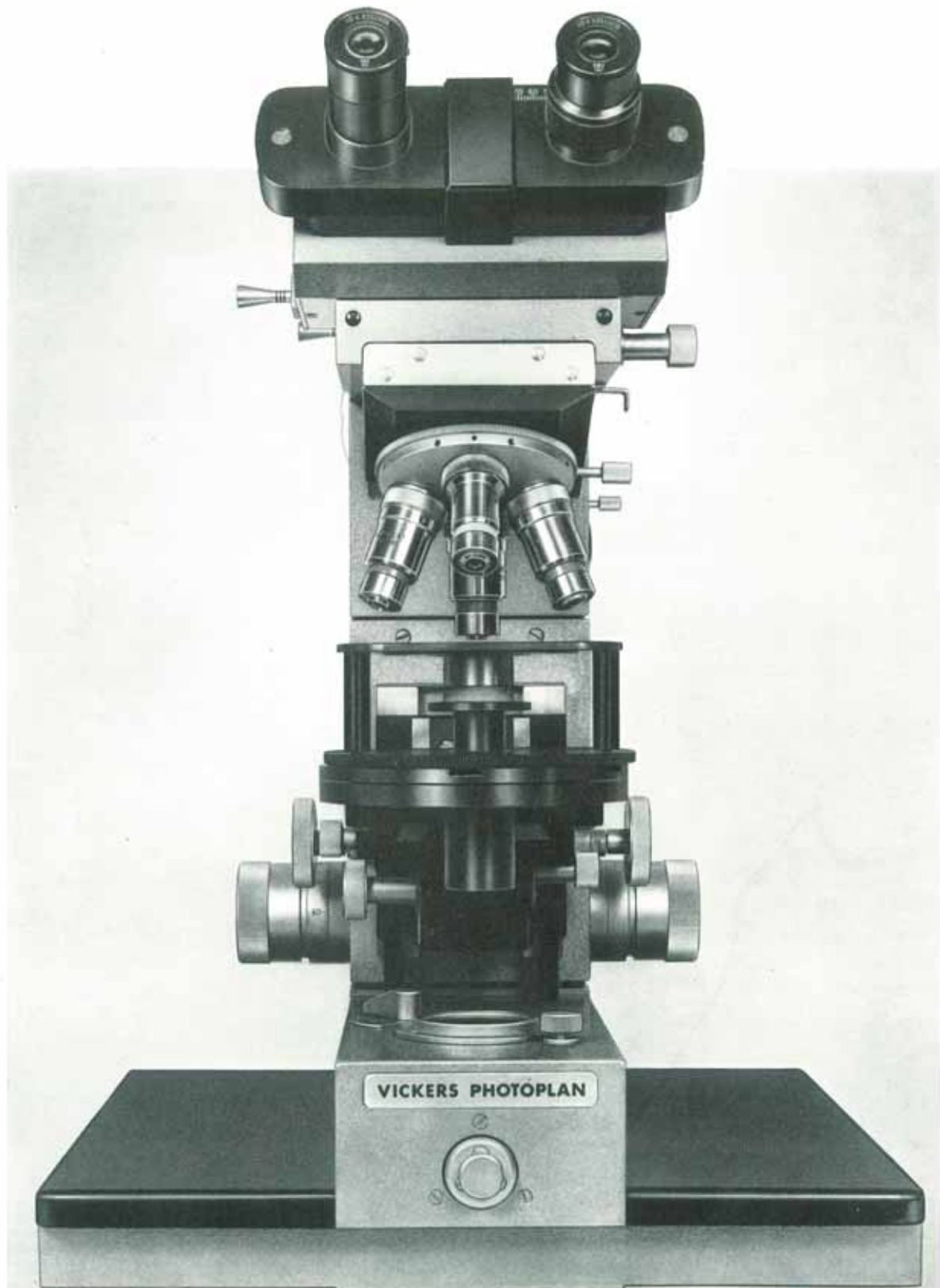


# M41

## MATERIALS RESEARCH ACCESSORIES

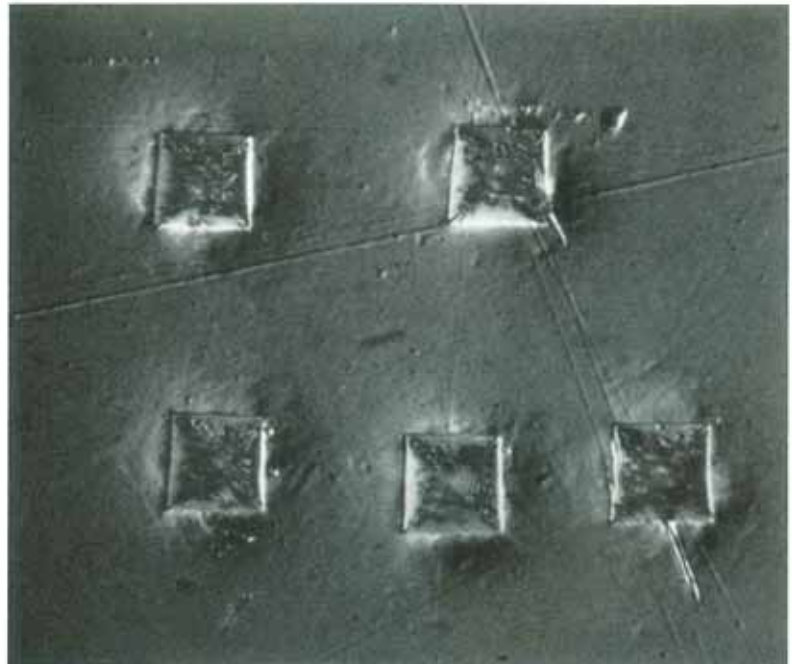


## **M41 MATERIALS RESEARCH ACCESSORIES**

A number of accessory units are available for the M41 Photoplan photographic research microscope which widen the scope of application in the fields of materials research and metallurgy.

### **NOMARSKI INTERFERENCE CONTRAST**

Microhardness indentations on stainless steel. "Pile-up" is to be seen very clearly around the indentations



### **NOMARSKI INTERFERENCE CONTRAST**

Etch pits in clear mounting resin



# INCIDENT NOMARSKI INTERFERENCE CONTRAST EQUIPMENT

The Nomarski interference contrast system adds new dimension to incident light images. It provides an extremely sensitive technique for the detection of slight surface irregularities in opaque specimens. The system renders changes in slope and height on the surface as changes in colour and contrast. The sensitivity is such that surface irregularities are made visible on even very well polished specimens.

The use of Nomarski contrast is limited by the size and separation of surface irregularities, etched specimens having very fine detail not being generally suitable.

Nomarski interference contrast is purely qualitative and cannot be used for the measurement of path differences.

Four interchangeable objective systems are available.

Achromat 10× strain free.

Achromat 20× strain free.

Achromat 40× strain free.

Achromat 100× strain free.

The objectives are each mounted on the prism unit, fitted on a dovetail slide to the standard incident illuminator, on separate readily attachable centrable holders.

A simple analyser slide and rotatable polarizer are used in conjunction with the Nomarski prism unit to produce the necessary polarizing conditions.



