

PREMIER DISPERSION MILLS

GENERAL OPERATING INSTRUCTIONS

DIRECTION OF ROTATION ANTI-CLOCKWISE LOOKING ON ROTOR.

84 MILL SCALES CALIBRATED IN 0.001 INCH.

130, 200, MILL SCALES CALIBRATED IN 0.025mm.

KEEP THIS MACHINE CLEAN - PARTICULARLY THE INTERIOR.

DO NOT START THE MACHINE WITHOUT CHECKING THAT THE ROTOR IS FREE TO ROTATE.

DO NOT RUN THE MACHINE DRY IF SET AT CLOSE TOLERANCE (0.025mm OR LESS).

DO NOT OPERATE MACHINE WITHOUT A STARTER HAVING OVERLOAD PROTECTION INCORPORATED. (STARTERS NORMALLY SUPPLIED).

ABRASIVE SURFACES CAN BE DAMAGED BY THERMAL SHOCK DO NOT SUBJECT THEM TO RAPID CHANGES IN TEMPERATURE.

ABRASIVE SURFACES CAN BE DAMAGED BY PHYSICAL SHOCK.

NOTE

0.001 INCH = 0.025mm

PREMIER DISPERSION MILLS

INTRODUCTION

Premier Colloid Mills have been designed to very accurate limits and it is on these accurate limits that the success of the machine depends.

It is very important to note, therefore, that Colloid Mills, are precision machines and should be treated as such at all times. If the instructions given in the attached notes are carried out carefully, then the Mill will give many years of perfect service.

SETTING UP PROCEDURE

Before wiring up to the electrical supply:

Remove the three locking screws. This will free the stator head, which with the hopper can be lifted clear from the top of the Colloid Mill.

Once the stator head has been removed it will be seen that the clearance between the rotor and stator is adjusted by moving the whole of the stator head up and down. The adjusting ring actuates the up and down movement.

Turning this adjustment ring clockwise reduces the clearance, while an increase in the clearance is obtained by rotating in an anti-clockwise direction looking down on the top of the machine.

Wiring up - the direction of rotation must be **ANTI-CLOCKWISE**

Check tightness of rotor nut after initial run. **REPLACE STATOR HEAD WITH CARE.**

STARTING A NEW MILL

Ensure that the mill and particularly the working surfaces are clean and that they are **NOT IN CONTACT**. This can be checked by rotating the Mill by hand as follows:

84 Mill	Pulling the belt drive under the machine body.
130 Mill	Turning the handwheel located inside the body.
Models 200 and 250	Through access door in side of cabinet a handwheel will be found on the lower end of the mill shaft directly under mill pulley, enabling shaft to be pulled round by hand.

CLEARANCE ADJUSTMENTS

1. Ensure that the rotor is running freely.
2. Rotate the adjusting ring, or stator head, to bring the working surfaces into contact. Rotating the rotor by hand until a slight whisper between the working surfaces is heard can test this. This should only be a slight whisper and the stones not rubbing hard.
3. Tighten the locking nuts finger tight only. Rotate by hand again, to see whether the tightening of the locking nuts altered the zero setting. If this is the case, adjust again until the stones are lightly touching **WHEN THE LOCKING SCREWS ARE TIGHTENED FINGER TIGHT.**

ADJUSTING THE SCALE

If the above instructions have been followed, the Mill working surfaces should now be at ZERO. All machines have an engraved scale graduated 0.025mm or 0.001 inch so that accurate clearances can be set between working surfaces. These scales differ slightly according to the type of machines.

84, 130, 200, 250 MILL

It will be noted that the adjusting ring has a secondary ring super-imposed on it that can be rotated freely, once the SMALL LOCKING screws on the perimeter have been loosened. This secondary ring will rotate independently of the main adjusting ring, and has at one point a pointer engraved on it.

This is a ZERO pointer.

Having found the ZERO of the machine as previously explained this pointer should be brought into line with Zero of the scale engraved on the stator head, each division representing 0.025mm. Re-tighten the locking screws of the Zero pointer ring and the pointer will now move with the adjusting ring. The pointer can now be set at any desired number on the engraved scale, by moving the main adjusting ring.

