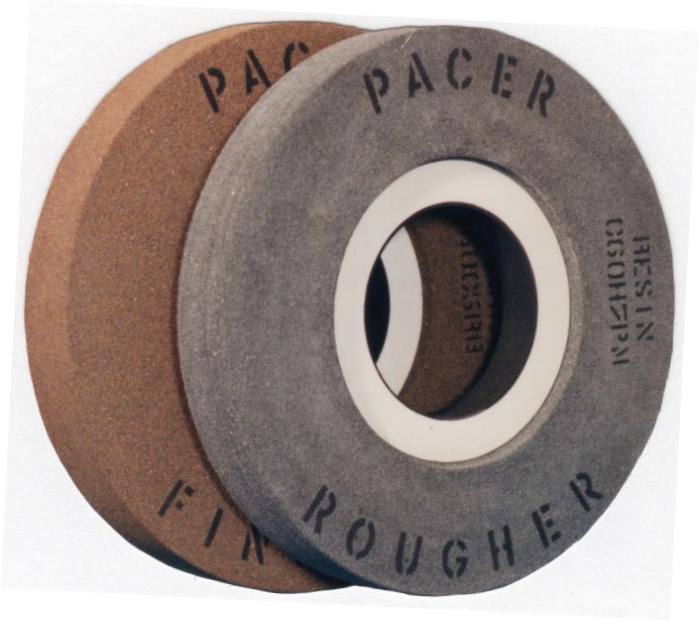
OPERATING INSTRUCTIONS

PACER

ROLL GRINDING WHEELS

FOR PAPER MILLS



PM RESIN BOND FOR ROUGHING
CORK FILLED, RUBBER BOND FOR FINISHING

Pacer **PM (Paper Mill) resin bond** wheels are designed for fast roughing of chilled iron, stainless, granite, poly, rubber, and other type rolls. Pacer **cork filled - rubber bond** wheels are designed for fast finishing. The time difference between Pacer wheels and older types should be noticeable quickly. So should be the quality and appearance of the roll surface.

Pacer wheels are not difficult to use but a few guidelines must be followed so the PM or cork wheel works as designed. Following are instructions for the best operation. Some are traditional practices for roll grinding wheels in general. Others are specific to Pacer wheels since the wheels do operate differently.

The information in this literature is presently known to the company. When significant new information or product development occurs, updated instructions will be sent. Call the factory at 800-225-0315 to change or add a recipient name. Brochures describing both types of wheels and additional instructions are available. Any questions or comments regarding wheel performance are encouraged.

PERFORMANCE TO EXPECT

PM roughing wheels can remove 25 cu" per hour from chilled iron rolls. An operator should expect to remove .002" to .003" per hour from an average roll. A 60 grit PM generates a surface without random, deep grit marks usually left by shellac bond wheels. PM wheels can run at high amps and then at low amps without chattering – an advantage in reaching profile. The grinding action can be described as quiet and smooth. Stock removal on granite and stone-like rolls is exceptional. Rubber can be ground dry with no wheel loading and at lower amps. Suction roll burrs are minimal; easily removed by cork.

Pacer cork wheels now are more aggressive. An important formula change (new wheel specification) enables them to remove stock more easily than in the past. This shows in the traverse path and by the iron fines on the wet surface. They can remove a half tenth per pass. Time required is about three hours for an average iron roll.

Cork wheels are for more than bright finish. They finish better and faster than do roughing wheels. A 120-grit cork wheel will give a 5 to 8 Ra finish with no lead-lines, deep grit marks or chatter. The profile should be better than after roughing. Also, they are not just for iron.

MAIN OPERATING REQUIREMENT

In order for the PM or cork wheel to perform as stated, one requirement must occur. **The wheel must break down**, Amps must drop while traversing (if not infed). This is not difficult. Improper coolant, speeds, amps, however, may not allow the wheel to break down as it should.

The wheels stay sharp by breaking down properly. A loaded cork wheel will only shine the roll. A shiny roll still having random, deep grit marks or lead-lines is not good enough. These instructions will cover the proper operating conditions for breakdown. If a wheel still breaks down a little, call the factory. Pacer's experience with many mills may help identify a solution.

BASICS OF OPERATING THE PM AND CORK

The PM is run in a similar way to traditional wheels, with certain exceptions noted below. Their advantage is in removing more stock at the same amps. They can be pushed to higher amps and traverse speeds than most wheels but with less chatter tendency. It is advisable to operate at moderate speeds and amps listed. Only after experience with a wheel's action on a roll should an increase in wheel amps or roll speed be considered.

