Leitz
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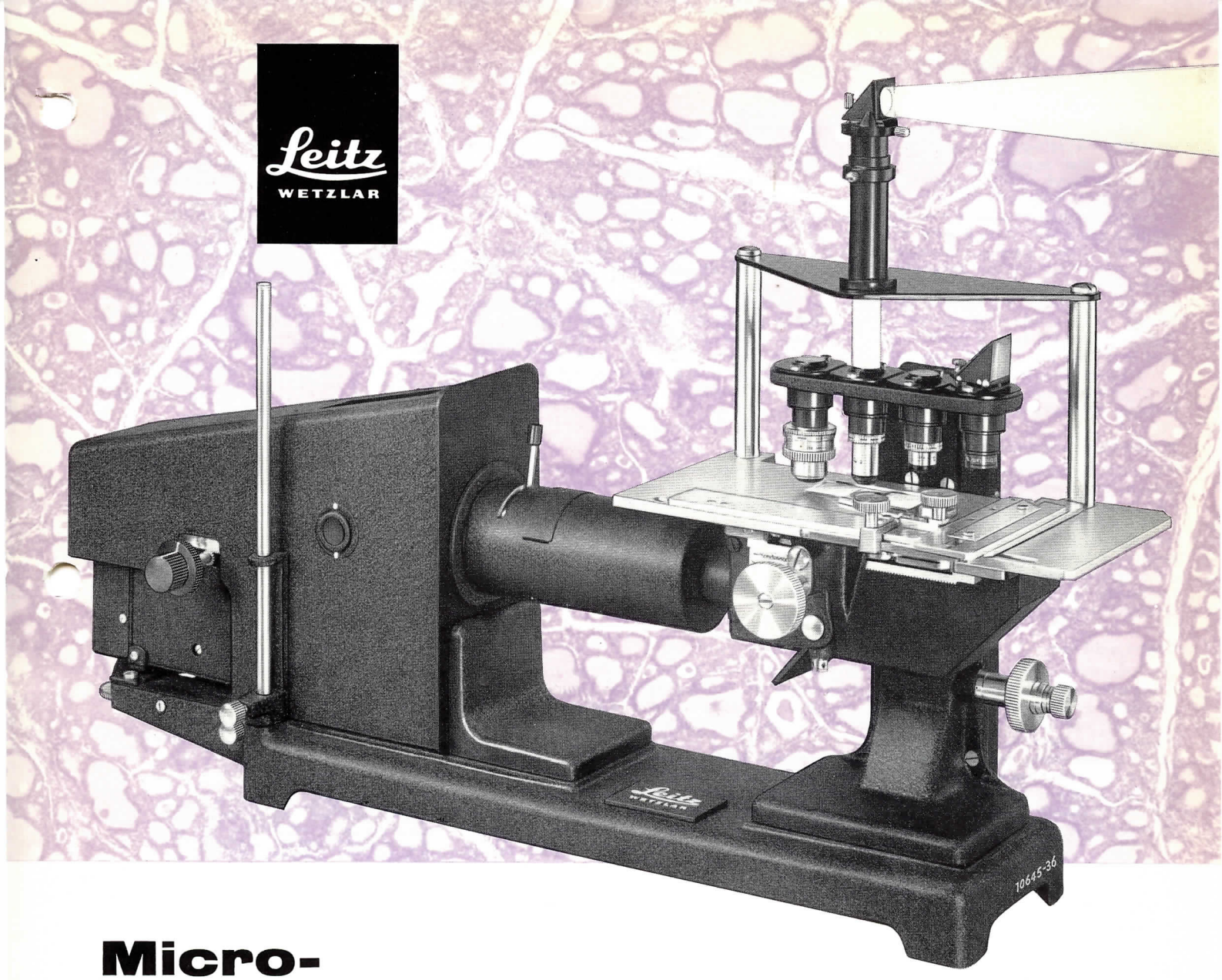


Micro-Projector XIc for lecture halls

Lecture hall model for the projection of large screen images of microscopic specimens; of proven design and efficiency.

Screen image diameter up to 8 ft.

Projection distances up to 75 feet.

Projection distance and size of screen image can be varied according to the size of the room.

4 systematically graded magnifications.

Rapid change of magnification by single-knob control:
The object stage with the specimen is guided between the objectives and the corresponding balanced condensers, so that the image remains in focus.

Direct change-over from the projection of general features without eyepiece to micro-projection with eyepiece.

A screen image of exceptional brightness, clarity and definition, due to the use of high aperture objectives.

Effective protection of the specimen against heat.

Large horizontal object stage with built-in mechanical stage.

