



OPTICAL MEASURING TOOLS LIMITED

Optical elements and systems for industry



This brochure is designed to give abridged details of some of the more widely employed Optical Elements manufactured by Optical Measuring Tools Ltd., who have one of the most modern installations for this purpose in Great Britain and a staff of highly skilled personnel capable of producing the most complex optical components. The wide range of substances worked includes fused and natural quartz crystal and a variety of synthetic materials; metals are also surfaced to a high degree of optical polish and flatness.

Contracts for the manufacture of optical elements made from glass, quartz (fused or crystalline) with plane, spherical or cylindrical contours are undertaken; surfaces can be worked to within 0.000001" (0.00002 mm) and angles corrected to 1 second of arc.

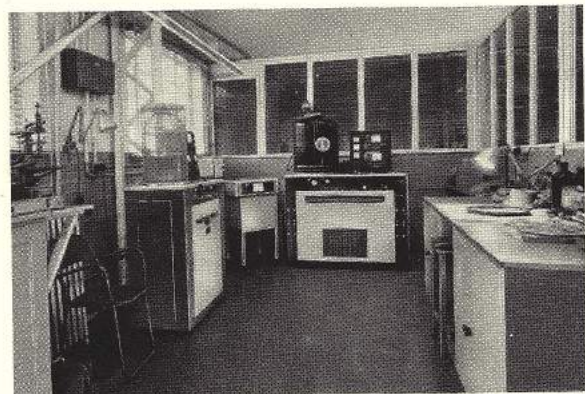
An advisory service is offered for the computation of individual components and complete optical systems are designed to meet customers' specific requirements.



Optical Polishing Shop



Linear Engraving Department



Vacuum Coating Laboratory

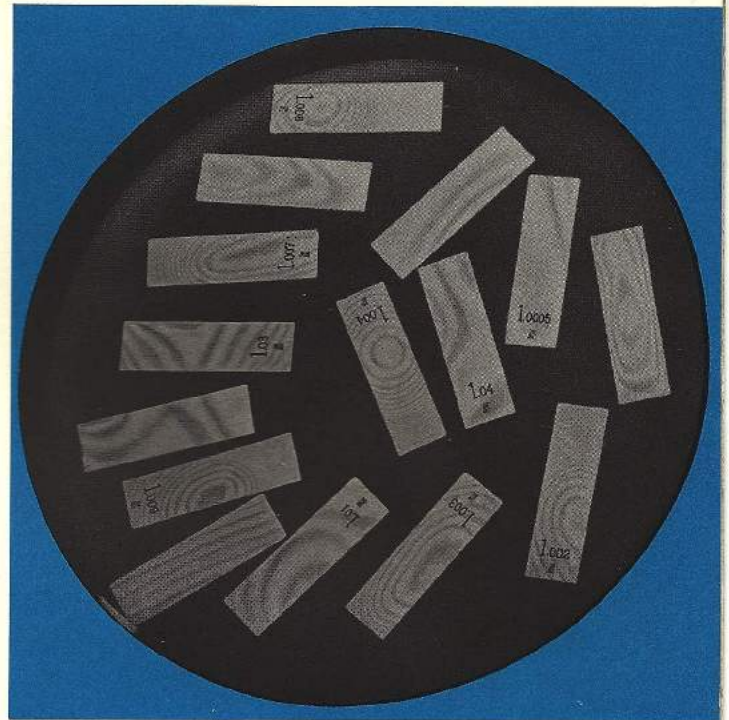
O.M.T. have been appointed by the National Research Development Corporation as the official manufacturer of master radial and linear diffraction gratings utilised in equipment calling for ultra precise measurement and numerical control.

Optical Flats

Optical flats have become widely accepted in recent years as providing a reliable method of accurately inspecting and measuring the surface flatness of many types of precise engineering equipment, such as slip gauges, test blocks, micrometer anvils, etc.

By their employment, gauge surface inaccuracies, of an order too small to be detected by a micrometer, may be determined. It is, indeed, possible to detect variations of 0.000001" (0.00002 mm).

The use of optical flats is based on the fact that if a glass or quartz plate is put into close contact with another surface, a series of colour fringes or bands will be visible and these will indicate the inaccuracies of the surface being checked. These colour fringes are produced by the interference of light reflected from the two contacting surfaces. It is known that the distance between two colour fringes represents a surface inaccuracy of 0.00001" (0.0002 mm) so a definite basis for comparison is available.



Variations in surface flatness of a series of slip gauges is portrayed in this illustration.