Once the roll pits, burns, or grooves are removed, it is not necessary to make numerous passes at decreasing amps and traverse speeds. After achieving equal amps across roll, common practice is to allow the wheel amps to drop during a handful of passes. Machines having manual infeed often require more passes to achieve roll straightness. A few passes at low amps should then bring profile to within .0005". At this point, it usually works out better to go right to the cork wheel.

Finishing chilled iron with a cork wheel is a two-phase operation. The first phase is to remove roughing wheel marks while improving the profile. This phase has certain wheel and roll settings. Twelve aggressive passes usually are enough. The second phase is to produce the finish. This has different settings. Twelve to fifteen lighter passes should be sufficient. Cork wheels alone can be used for light removal on hard rubber. Roughing rubber can be done dry, but finishing may need to be done wet.

COOLANT – SELECTION

The most common cause of wheel problems on chilled iron is coolant related. The choice of coolant is important. Many coolants contain lubricating materials such as mineral oils, soaps, paraffins, and silicones. The slicker the roll, the more difficult for abrasive grit to penetrate the hard surface. Wheels may glaze. Cork wheels are affected more by coolants containing oils, soaps, etc. than are PM wheels. The wheel face can load quickly, developing a thin, black layer. Neither the cork nor PM should have to be redressed. The face of either wheel should stay sharp.

Alkaline chemicals such as soda ash (sodium carbonate) or oakite (trisodium phosphate) in excess amounts also causes slickness. They have been used in the past to soften shellac wheels. They have no such effect on PM or cork wheels. In moderate amounts they can be satisfactory. Often, however, the concentration is made much higher than necessary, causing the wheels to perform below their potential. It is recommended to dilute the tank while grinding until some rust appears on the roll. Rust shows within minutes if the concentration is too low. Then add enough to inhibit the rust.

Powdered alkaline chemicals also have a disadvantage of gradually depositing in coolant lines. Another way to check tank concentration is by test kits from the manufacturers. Over time, the lines and valves can become blocked. The foaming action and coating by these coolants (actually cleaners) makes roll inspection more difficult than with other coolants.

Grinding fluids are classified as soluble oil, semi-synthetic or synthetic. **Only** synthetics should be used and **only** those having little or no lubricity. Lubricity is not needed or wanted. Use a refractometer (and refractive index factor) to monitor coolant concentration. *Contact Pacer*. I to 2% often is enough to inhibit rust. Good synthetics have a number of features other than rust inhibition:

Not oily – no slippery film on roll or machine
Low foaming – much easier to see marks on roll
Excellent settling – fines drop to bottom of tank
Rejects tramp oil – oil floats on top of tank
Good bacteria and mold control – no tank odor
Environmentally safe – no oils, phenols, nitrites.
Economical – low concentration, long life

COOLANT – FLOW AND FILTERS

If a wheel seems to act hard, a solution could be to reduce the coolant flow. This causes the wheel to run warmer and release grit more easily. The best way is to move the spout so the flow is onto the roll, about 6" to 9" above the nip area. The flow reaches the nip area in a thin film. Be sure the flow covers the full wheel face to prevent chatter or marks caused by dry grinding. **Low flow is always a good practice with cork wheels**. Since they are packed tight and have little porosity, high flow can pressure the abrasive away from the roll.

Swarf may contain spent grit, iron or rubber fines, tramp oil, etc. A filter machine at the tank helps greatly but can still pass some swarf. The swarf may deposit in long coolant lines to the spout. Hard particles can scratch the roll during finishing. Excessively dirty coolant may load cork wheels.

A simple way to ensure no oil or particles are pumped between roll and wheel is to install a filter unit close to the spout. A good location is on the pipe just behind the wheel guard. The unit is basically a common water filter – a 19" high by 4" dia housing containing an 18" high replaceable cartridge. The unit is bypassed during roughing. Turning two hand valves directs flow through the unit during finishing. The unit and replaceable cartridges are inexpensive and should be considered by mills needing roll surfaces to be as scratch free as possible. The housing can be metal or clear to see contamination being collected. Cartridges should last a number of rolls.