Coarse and fine focusing by co-axial controls situated at a convenient height beneath the object stage.

High reliability, simple operation.

A special model of the Micro-Projector XI c fitted **with a xenon lamp** instead of an arc lamp can also be supplied. Details available on request.

590 – 1/Engl.

Technical features

Optical equipment

The objectives used in the Micro-Projector XI c are systematically graded, parfocal and are fitted in special non-reflecting black lacquered non-interchangeable mounts. All the objectives are notable for their outstanding spherical and chromatic correction with a high aperture and give maximum brilliance of the screen image.
General survey objective without the use of an eyepiece, focal length of 40 to 120mm according to screen distance; microprojection achromatic objectives 6/0.18 and 13/0.40, also apochromatic objective Apo 40/0.95 (in conjunction with eyepieces).
For each objective there is a corresponding condenser of appropriate focal length and aperture which ensures best possible illumination of the field of view for the particular magnification range. The condenser for the Apo 40/0.95 objective has an aperture diaphragm and is vertically adjustable by means of a lever to enable the iris diaphragm of the aspherical collimator to be focused in the specimen plane when using slides of varying thickness (Köhler's principle of illumination). In the case of the two low-power objectives, the iris diaphragm at the arc lamp is used as an aperture stop. All glass-air surfaces of the objectives fitted to the Micro-Projector XI c are given what is known as a "C" (or contrast) coating. This effects a considerable improvement, particularly in diascopic and micro projection, and produces a marked increase in the brilliance and clarity of the screen image.

Projection microscope

When the magnification is changed, the horizontal object stage with the specimen is guided between the objectives and the corresponding condensers in such a way that the specimen is introduced beneath the next objective in exactly the same position. The object stage is arrested in the appropriate position by click-stops. The projection prisms are adjustable by means of a milled screw in order to raise or lower the image on the projection screen. There is a built-in mechanical stage which has an adjustment range of 40 x 90mm and is designed to take all the usual sizes of object slides.
Coarse and fine co-axial controls for focusing the image are placed at a convenient height underneath the object stage.

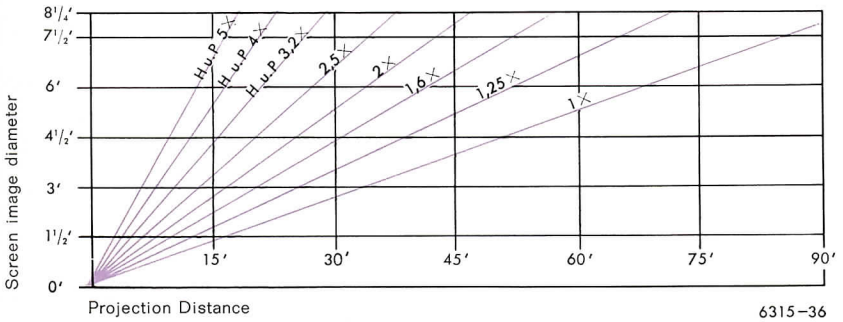
Light source

The large high-power arc lamp mounted on the same baseplate as the microscope incorporates a fully automatic carbon feed with a built-in electro-magnetic control mechanism. Once the correct gap has been set between the carbons, the arc lamp requires no further attention. The arc lamp equipment comprises a built-in aspherical illuminating lens (collimator), an adjustable iris diaphragm, an insertable filter and a reflector.
Direct current should be given preference for operating the arc lamp, as the light intensity is more than one third greater than when A. C. is used. The arc lamp burns at 55 volts D. C. (load of 10 amps.) and is connected to the mains supply through a resistance or rectifier. To achieve maximum brilliance of the screen image on alternating current it is advisable to use a regulating selenium dry rectifier, which is very economical in operation.

Range of magnifications

To allow for different screen distances, various projection eyepieces are available. Based on a uniform field-of-view diameter, these eyepieces have been graded to give the most suitable image diameter of about 5 to 6 feet for all the usual screen distances. In general, preference is given to a screen distance of 13 to 16 feet in conjunction with a 4x eyepiece. The projection eyepieces are not suitable for direct visual microscopy.

Selection table of eyepieces



From the above table the diameter of the projected image can be seen in relation to the screen distance and the eyepiece magnification. If the screen distance and the desired diameter of the screen image are known, the necessary projection eyepiece can be determined by means of this table.

The total magnification M of the screen image can be calculated from the following formula:

M = objective magnification x eyepiece magnification x 1.22 x screen distance in feet.