DO NOT FORGET TO RE-TIGHTEN THE STATOR LOCKING SCREWS.

84 MILL

Graduations are in thousands of an inch, thus if the Scale is set to the Figure 5 the clearance between the working surfaces will be 0.005 inch.

GENERAL

Once the machine has been zeroed only occasional check is necessary to compensate for wear. On a new machine this should be checked daily, until the machine has RUN-IN. On a new machine the stones have been works lapped, but as there may e a certain amount of loose grit present on the stones it is advisable to run the machine at a wide setting (say 0.25mm) with water or few pounds of spoiled product before production commences. Check for zero again after this operation.

REPLACEMENT STONES

The stones are accurately manufactured and any difference in the flatness between the rotor and stator is not likely to be greater than 0.125mm. This degree of accuracy is quite satisfactory for most products. Where clearances of less than 0.05mm are to be used, it is essential for the machine to be absolutely accurate and the only way to achieve this is for the stones to be lapped in-situ.

Mills are test run in our works and stones lapped before despatch, but when the rotor or stator is replaced, new stones must be lapped in, in-situ, before a high degree of accuracy can be obtained.

LAPPING TECHNIQUE

Mix a quantity of silica (of the type used in paints as a flattening agent) with water. This should be a readily flowing consistency. Set the mill so that the rotor and stator are almost at zero position, in other words the stones are touching very lightly. Pass the silica suspension through the mill, with the mill running and circulate for 10/15 minutes. In the absence of silica, any proprietary pot cleaner or scouring powder will serve equally well.

Stop the machine frequency to ensure that the surfaces are still only lightly rubbing and very gradually reduce the clearance by approximately $\frac{1}{4}$ of a division as the high spots on the rotor and stator wear off.

THE MILL MUST NEVER BE RUN DRY WHILE THE SURFACES ARE IN CONTACT

When it can be heard by rotating the mill by hand that the stones are touching all the way round, wash out the silica. Set the stones to rub lightly and, with water only, repeat the procedure for 5/10 minutes. If the stator head is removed and the stones true, a uniform glaze should be seen on the rotor and stator working surfaces. This uniform glaze is essential for the production of top quality paints, enamel and very fine dispersions. It is pointless to dress the stones to this accuracy if a wide clearance is to be used.

CLEANING AFTER LAPPING - REMOVING OF STATOR

The machine should be cleaned out after lapping using water while the mill is running. The machine should then be stopped and the three locking screws removed. The adjusting ring can then be turned in an anti-clockwise direction, thus raising the stator head clear off its location. The stator can then be lifted clear of the machine. It will be found easier to lift this clear, if the hopper is left in position (particularly with large mills). Check that the stones are clean of lapping compound.

IMPORTANT NOTES

It is possible that if there is any dirt or foreign matter on the top face of the adjusting ring when it comes into contact with the lower side of the stator, to cause the stator head to cock slightly throwing the working surfaces out of true. These surfaces should always be checked for dry particles of material before re-assembly.

STAINLESS STEEL WORKING SURFACES - FOR SPECIAL APPLICATIONS

When the mill is fitted with stainless steel working surfaces, the same instructions apply except for the clearance adjustment.

Carry out instructions for clearance adjustments 1,2 and 3 as for abrasive type but when working faces meet, adjust zero point to line up with zero on scale and then raise stator head by a minimum of three divisions (0.075mm). This is the minimum clearance recommended with stainless steel working surfaces.

OPERATING AT ELEVATED TEMPERATURES

Special procedures must be observed when high temperatures are developed or when products are processed hot.

STAINLESS STEEL SURFACES

It is very important that the zero is located with the machine at its operating temperature, to do this, open the clearance to approximately 0.125mm and pass hot water through the machine (stationary) until the metal is at the approximate temperature to which it is going to be operated. When this has been achieved, locate the zero by lowering the head until it just touches the rotor with the locking nut tightly secured. After locating the zero, adjust the clearance between the surfaces to the required amount.

ABRASIVE SURFACES

The notes on stainless steel should be generally observed. The abrasive surfaces are frequently used to carry out fine grinding of tacky materials.