OMT Optical flats are available in the following three qualities

WORKSHOP QUALITY

One or both surfaces to 0.000005" (0.0001 mm) per inch made in glass only.

INSPECTION QUALITY

One or both surfaces flat to 0.000005" (0.0001 mm) made in glass or fused silica.

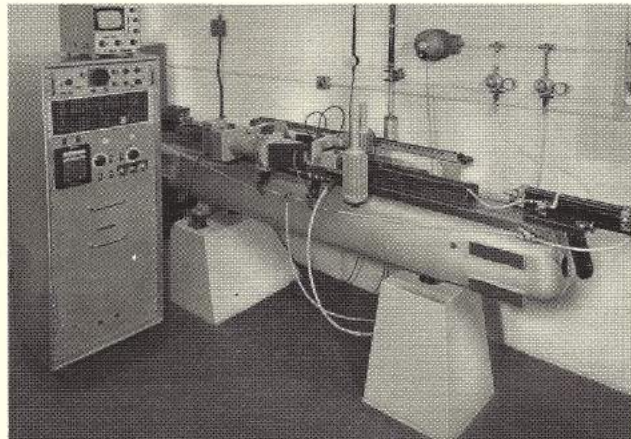
REFERENCE QUALITY

One or both surfaces flat to 0.000001" (0.00002 mm) made in fused silica only.

All of the above types are available in the following standard sizes but prices for 'specials' can be quoted on request.

Diameter	Normal Thickness
1½" (38 mm)	1" (13 mm)
2" (51 mm)	1" (13 mm)
3" (76 mm)	1" (13 mm)
4" (102 mm)	1" (13 mm)
5" (127 mm)	1" (13 mm)
6" (152 mm)	1" (19 mm)
7" (178 mm)	1" (19 mm)
8" (203 mm)	1" (19 mm)

Diffraction Gratings



Grating machine for the production, copying and checking of master linear gratings

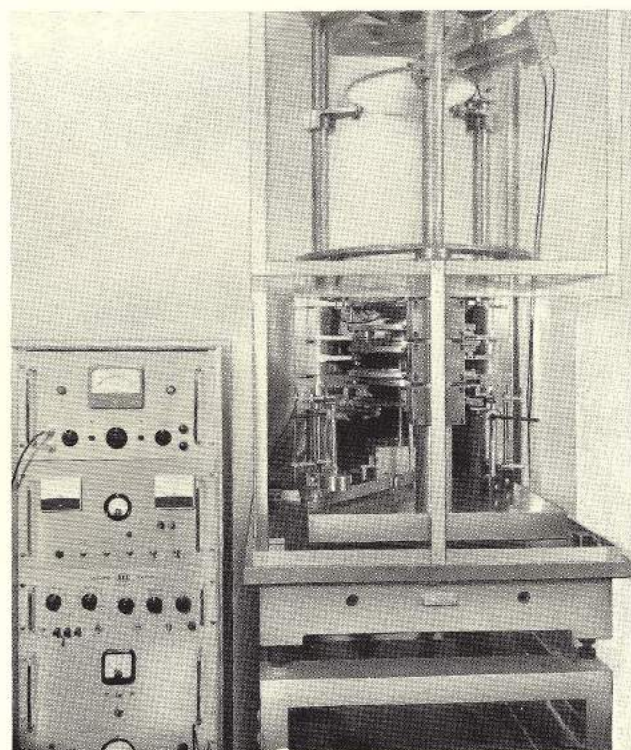
A wide range of precision linear and radial gratings is available for the measurement of extremely small linear and angular displacements in precision measuring equipment and machine tools. The output from this type of measuring system is ideal for applications involving digital readout and numerical control.