## Nomarski interference contrast unit (incident light)

**M413300** Nomarski interference contrast unit

**M413250** Push-on graduated polarizer

**M410880** Analyser slide (to fit head carrier bracket without Bertrand lens)

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**M022303** Achromat 10× objective strain free

**M007716** Centring objective changer mount

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**M022404** Achromat 20× objective strain free

**M007716** Centring objective changer mount

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**M022804** Achromat 40× objective strain free

**M007716** Centring objective changer mount

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**M022603** Achromat 100× objective strain free

**M007716** Centring objective changer mount

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# VICKERS MICROHARDNESS TESTER

The Vickers microhardness tester allows microhardness testing to be efficiently carried out by non specialised personnel.

The pyramid diamond is embedded in the centre of a glass plate in front of the objective optical system. The plate is supported by a flexible rubber diaphragm which is pushed forward during the indentation by pneumatic pressure imparted by a transmitter cylinder. The objective system is thus held steady whilst the diamond mounted on the diaphragm, moves. The load may be varied on the transmitter cylinder in discrete steps of 5, 10, 20, 50, 100 and 200 grams. After the selection of the required load, which is read against the index on the transmitter cylinder, a lever is depressed, and the correct load at a constant rate for that load is automatically applied to the indenter by pneumatic pressure. When the lever is returned the pneumatic pressure is released and the indenter is restored to its original position. The indenting operations are entirely impersonal, and variations in the rate of operation of the lever, which may be expected between different operators do not influence the final results.