It is often necessary to run the machine at 0.025mm clearance. At this fine clearance some frictional heat will be generated which will cause slight expansion in the shaft, and reduce the clearance at which the machine is operating. For the first few minutes running it will be found necessary on all mills to allow for slight expansion of the rotor shaft. Stop the machine and test by hand turning to see if the working surfaces have come into contact. If they have, re-set two or three times during the first 10 minutes running, until a steady state is reached.

NB The abrasive stones are liable to damage through thermal shock. While they can be used at high temperatures they should not be subjected to a sudden increase or reduction of temperature. For example, if the machine has been running at 80 degrees C. immediate flushing of cold water is not advisable.

LUBRICATION

It is impossible to lay down a strict greasing schedule since the product being milled affects the amount of grease used. As a general guide we suggest one shot of grease every 60 running hours, if the product being processed contains no volatile solvent, or one shot every 12 running hours if solvent fumes are present, especially with those types of products that could leach out the grease.

CLEANING

After production has ceased, flush the machine through with a solvent, cleaning down the hopper with a brush or scraper (soft polythene pot scraper has been found very suitable). Remove stator and complete final cleaning of underside. The interior of the mill will be exposed for further final cleaning. Occasionally (say once weekly) it is advisable to remove the rotor, to make sure that there has been no build-up of product under the rotor.

REMOVAL OF ROTOR

84 Mill (After and including Machine No. 84186).

This mill has the rotor fixed by a cap screw, which is visible after removal of the rotor stone locking screw. The actual abrasive stone is loose and can be removed leaving the rotor carrier in place.

To remove this rotor carrier undo the cap screw with an Allen key and remove. It will then be found that the rotor carrier can be lifted clear of the shaft. There is a small washer under the head of the cap screw. This almost invariably remains in the recess of the rotor carrier, but care should be taken not to lose or mislay it otherwise proper assembly is impossible.

When the rotor carrier is removed from the shaft, it will be noted that the top of the shaft is a square form, which locates mating cut-outs in the rotor carrier. In the centre of the square is a round pillar. On this pillar are fitted two Bellville washers (cap spring steel). These washers will often remain in the rotor carrier housing. These should be taken out, cleaned and re-greased. When replacing these washers they must be assembled with faces concave to concave and located on the pillar of the shaft.

The rotor can be replaced, taking care to see that the rotor locates on the square part of the shaft. Replace the washer and cap screw and tighten.

This assembly gives the flexibility (rocking motion) which is necessary in this type of mill to give the compensating mechanism when operating at very fine settings.

200, 250 AND 130 MILLS

The rotor stone can be removed after removal of the rotor screw. The rotor carrier can be removed by first releasing the grub screw in the centre boss then unscrewing the centre boss. It will be necessary to apply pressure to the drive belt when unscrewing the rotor screw and the centre boss. The rotor carrier is keyed to the shaft.

CHANGING STATOR STONE

130, 200 AND 250 MILLS

These mills are fitted with loose stator stones and are secured to the stator head on the underside by a stainless steel retaining ring held in position by stainless steel hexagon headed bolts. Plastic locking washers are fitted under the hexagonal heads. Remove by undoing bolts, lifting off retaining ring and the stones are then removable.

GENERAL NOTES

PRODUCT NOT FEEDING SATISFACTORY

If the product is of a very viscous nature, which will not be pulled into the mill by the impeller fitted to the top of the rotor, then it will probably be necessary to employ a pump feed. Almost any pump that will handle the material can be used, but the pressure at the mill head must not exceed 10 PSIG.

SEVERE VORTEX IN THE HOPPER

With less viscous materials, remove the impeller and replace with plain washer.

OVER HEATING

This may be due to a number of reasons. If possible, run on slower speed - open the clearance slightly or reduce the viscosity of product.

MOTOR

This is a standard Totally Enclosed Fan Cooled Squirrel Cage Motor. Water should be kept away from motor.

SPECIAL INSTRUCTIONS

These machines are fitted with 2 speed motors, giving high and low speed at the touch of a button. Direction of rotation ANTI-CLOCKWISE should be the same for both speeds. When wiring up check that the direction of rotation is correct for both speeds.