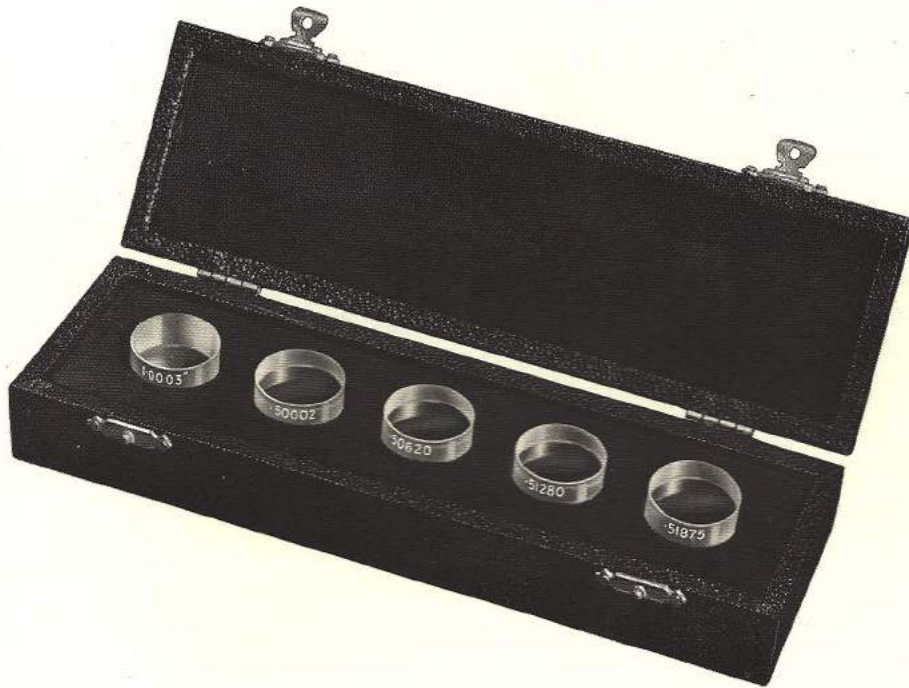
Master gratings, both linear and radial, are available for the production of copy gratings in varying line structures to customers' requirements. The production of master gratings — linear or radial — can be undertaken to customers' specifications. Radial gratings can be produced by either photographic or metalised techniques with a maximum error of 1 second of arc. If required, certification of accuracy can be supplied by The National Physical Laboratory.

Master gratings supplied by The National Engineering Laboratory are also available and Optical Measuring Tools Limited are licensed to produce scales from these masters. Gratings produced on the O.M.T. equipment are periodically checked for accuracy at The National Physical Laboratory and linear gratings of 50" (1270 mm) in length, with a maximum error of 0.00004" (0.001 mm) overall can be produced by the photographic method.

Examples of the application of radial and linear gratings are to be found in O.M.T. Rotary Tables and Newall Jig Boring Machines, both with digital readout.

Grating machine for the production, copying and checking of master radial gratings





Fused Quartz Micrometer Gauges

These superior quality gauges, manufactured from fused quartz because of its hard wearing qualities and thermal stability, are designed specifically for checking the flatness and parallelism of micrometer measuring faces.

They are supplied in sets of five, each calibrated to the fifth place and with the size engraved on the periphery. The size range has been established in order to permit the micrometer measuring faces to be checked at each quarter turn.

Nominal Gauge Sizes

ENGLISH (All 1" dia.)

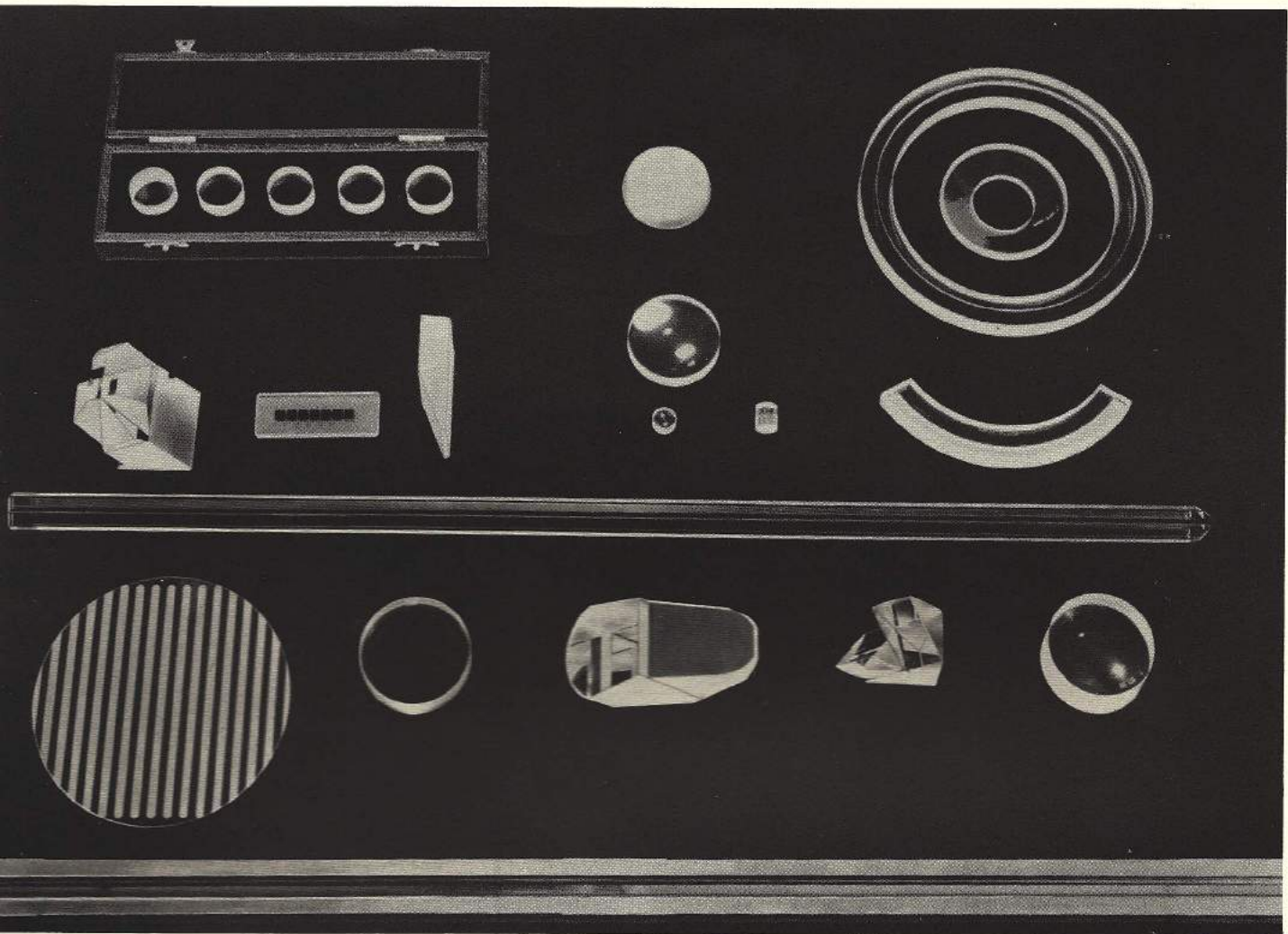
0-5000"
0-5062"
0-5125"
0-5187"
1-0000"