The particulars of total magnification of a microscope are based on conventional vision or a projection distance of 10 inches. When calculating the screen image magnification (linear magnification in relation to projection distance in feet), it is therefore necessary to multiply by the factor 1.22 shown in the formula.
The 3.2 x, 4 x and 5 x projection eyepieces are of the Huygens type for the low-power micro-objectives and of the PERIPLAN® type for the higher-power objectives (starting at objective 10/0.25). In the case of the 1 x to 5 x projection eyepieces the difference between Huygens and PERIPLAN eyepieces is virtually imperceptible; they are supplied as uniform types.

Eyepiece	Projection distance in feet	Low-power projection without eyepiece: Image diam. in feet	Low-power projection without eyepiece: Magnification with objective	Screen image diam. in feet	Micro-projection (with eyepiece): Magnification on screen with objectives 6/0.18	13/0.40	Apo 40/0.95
	ft	ft''	40 mm	ft''			
5x	13	4 11	100:1	5 9	480:1	1040:1	3200:1
	16	6 1	125:1	7 3	600:1	1300:1	4000:1
4x	13	4 11	100:1	4 7	385:1	830:1	2550:1
	20	7 5	250:1	6 11	575:1	1250:1	3850:1
50 mm							
3.2x	20	5 11	120:1	5 7	460:1	1000:1	3100:1
	23	6 11	140:1	6 7	540:1	1165:1	3600:1
	26	7 10	160:1	7 5	615:1	1330:1	4100:1
2.2x	26	7 10	160:1	5 9	480:1	1040:1	3200:1
	30	8 10	180:1	6 7	540:1	1170:1	3600:1
	33	9 10	200:1	7 3	600:1	1300:2	4000:1
65 mm							
2x	33	7 7	155:1	5 9	480:1	1040:1	3200:1
	36	8 2	170:1	6 5	530:1	1150:1	3500:1
	39	9 0	185:1	6 11	575:1	1250:1	3850:1
100 mm							
1.6x	39	5 11	120:1	5 7	460:1	1000:1	3100:1
	46	6 11	140:1	6 7	540:1	1165:1	3600:1
	52	7 10	160:1	7 5	615:1	1330:1	4100:1
1.25x	52	7 10	160:1	5 9	480:1	1040:1	3200:1
	59	8 10	180:1	6 7	540:1	1170:1	3600:1
	66	9 10	200:1	7 3	600:1	1300:1	4000:1
120 mm							
1x	66	8 2	165:1	5 9	480:1	1040:1	3200:1
	75	9 4	170:1	6 7	550:1	1200:1	3700:1

The object field diameter can be calculated from the formula

$$\text{Object field diam.} = \frac{\text{image diam.}}{\text{Magnification}}$$

Complete outfits

Microprojector XI c with electro-magnetically controlled arc lamp 10 amps D. C. Special projection microscope for rapid change of four ranges of magnification and with large built-in mechanical stage.
Optical equipment: General survey objective MILAR or SUMMAR; Achromatic objectives 6/0.18 and 13/0.40, Apochromatic system Apo 40/0.95; 2 reflecting prisms; general survey objective and eyepiece depend upon screen distance and the size of the screen image desired (cf. tables).

Recommended complete micro projectors for the screen distances indicated	Code-Number
13 – 16 ft. MILAR 40mm, Huygens and PERIPLAN eyepieces 5 x	35 000
13 – 20 ft. MILAR 40mm, Huygens and PERIPLAN eyepieces 4 x	35 001
20 – 26 ft. MILAR 50mm, Huygens and PERIPLAN eyepieces 3.2 x	35 002
26 – 33 ft. MILAR 50mm, eyepiece 2.5 x	35 003
33 – 39 ft. MILAR 65mm, eyepiece 2 x	35 004
39 – 53 ft. MILAR 100mm, eyepiece 1.6 x	35 005
53 – 65 ft. MILAR 100mm, eyepiece 1.25 x	35 006
65 – 75 ft. SUMMAR 120mm, eyepiece 1 x	35 007
Electrical Equipment (necessary for above projectors) Direct current:	
110 volts D. C.: resistance 6.3 ohms	35 400
220 volts D. C.: resistance 11.7 ohms	35 401
Arc lamp carbons, 100 pairs, cored, horizontal 8 x 135mm, vertical 8 x 110mm	500 005
Alternating current: Arc lamp rectifier for connecting to: A. C. 110/220 volts, 50 cycles D. C.: 60 volts, 12 amps. Arc lamp feed, no-load voltage approx. 75 – 80 volts. Size: 550 x 490 x 350mm (1'9" x 1'7½" x 1'2"); Weight: approx. 100 lbs.	35 402

Design subject to alterations without notice.

Eyepieces supplied separately on request.

® = Registered trademark

List 590 – 1/Engl. Printed in Germany VII/66/DLW/B

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