CHANGING SPEED

Always start the machine on SLOW speed and when it is running freely, press STOP button and immediately, press FAST button. This procedure is essential on larger mills otherwise the shock load of high speed, direct on line starting, puts a serious strain on moving parts.

If it is desired to change from fast to slow speed press STOP button and when machine has nearly stopped, the SLOW button can be pressed.

USE OF TWO SPEEDS

These machines are capable of working at fine tolerances and the slow speed is provided primarily for enabling the machine to be run at settings of 0.025mm or less for fine dispersion work. If settings of this fineness are necessary, too much heat would be generated at the fast speeds especially on viscous products. The slow speed is also useful if it is desired to decrease the amount of work done on the product.

MAINTENANCE

DRIVE

The mill is driven by means of a Poly 'V' Belt, which when properly fitted and tensioned remains virtually constant. The mill is despatched with the belt set correctly.

If, however, there is cause to remove or renew the belt the following must be observed. For Poly 'V' Belts. When correctly tensioned there should be approximately ½" lateral movement midway between pulleys.

SPECIAL FOR 84 MILLS WITH ABRASIVE WORKING SURFACES ONLY

These machines are fitted with flexible mounted spring loaded rotors, enabling them to compensate for slight expansion, and they can be run with the working surfaces in contact, for extremely fine dispersion work. When operating at these settings, the mill should **ALWAYS BE RUN AT THE SLOW SPEED.**

LOW CLEARANCE SETTINGS

On the engraved scale it will be noted that there are graduations to the left of the zero mark, indicating that the mill can be set for compression settings. It is seldom necessary to operate below minus 0.050mm. These machines can of course operate at very fine clearance settings like other Premier Dispersion Mills.

HEATING OR COOLING SYSTEMS 200 AND 250 MILL

These machines are fitted with water jackets round the stator. These are made of thin gauge stainless and will not withstand high pressure. Thin gauge is used to obtain a satisfactory heat transfer and the pressure in the jacket should never exceed 5 PSIG.

As a safety measure it is suggested that a small header tank should be installed so that the water flows from a height of a few feet only and at atmospheric pressure.

Live steam on LOW pressure may be used discharging to atmosphere, if it is desired apply heat to the milling operation. Care should be taken to set the zero when the machine has reached its operating temperature.

SUPPLEMENTARY TO OPERATING INSTRUCTIONS

84, 130, 200 AND 250 TWO-SPEED MILLS

When operating the mill on high speed, assuming the mill has been set to zero in accordance with the General Operating Instructions, open the mill setting to 0.2-0.3mm (0.008"-0.012") and run the machine on high speed for 10 -15 minutes. By this time the bearing assembly will have heated up to its operating temperature. This elevated temperature will have caused the shaft and rotor assembly to expand upwards and thus close the gap between the two working surfaces.

Stop the mill and immediately close the mill setting down, until the working surfaces make LIGHT contact. Do not forget this should be checked only when the stator three locking screws have been tightened.

On checking the scale it will be noted that the new zero point will be 0.075 - 0.125mm (0.003" to 0.005") in excess of the original zero. This means that this amount of expansion has taken place, and must be allowed for when setting the mill for operation.

It is recommended that the zero mark is not altered, but that the amount of expansion is added to the working clearance desired, and the mill set at this. When the mill is run of slow speed no expansion takes place and the original zero is then correct.

LOOSE ROTOR STONE REPLACEMENT

REMOVAL OF STONE

If it will not lift out of the carrier when the rotor nut is removed, it can usually be removed by replacing the whole rotor carrier and stone in some hot water about 140 degrees F.

This will have the effect of expanding the stainless steel and whilst still hot the stone can usually be prised out.

The carrier can be cleaned of product with a suitable solvent applicable to the material being processed. It must be thoroughly clean.

DO NOT hammer the carrier in an effort to loosen the stone, as this will bruise or distort the carrier rim and it will not then accept the new stone.

Loose stone rotor carriers should not normally be returned. All that is required is the fitting of new loose stone. Damaged or distorted rotor carriers are useless and cannot qualify for any allowance.

Refer to instructions for 'lapping in' new stones.