WHEEL DRESSING

As with any wheel, dressing with a sharp diamond is important. This is especially so with cork wheels. They have a rubber bond. A dull, flat diamond does not shave off the face properly but instead pushes the material aside. The

wheel does not start the job sharp. It might shine instead of removing the necessary stock. A single point or multi-point (brazed to the surface) diamond nib works well if it is new. It could stay reasonable sharp if rotated frequently. In actuality, it usually is not rotated frequently and for a number of reasons. If mounted behind the wheel, it and the set screw get covered by hardened swarf. If strapped to the roll, the fixture may not have an angle.

A better approach is an "impregnated" diamond nib. This has a metal block containing many small diamond chips throughout its matrix. The block is brazed to the same size shank as single or multi-point types. The metal block wears away during dressing, exposing sharp diamond edges. An impregnated nib always is sharp. **Impregnated diamond nibs work well on both the cork and PM wheel.** They are inexpensive and last long. *Contact Pacer.*

Moderate dressing speed is recommended for either wheel. A new PM wheel on a cold roll with cold coolant may act harder at first. Redressing a time or two may help. Soon the wheel, roll and coolant will warm for easier grinding.

Traverse lines can disappear more easily by the end of the cork process if the cork wheel edges are chamfered. A good time to chamfer is between the cork roughing phase and finishing phase. First, run the wheels far off the end of the roll for safety. The chamfers should be slight (about 10 degrees) and extend in 3/8" from the sides. Use an abrasive stone, sandpaper, or a file. Chamfering isn't absolutely necessary but may save time.

ROLL SPEED

The recommended roll speed for PM wheels is 60 surface feet per minute (sfm). An extra hard roll or certain conditions may make the wheel sing. Drop the roll to 45 sfm to give the grit more time to dig into the hard surface. If the roughing is going very well, increasing the roll to 75 sfm could be tried. This will reduce time since traverse speed also should be increased.

During the cork roughing phase, run the roll at 60 sfm. During the cork finishing phase, increase to 90 sfm or even 105 sfm. This increase will keep traverse speed up while the travel per revolution is being decreased. A tachometer with a 1' circumference (3.820" dia) wheel on its shaft is the best way to measure roll sfm. It is fast and accurate. If a tach isn't available and the machine has no gage, the rmp of a mark on the roll can be counted. The table lists various roll rpms. Go down to the roll diameter. Then go right to the column of the chosen roll sfm. The intersection number is the proper rpm.

Roll	Roll surface feet per minute (sfm)					
	30	45	60	75	90	105
diam	sfm	sfm	sfm	sfm	sfm	sfm
10"	11.5	17.2	22.9	28.6	34.4	40.1
12	9.5	14.3	19.1	23.9	28.6	33.4
14	8.2	12.3	16.4	20.5	24.6	28.6
16	7.2	10.7	14.3	17.9	21.5	25.1
18	6.4	9.5	12.7	15.9	19.1	22.3
20	5.7	8.6	11.5	14.3	17.2	20.1
22	5.2	7.8	10.4	13	15.6	18.2
24	4.8	7.2	9.5	11.9	14.3	16.7
26	4.4	6.6	8.8	11	13.2	15.4
28	4.1	6.1	8.2	10.2	12.3	14.3
30	3.8	5.7	7.6	9.5	11.5	13.4
32	3.6	5.4	7.2	9	10.7	12.5
34	3.4	5.1	6.7	8.4	10.1	11.8
36	3.2	4.8	6.4	8	9.5	11.1
38	3	4.5	6	7.5	9	10.6
40	2.9	4.3	5.7	7.2	8.6	10
42	2.7	4.1	5.5	6.8	8.2	9.5
44	2.6	3.9	5.2	6.5	7.8	9.1
46	2.5	3.7	5	6.2	7.5	8.7
48	2.4	3.6	4.8	6	7.2	8.4

TRAVERSE SPEED

PM wheels work well at near full wheel width traverse speed. A 3" wide wheel should travel 2-1/2" per roll revolution. A grease pencil spiral line on the roll would measure 2-1/2", even if two wheels are used. Travel one half wheel width off roll end. During the cork roughing phase, traverse at same speed. Travel, however, only 3/8" off roll end. The wheel is resilient and can become dressed while traveling past edge of roll. During the cork finishing phase, decrease traverse speed gradually. The last few passes should be at about 1/2" traverse.

WHEEL SPEED

Low speed removes stock faster than high speed and is calmer acting. The table lists recommended rpms for various wheel diameters. As long as breakdown is not excessive, these (or even lower) rpms should be used. Use same speed for cork roughing and finishing.