The diagonals of the indentation are measured with a filar micrometer eyepiece and a 40 $\times$  reading objective, the overall initial microscope magnification, excluding the eyepiece, having been set at 75 $\times$  with an eyepiece draw-tube. The eyepiece is fitted with a centring movement so that the diamond may be accurately placed where required. The movement is smooth and responsive.

The filar micrometer eyepiece is mounted with the centring device on a cone fitting to the monocular head body. This integral arrangement ensures great stability during measurement. The searcher objective, indenter objective and measuring objective are mounted on an interchangeable objective changer allowing speedy change from microhardness testing to other techniques with no disturbance to the specimen.

The microhardness tester may not be used with the autolevelling stage.

## **Choice of Indenter Diamond**

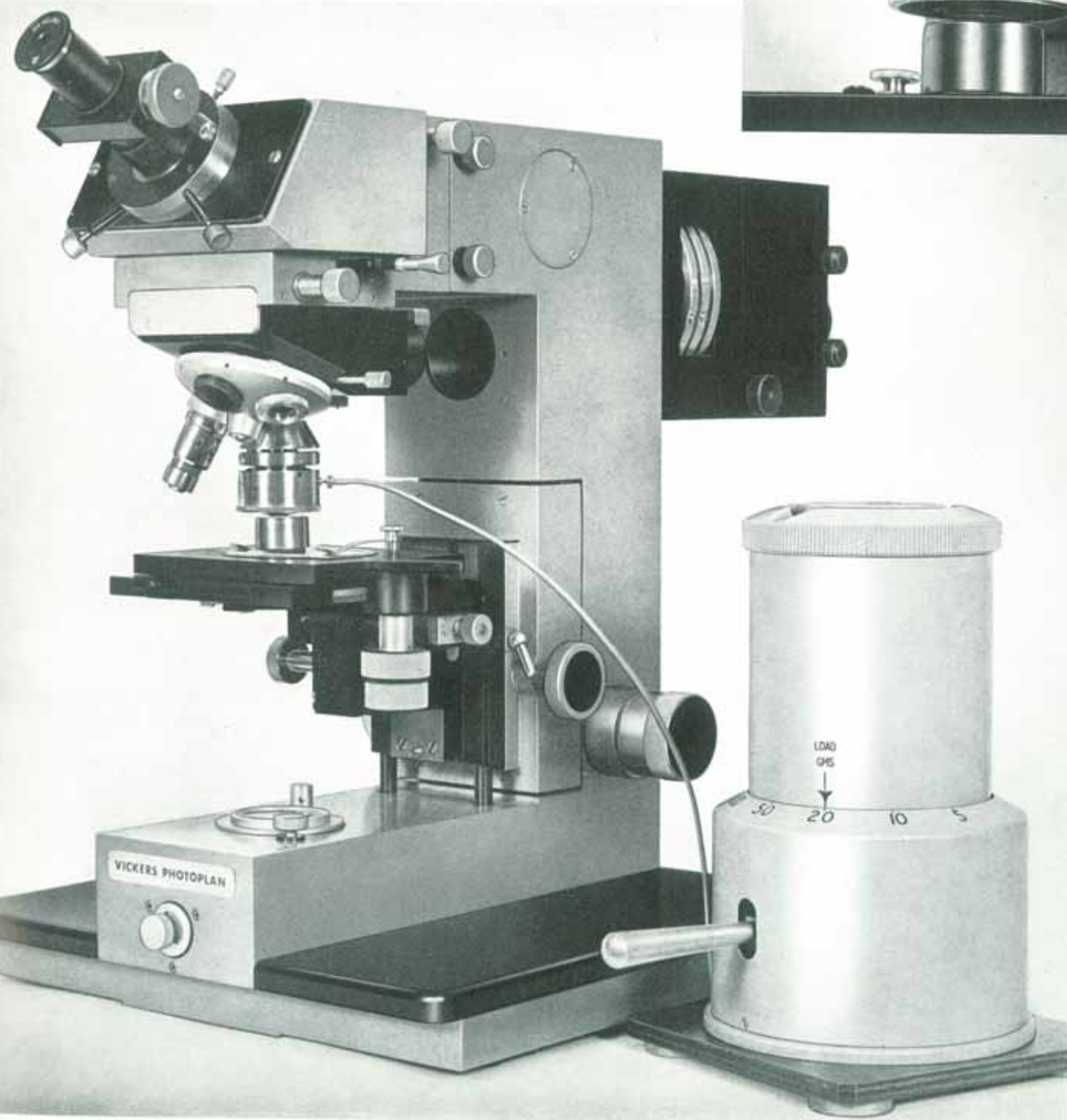
The standard indenter objective is fitted with the Vickers pyramid diamond which is suitable for most applications. If required the unit may be supplied with a Knoop diamond whose longer indentation is preferable with hard surfaces for higher reading accuracies and shallower impressions for very thin films.