METRIC (All 25 mm dia.)

12-000 mm
12-125 mm
12-250 mm
12-375 mm
25-000 mm

All O.M.T. Micrometer Gauges comply with National Physical Laboratory specifications.

N.P.L. certificates are supplied with gauges at slight extra charge.



Precision Lenses

A comprehensive selection of achromatic lenses and condensers covering a wide range of diameters and focal lengths is available from stock. The Company offers a highly qualified advisory service for the computation of individual components and complete optical systems and specialise in manufacturing lenses of quartz, glass and synthetic materials to customers' specific requirements.

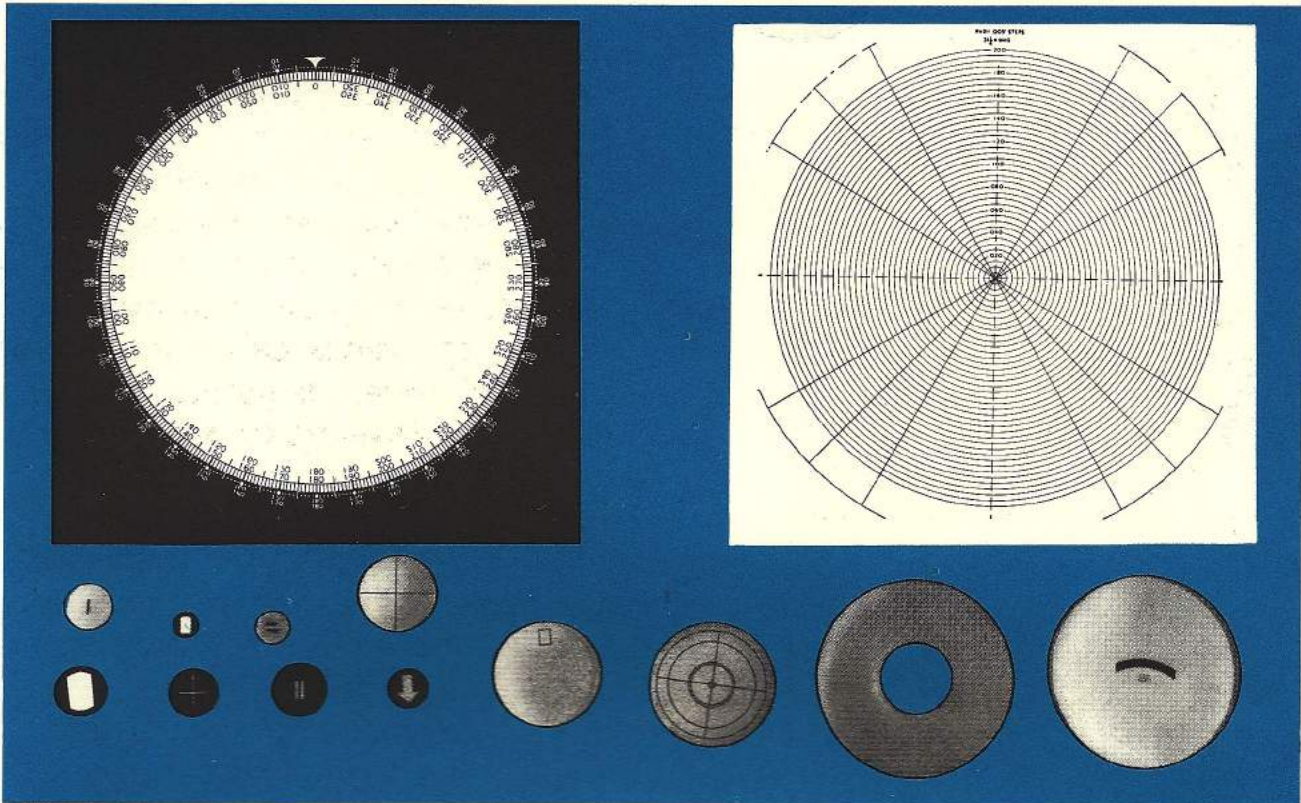
O.M.T. also supply, or contract for the production of optical components for Schlieren and solid state laser equipment, including confocal mirrors, neodymium and ruby laser rods, to a high degree of accuracy.