	16"	20"	24"	26"	28"	30"	36"
PM	750	600	500	475	425	400	350
Cork	500	400	350	325	300	275	225

If the machine has no rpm gage, a tachometer should be used, as with the roll speed. The wheel guard should have a hole (about 1" dia.) at the spindle centerline for the tachometer probe. The guard should be in place whenever the wheel is rotating. To avoid having to take readings every time the wheel speed or roll speed is changed, all rheostats should be permanently marked with various rpms.

WHEEL AMPS

Set infeed so PM wheels run at 10 to 15 amps over idle. This may be less than with older type wheels, but they do remove considerable stock in this range. Less amps means less roll deflection, spindle bearing wear and energy. For machines with % of load instead of amp gages, it would help to measure and write actual amps on the gages or paper.

As with roll speed, if the roughing is going very well, increasing the amps could be tried. This will increase removal per pass. At some point, higher infeed will not produce higher amps. Infeed above this point will just wear the wheel instead of removing more stock. It is not necessary or good practice to exceed 25 amps over idle. Amps for rubber rolls should be 8 to 12 over idle.

During the cork roughing phase, run wheels 10 to 12 amps over idle. Short passes could be made on high areas to get profile more quickly. After marks are removed and profile achieved (about twelve passes), start finishing phase. Make three passes each at about 10, 8, 6, and then 4 amps over idle. Decrease traverse about 3/8" each set of three. Keep the amps steady during each set.

Another method is to allow the wheel amps to drop very gradually at full traverse. Some operators prefer to mix methods, and some develop their own. **As with all the above recommendations, operators should use their own best judgement.** Automatic infeed will need to be shut off at some point. Complete the decrease manually. The spiral lead-line should disappear in the last few passes.

CHATTER – AVOIDING, REMOVING

Chatter can occur with any wheel although less with PM and almost never with cork. An advantage of cork is that it removes chatter. A wheel can chatter if acting too hard or, for different reasons, if acting too soft.

Chatter could be wheel caused but often machine or roll caused. Grinding a sagged, out of round, chilled iron roll relieves stress. The roll may then flex slightly – a possible cause of chatter. During the rounding process, extra speed adjustments may be needed. If chatter persists, check flow coverage, wheel balance, mount, roll supports & bearings, spindle bearings & belts, roll drive, feed assembly, swing assembly, etc.

If a wheel acts hard, do one or more of the following:
DECREASE wheel speed or flow or concentration.
INCREASE amps or roll speed or traverse speed.

If a wheel acts soft (high infeed needed to hold amps):
INCREASE wheel speed or coolant flow DECREASE amps or roll speed or traverse speed.
For a roughing wheel on chilled iron, decreasing wheel speed (until roll turns dull grey) for one minute is a way to sharpen it. Some machines are programmed to do this several times per

pass. Generally, if chatter is starting, change wheel or roll speed to prevent spread.

If deep chatter occurs, a solution is to decrease roll speed to 30 sfm for a while. This slow roll speed (slow traverse also) can stop chatter from traveling and then remove it. A solution to localized deep chatter is to grind the roll lower on both sides of the chatter before traversing it. The wheel gets below the chatter. Some use high wheel speed and/or roll speed to remove chatter.

WHEEL SPECIFICATIONS

It is not necessary to inventory many wheel types. Only a 60 PM and 120 cork are needed for most hard rolls. The H grade PM is most widely used. An I grade is recommended in certain cases. A 30 PM will handle most softer rolls. Pacer carries stock for fast shipment.

CHILLED IRON, STAINLESS, BRONZE:

roughing – moderate removal (to .020")	C60H7PM
roughing – heavier removal	C46H7PM
finishing – standard (5 to 8 Ra)	C120A3RC Cork
finishing – finer (2 to 5 Ra) after	C120 C240A3RC Cork

HARD RUBBER, GRANITE, TOP ROCK, FELT:

roughing – all removals	C60H7PM
finishing – or light rough & finish	C120A3RC Cork

SOFTER RUBBER (ABOVE 10 P&J):

roughing – dry or wet	C30H7PM
finishing – if necessary	C60H7PM

CHROME, CARBON STEEL

roughing – chrome	A60H7PM
roughing – carbon steel	A4617PM
finishing	A120A3RC Cork

Roll Wheel Hotline
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