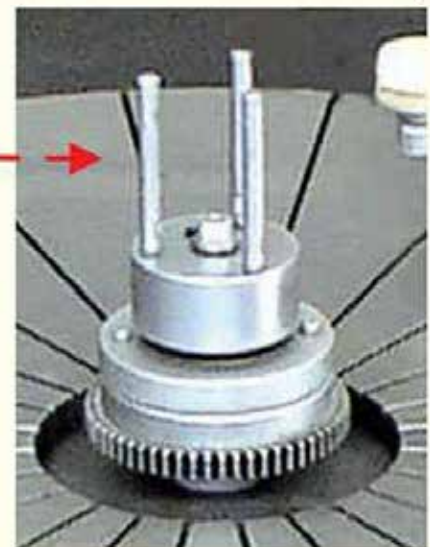




LAPPING MACHINES



WITH REVERSE MECHANISM



Close up view of reverse mechanism

PRECISION LAPPING MACHINES

- ▶ A wide variety of materials can be lapped.
- ▶ Flatness to one light band (0.0003mm) on 75 dia. component.
- ▶ Surface finish to less than 0.2 μ RA.

The advantages of lapping for obtaining fine flatness and surface finish have long been recognised by production and design engineers. Proper finish and flatness can be achieved with any of the 7 standard lapping machines in the GMT range, in bench and floor models.

Some reasons why lapping machines help to transform a costly, rarely used, hand operation to a fine accuracy economical process:-

- a. Parts of different shapes, thickness and materials can be lapped.
- b. Because the lap plate continuously maintains its flatness, production is not interrupted.

- c. Appropriate diameters of the conditioning rings result in optimum lapping area.
- d. Lapping cycles are controlled by an automatic and adjustable digital display timer.

A partial list of the materials that lend themselves to lapping :

- | | |
|---------------------------|-------------|
| • Cast iron | • Tungsten |
| • Plastics | • Ceramics |
| • Stainless Steel | • Alumina |
| • Silicon | • Bronze |
| • Stellite | • Carbon |
| • Ferrite | • Aluminium |
| • Steel(soft or hardened) | |

Pump manufacturers, electronic industries, valve manufacturers, etc., have found a sure way of obtaining positive sealing.

REVERSE MECHANISM

Reverse mechanism is used to correct the flatness of the lap plate and avoid down time for lap plate correction.

MODELS 300mm and 400mm DIA:

300mm and 400mm dia lapping machines are bench models and are robust. The lap plate and conditioning rings are made from special, close-grained, cast iron. The lap plate is supported on a preloaded taper roller bearing for maximum stability.

STANDARD EQUIPMENT

- Heavy duty steel fabricated housing.
- Abrasive distribution system with pump, tank and infinitely variable flow control.
- Cast alloy lap plate, radially serrated.
- Three adjustable conditioning rings with yoke and bearing assemblies.
- Automatic lapping cycle timer.
- Drive unit, 0.37 kw motor with gear box.
- Reverse mechanism.
- Three pressure plates with lifting eye bolts.
- Three felt pads.

OPTIONAL EQUIPMENT

- Variable speed drive.
- Special lap plate for lapping tungsten carbide, ceramics, etc.
- A handy machine cabinet which permits storage for all accessories.



Machine Cabinet

LAPPING MACHINES, MODELS 610, 900 and 1200mm DIA:

These sizes are constructed on a solid fabricated structure and heavily ribbed.

Special attention has been given to the design of the main spindle bearings, giving great axial load capacity, maximum stability, long life and smooth performance, even under heavy eccentric loading.

Lap plates are manufactured from close-grained alloy cast iron, stress relieved after pre-machining and finally finish-machined and lapped in position.



900mm dia lapping machine

STANDARD EQUIPMENT

- Heavy duty structural steel with integrally mounted drive motor, gear reduction unit, abrasive pump, abrasive distribution system, complete with electrical control panel.
- Heavy duty work table, manually adjustable vertically.
- Alloy cast iron serrated lap plate.
- Three adjustable conditioning rings with roller yoke assemblies.
- Three felt pads.
- Reverse mechanism.
- Adjustable timer, tank, feeding system with adjustable flow control.
- Removable drain container.
- Main drive motor with gear reduction unit.
- Three cast alloy pressure plates with eye bolts.
- Wrenches, instruction manual.
- Stirrer motor.



OPTIONAL EQUIPMENT

- Heavy duty, double acting, pneumatic cylinders, radially adjustable, mounted on a steel spider assembly.
- Variable speed drive.
- Special porous-structure lap plate for lapping tungsten carbide material.
- Provision for water cooling.

ABRASIVE TANK

A pump feeds the slurry to the lap plate through an infinitely adjustable control jet which closely regulates the required amount of flow on to the lap plate, irrespective of the size of the abrasive particles used.



LAPPING MACHINES SIZES 1500, 1800 and 2100mm DIA



1500mm dia lapping machine

Sizes 1500, 1800 and 2100 mm dia machines are massive with heavily ribbed fabricated bases.