Prisms

A wide range of prisms is available in many optical materials and prisms with angles corrected to within one second of arc may be manufactured to order.

O.M.T. specialise in the production of polyhedral beam splitting prisms, roof prisms, pentagonal prisms, glass polygons to N.P.L. specifications and 'specials' to suit customers' requirements.

The above photograph shows a range of finished optical components including Micrometer Gauges, Prisms, Aluminised mirrors, Lenses, Graticles, Rotary Table Circular Scales, a Neodymium Laser Rod, a Metal Engraved Scale and a Rotary Table Quadrant Scale.



Graticules

The wide employment of numerous forms of graticules in the comprehensive range of O.M.T. high-precision optical inspection equipment has led to the development of special production techniques and the installation of the most modern apparatus for manufacturing purposes. As a result, the Company is able to offer a wide selection of photographic type and metallised graticules for use in optical, scientific and industrial fields.

Special graticules are manufactured to suit customers' requirements.

O.M.T. specialise in the manufacture of precise circular scales with a maximum overall error of division throughout 360° not exceeding 2 seconds of arc. Linear engraved scales on metal or glass, with National Physical Laboratory certificate of accuracy, also feature in the O.M.T. production programme.

Vacuum Coating

The O.M.T. high-vacuum laboratory produces surface-coated mirrors, anti-reflecting coatings, multi-layer films, metallic electrical conducting coatings, neutral filters, etc., to customers' specific requirements. Quotations are submitted for large and small quantities of all first quality coatings.

OTHER PRODUCTS MANUFACTURED BY THE NEWALL GROUP OF COMPANIES

CYLINDRICAL GRINDING MACHINES, INTERNAL GRINDING MACHINES, UNIVERSAL GRINDING MACHINES, ANGLE HEAD GRINDING MACHINES, ANGLE APPROACH GRINDING MACHINES, MACHINE TOOL EQUIPMENT, SPECIAL PURPOSE GRINDING MACHINES, MULTI-WHEEL GRINDING MACHINES, UNIT-BUILT GRINDING MACHINES, CAMSHAFT GRINDING MACHINES, CRANKSHAFT GRINDING MACHINES, JIG BORING AND MILLING MACHINES — CONVENTIONAL AND NUMERICALLY CONTROLLED, JIG GRINDING MACHINES, SPARK EROSION MACHINES, NUMERICALLY CONTROLLED MULTI-SPINDLE MACHINING CENTRES, HYDRAULIC UNITS FOR MACHINE TOOLS, TOOLMAKERS' MICROSCOPES, OPTICAL COMPARATORS, WORKSHOP PROJECTORS, PROJECTION PANTOMETERS, ROUNDNESS MEASURING MACHINES, OPTICAL DIVIDING HEADS, ROTARY INDEXING TABLES, ELECTRO-PNEUMATIC AIR GAUGING EQUIPMENT, ELECTRONIC GAUGING EQUIPMENT.



Sales organisation

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