

Flatness

and hand lapping / polishing



MEASURING FLATNESS



Lapmaster precision Flatness Gauges

The gauge is of the spherometer type having a dial test indicator mounted in the centre of the gauge body. The gauge rests on three feet, which are fitted with hardened steel ball anvils. (These are screwed in and can be replaced should they wear after prolonged useage.)

Lapmaster flatness gauges have a resolution of 2 microns. This means that the resolution of the flatness gauge with interpolation is 1 micron over 237mm. (equivalent to one sodium light band over 71mm).

The gauge is zeroed prior to use by setting it on a master flat so that all three feet and the anvil of the dial gauge are on the same plane, and the dial test indicator bezel or the adjustable foot are then adjusted to set the indicator to zero. Each gauge comes complete with a hardened steel master flat, lapped and polished better than 0.3 micron, and a box which houses both when not in use.

Flatness Gauges are available in the following sizes:

- Metric scale 5"
- Metric scale 7"
- Metric scale 9"

Customs sizes are available on request.

International Lapping and Polishing Machine Systems

www.lapmaster.co.uk

PRECISION FLATNESS GAUGES

All Lapmaster precision flat lapping machines are of the "ring lapping" type. This design permits high standards of flatness to be routinely achieved by careful adjustment of the lateral position of the cast iron conditioning rings on the annular lap plate track.

To consistently achieve successful results it is essential to periodically asses the flatness of the lap plate. As well as giving a spot check at the time of testing, the results of a series of checks, if recorded, will form a log and allow careful analysis of trends, providing information for correctional measures to be made if required ie: adjustment of the conditioning ring positions.

There are several methods of testing, for example a monochromatic light and optical flat can be used to set up an interference pattern. This technique requires that the surface to be tested is reasonably reflective, so in most cases after lapping and cleaning, a hand polishing operation must be carried out. This check can be carried out on the component itself, or on a special test plug made of brass, which can be run along with a batch of components.

The benefit of the Lapmaster flatness gauge is that it allows direct reading of the flatness of the lap plate itself once it has been cleaned. It also eliminates the need for a hand polishing stage, which is particularly beneficial when large components are being processed.



Hand lapping and polishing plates are available in the following diameters:

- 6"
- 12"
- 18"

Custom sizes are also available and can be quoted on request.

POLISHING STAND

For flatness assessment the surface being examined must be sufficiently shiny so that light will be reflected back through the optical flat. If the component is to be checked after a polishing operation, or after the lapping process if it is very hard material, then it will have sufficient reflectivity so that no further polishing is needed. However for the majority of work the lapped surface must be lightly polished. As this stage does not require much time it is conveniently carried out manually, using a figure of eight motion. The Lapmaster polishing stand used for this, can be loaded with a roll of abrasive paper (width 305mm), clamped taut to prevent the edges of the work from being rounded, and situated on a bench near to the lapping machine.

HAND LAPPING PLATES

Lapmaster hand lapping plates are suitable for laboratory, tool room or maintenance workshop and can be used for lapping parts to extreme flatness in low volumes.

These plates are made from high quality low porosity grey cast iron (Grade 300 to BS1452) and are usually serrated with a square crosshatched pattern. Solid (Unserrated) hand lapping plates are available for use with very small workpieces.

They are used with an abrasive grit, applied in paste form to give a uniform dull matt finish on a wide variety of metallic and non-metallic materials.

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