## **Use with very brittle materials**

If microhardness measurements are to be made on very brittle materials which by their very nature tend to be damaged by sudden impact then a specially calibrated cylinder fitted with a restriction device should be employed. The speed of indentation is considerably reduced with this cylinder, indentation time two minutes, decreasing the chance of shatter.

**M413100 Micro Hardness Testing Equipment** for the M41 including transmitter, indenter objective, 40 $\times$  achromatic measuring objective, monocular body for normal tube eyepiece, centring micro hardness testing adaptor, anti-vibration platform, test specimen, filar micrometer and wooden box

**M413040** Quadruple revolving incident bright field objective changer.



## AUTOLEVELLING STAGE FOR POLISHED SPECIMENS

The autolevelling stage is suitable for the observation of polished specimens without the need for previous press alignment.

The specimen is placed on a foam pad which evens out any base irregularities in the specimen and is pressed by light spring pressure up against an accurately aligned top plate. Two interchangeable top plates are provided each having a free aperture of 22mm. The first will accommodate specimens in 25.4mm mounts (1") and the second, specimens in 35.5mm mounts (1.25"). The top plates are fitted with magnets for speedy interchange. The stage is fitted with a smooth gliding movement of 20.3mm (0.8") diameter covering very nearly the whole free aperture. Specimens up to 25.4mm in height may be employed. The unit is supplied in one of two forms:

Attached to the precision rotating stage provided with a 360° graduated rotational movement and a centring device in addition to the gliding movement.

Attached directly to a stage bracket with the gliding motion only.

**M412540** Autolevelling gliding stage with magnetic stage plates for 1" and 1.25" mounted specimens, on centrabale graduated rotating stage with carrier bracket

**M412550** Autolevelling gliding stage with magnetic stage plates for 1" and 1.25" mounted specimens, with carrier bracket

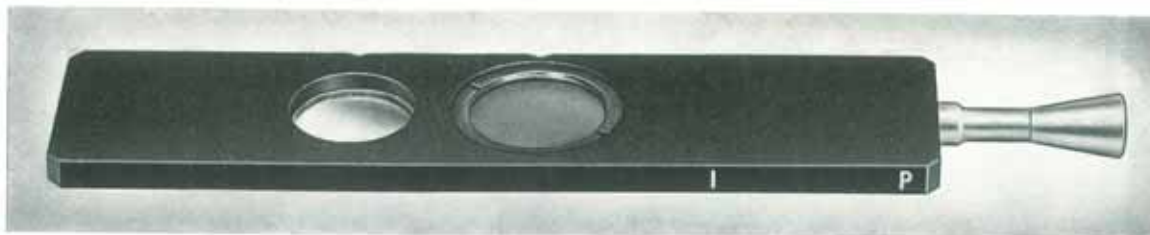


Autolevelling gliding stage



Autolevelling gliding and rotating stage

## SIMPLE POLARIZING ACCESSORIES



Analysers slide with clear and analyser apertures each containing a white order quartz plate

The addition of simple polarizing accessories to a basic microscope outfit permits the purely qualitative detection and examination of strongly birefringent materials in both incident and transmitted light.