Large heavy duty roller bearings have been provided to take care of eccentric and other radial loads.

The drive is taken from the main motor through 'V' belts through a fluid coupling

to ensure smooth working. The drive to the lap plate is through a heat-treated pinion and a high tensile spheroidal cast internal gear.

Variable speed drive for lap plate, reverse mechanism for conditioning ring is supplied as standard.

Water cooling for the lap plate is optional.

GMT MONOCHROMATIC LAMP

With GMT Monochromatic Lamp one can measure flatness within 0.6 microns quickly and easily. These attractive and self contained units use sodium lamp to produce a brilliant glare free light of known wave length. Contrasting light and dark bands are readily observed on most reflective or semi-reflective surfaces. Used with GMT optical flats, they measure surface flatness within 0.3μ on parts upto 75mm dia.

OPTICAL FLAT

GMT optical flats are made from clear fused quartz. Flats made of quartz are superior due to their very low thermal expansion and their greater resistance to abrasion. GMT optical flats are available in 50, 75, 100 and 150 mm dia sizes.

POLISHING STAND

In order to obtain utmost reflectivity from a lapped surface for light band interpretation, it is generally required to hand polish sample parts briefly after work has been lapped. GMT polishing stands are made to effectively handle a fine grade polishing paper; holding it absolutely tight to prevent rounding the edges of the work, yet permitting easy access to a new section of paper when desired. The stand is equipped to take a standard role of polishing paper.



GMT monochromatic lamp with optical flat



Optical flat

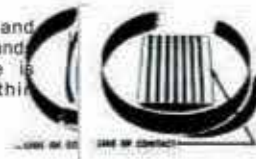


Polishing stand

MEASURING OF FLATNESS BY USING GMT MAKE MONOCHROMATIC LAMP AND OPTICAL FLAT



Straight, parallel and equally spaced bands show that surface is perfectly flat within 0.0003mm



Bands do not curve end for tangent line to intersect one full band. Curvature of bands is equal to one half the distance from one band to the next, or 0.00014mm out of flat. Curvature away from line of contact indicates part is convex.



Two way curve shows part to have a ridge along line of contact. Ridge is 0.0003mm in each direction. This is a simple example of topographical effect of monochromatic light and optical flat shown in this position to illustrate



Straight parallel bands show that surface is perfectly flat within 0.0003mm



Imaginary tangent line intersects one interference band immediately above it. This shows the sides to be below one band or 0.0003mm



3. Imaginary tangent line intersects the 1 interference band immediately above it. This shows the sides to be below one band or 0.0003mm.

Light band readings through an optical flat, using a monochromatic light source, represent the most accurate method of checking surface flatness. The monochromatic light on which the following diagrammatic interpretations of light wave readings are based, comes from a sodium-filled tube source which eliminates all colours except "yellowish orange". The wave length of light from this source is approximately 0.6 microns. However, since only one half of the wave length is used in the measurement procedure, the

increment of measure is one half of 0.6 microns i.e. 0.3 microns.

The dark bands viewed beneath the optical flat are not light waves - they simply show where interference is produced by reflections from two surfaces. These dark bands are used in measuring, as shown in the illustration to the right. The band unit is 0.3 microns i.e. between the center of one dark band and the center of the next dark band, the level of the work has risen or fallen by 0.3 microns in relation to the optical flat.

DIMENSIONAL SPECIFICATIONS

All dimensions are in mm

Model	06-01	06-02	06-13	06-03	06-05	06-06	06-07
Size	300	400	610	900	1200	1500	1800
Lap plate OD	mm 300	400	610	900	1200	1500	1800
Cond. ring ID	mm 107	140	250	370	510	610	690
Length of machine (max.)	mm 800	900	1250	1400	1870	2635	3630
Width of machine (max.)	mm 675	775	1100	1300	1735	2300	3600
Height of machine (max.)	mm 610	610	1375	1475	1475	1600	1600
Lap plate speed	rpm 48	48	24/30/48	25/40/55	24/45/55	* 10 to 32	* 10 to 32
Main motor	kw/hp 0.37/0.5	0.37/0.5	1.5/2.0	2.2/3	5.7/7.5	7.5/10.0	15/20.0
Pump motor	kw/hp 0.11/0.15	0.11/0.15	0.25/0.33	0.25/0.33	0.25/0.33	0.25/0.33	0.25/0.33
Timer range	mts. 0-30	0-30	0-30	0-30	0-30	0-30	0-30
Stirrer motor	kw/hp -	-	0.37/0.5	0.37/0.5	0.37/0.5	0.37/0.5	0.37/0.5
No. of cond. rings	3	3	3	3	3	3	4
Hydraulic motor	kw/hp -	-	-	-	-	1.5/2	1.5/2
Standard power supply	415V / 3ph / 50Hz						

* Frequency variable speed



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