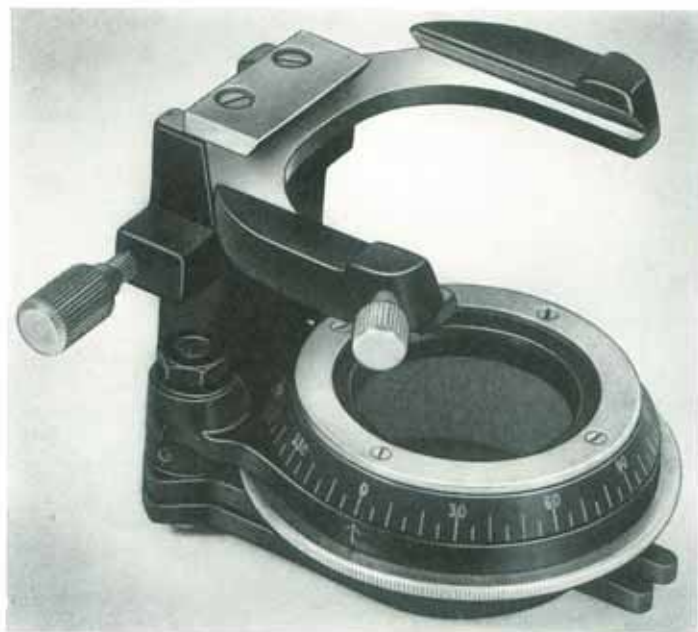
The graduated incident polarizer is contained in a push-on unit readily attached to the incident illuminator. The swing-out graduated transmitted polarizer and condenser carrier is attached in place of the standard substage condenser carrier on a clamp-on mount. The unit is graduated every 5° with a click stop at every 90°.

The analyser, orientated east-west, fits into the head bracket or transmitted light carrier filter slot on a push in filter holder.

The slider contains white order quartz plates in the clear aperture and in the analyser aperture for the compensation of binocular head polarizing effects.

### Simple polarizing accessories—to be used with head carrier bracket M410650

- M413250 Push-on graduated incident light polarizer
- M413010 Clamp-on polarizing substage with Akehurst carrier for transmitted light
- M410880 Analyser slide (to fit head carrier bracket M410650)



Transmitted light clamp-on polarizing substage



Push-on incident light polarizer

## HIGH INTENSITY WHITE LIGHT ILLUMINANT CSI 250w. metal halide

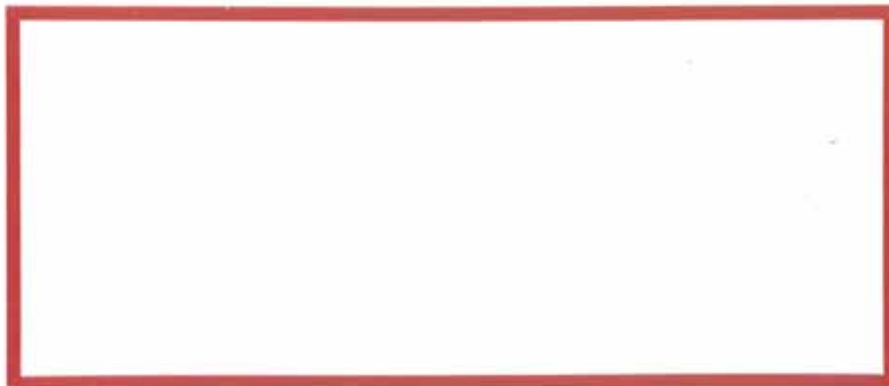
The CSI 250W, is a mercury vapour lamp the line emission of which is filled out by the addition of specific metal halides. The short wave output of the lamp emission has also been reduced providing a better overall colour balance but making it unsuitable for fluorescence excitation.

The lamp provides a very intense light source, mean luminous flux 15,000 lumens, which does not present the colour shift normally associated with mercury vapour lamps.

The lamp is highly suitable for projection, colour photography and polarizing work, having a colour temperature of 3,400°K and being free from arc wander.

The CSI 250W is employed in the standard large lamphousing which may be fitted either to the upper or to the lower stand apertures. (When fitted to the lower stand aperture the instrument must be raised on a special base).

- M411620** White light source CSI 250 watt lamphousing with iris and filter unit but without filter set
- M415250** Power supply unit for CSI 250 watt, 240 volt
- M413075** Riser plate, essential when large lamphousing is used directly for transmitted light
- M411780** Set of six filters for white light work (photo etc.)



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