

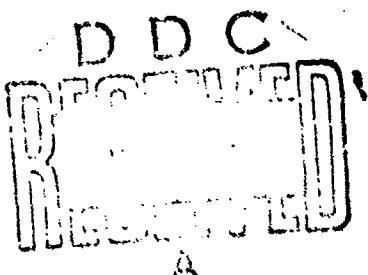
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NOLTR 72-18

A METHOD AND DATA-REDUCTION TABLES
FOR DETERMINING THE RESOLUTION OF
CAMERA SYSTEMS UNDER TYPICAL FIELD
CONDITIONS

By
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20 JUNE 1972



NOL

NAVAL ORDNANCE LABORATORY, WHITE OAK, SILVER SPRING, MARYLAND

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13. ABSTRACT A system is described for evaluating the resolving power of photographic and other optical systems under test conditions typical of their everyday use. The test data thus obtained reflects the effects of atmospheric haze, mount stability, operator focusing error, etc. The 40 x 42 inch test targets, which are based on the "USAF-1951" design, consist of resolution groups "minus six" through "minus one" with line widths varying from 0.56mm through 32mm. To facilitate the analysis of tests performed with the above targets, an extensive set of computer-generated Resolving Power Data Reduction Tables is presented in Appendix C. These tables permit rapid and accurate determination of image plane resolution of camera systems using lens focal lengths from 10mm through 2000mm. Data is provided for twelve selected object distances for each of 48 lenses. A second set of 192 tables enables resolution to be determined for any optical system producing an image magnification between 0.034621 and 0.000139. The selection and use of these latter tables are based solely on the size of the target image; the lens focal length and object distance need not be known. Three examples illustrating typical applications of the resolution targets and data reduction tables are presented. The references in this publication provide the background necessary for the inexperienced user to make full use of the resolving power tests provided in this report.
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A METHOD AND DATA-REDUCTION TABLES FOR DETERMINING THE RESOLUTION OF
CAMERA SYSTEMS UNDER TYPICAL FIELD CONDITIONS

This report describes a method and presents data reduction tables for use in evaluating the resolution of camera systems under test conditions typical of field use. The test method and data reduction tables were developed by the Photographic Division of the Engineering Services Department of the Naval Ordnance Laboratory (NOL), as part of the "High Acuity Experimentation II" program, which was conducted for Rome Air Development Center, Griffiss Air Force Base, Rome, New York. (MIPR No. F30602-71-X-0003).

The author wishes to thank Mrs. Mary Lou Blessing, of the Computer Applications Division of the Mathematics Department, for writing the computer program which produced the data tables. The author also wishes to thank Frank Pierce of the Publications Division for his editorial assistance in the preparation of this report.

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By direction

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INTRODUCTION

Resolving power tests have long been used to assess the image quality of photographic systems under laboratory conditions. In an effort to apply the principles of laboratory-type resolving power tests to field testing of complete photographic systems, the Naval Ordnance Laboratory, White Oak, has prepared large-scale resolution targets suitable for use at distances typical of those encountered under field conditions. Although the method by which resolving power test imagery is translated into quantitative data is fairly simple, preparation of data from large quantities of these tests involve numerous time-consuming calculations. To simplify this task, the Laboratory has also prepared a set of computer-generated data reduction tables which are based on the associated large-scale resolution targets.

These data reduction tables can be used to determine the resolving power of camera and other optical systems under actual field conditions. They are also useful to the optical metrologist for designing resolution experiments. The purpose of this report is to explain the use of the data reduction tables, to provide the background by which they were developed, and to suggest possible applications.

The reader who has not had prior experience in performing resolving power tests (such as work with an optical collimator, National Bureau of Standards (NBS) targets at 21 focal lengths, etc.) should familiarize himself with two publications: A Method of Determining the Resolving Power of Photographic Lenses, NBS Circular 533 (available from Superintendant of Documents, Government Printing Office (GPO), Washington, D.C.); and MIL-STD 150A, Photographic Lenses (also available from Superintendant of Documents, GPO, Washington, D.C.).

BACKGROUND

Under a contract with Rome Air Development Center, Griffiss Air Force Base, Rome, New York, (entitled High Quality Experimentation II, MIPR No. F30602-71-X-0003) the Photographic Division of the Naval Ordnance Laboratory investigated the performance of a number of popular 35mm still cameras. A major portion of the investigation was to quantitatively determine typical field performance, reflecting the effects of atmospheric haze, mount stability, and operator variability among other factors. It was decided to use resolving power tests as the primary means of evaluation because of their simplicity, ease of evaluation, and because the overall program concerned the recording of threshold-quality imagery.

Normally, resolution tests are run under carefully controlled conditions at either relatively close distances or with the aid of an optical collimator. Provisions are made for eliminating camera vibrations and other effects which might degrade the quality of the data.

The test conditions used to determine typical field performance are considerably different, however. For the purposes of the NOL field testing program, the resolution targets had to be suitable for a wide range of conditions, including use with focal lengths of 35 to 1400mm and object distances in excess of one mile. A search was made to locate a suitable off-the-shelf target, but when none could be found, a large-scale resolution target based on the USAF 1951 Design was prepared (see Figure 1). Its 40 x 42 inch size (including margins) permits easy carriage and mounting in field use but it is large enough to be used at typical object distances. The largest resolution pattern can be detected with a 135mm lens at 2000 feet with an effective camera-system resolving power of 72 lines per millimeter.

DETERMINATION OF CAMERA SYSTEM QUALITY USING DATA REDUCTION TABLES

After making a series of negatives of the resolution target and determining the smallest resolvable target on each negative by means of a 30-to 40-power microscope, one would normally compute the image plane resolution using the width of the target bar, the lens focal length, and the object distance. To simplify this task, data reduction tables (provided as Appendix C) have been prepared and especially keyed to the NOL large-scale test target. These tables facilitate direct and rapid determination of the image plane resolution for 48 lens focal lengths of 10 through 2000mm, at each of 12 typical object distances. A second series of tables allows determination of system resolution when the object distance and focal length are either unknown or are not listed in the tables. In either of these latter situations, the user selects a table based on system magnification determined by measuring the actual image size of the target as recorded on the film.

RESOLVING POWER TARGET DESIGN

The NOL large-scale resolution target is based on the design of the "USAF-1951" resolution target. The NOL target (Figure 1) consists of 36 target elements decreasing in spatial frequency as the sixth root of two ($\sqrt[6]{2}$) (approximately 12 percent). The geometric design of the target elements and associated terminology are presented in MIL-STD 150-A. A standard target element consists of two patterns (two sets of lines) which are oriented at right angles to each other as shown in Figure 2. Each pattern in turn consists of three bars and two included spaces, all of equal width. The length of the bars is five times the bar width. A bar or a space is referred to as an interval, while the combination of a bar and a space is referred to as a unit. The unit width is used to compute the spatial frequency of the pattern.

To facilitate the microscopic examination of the test imagery, the 36 elements are organized into sets of six, each set being referred to as a group. Figure 2 illustrates a single target group. The NOL

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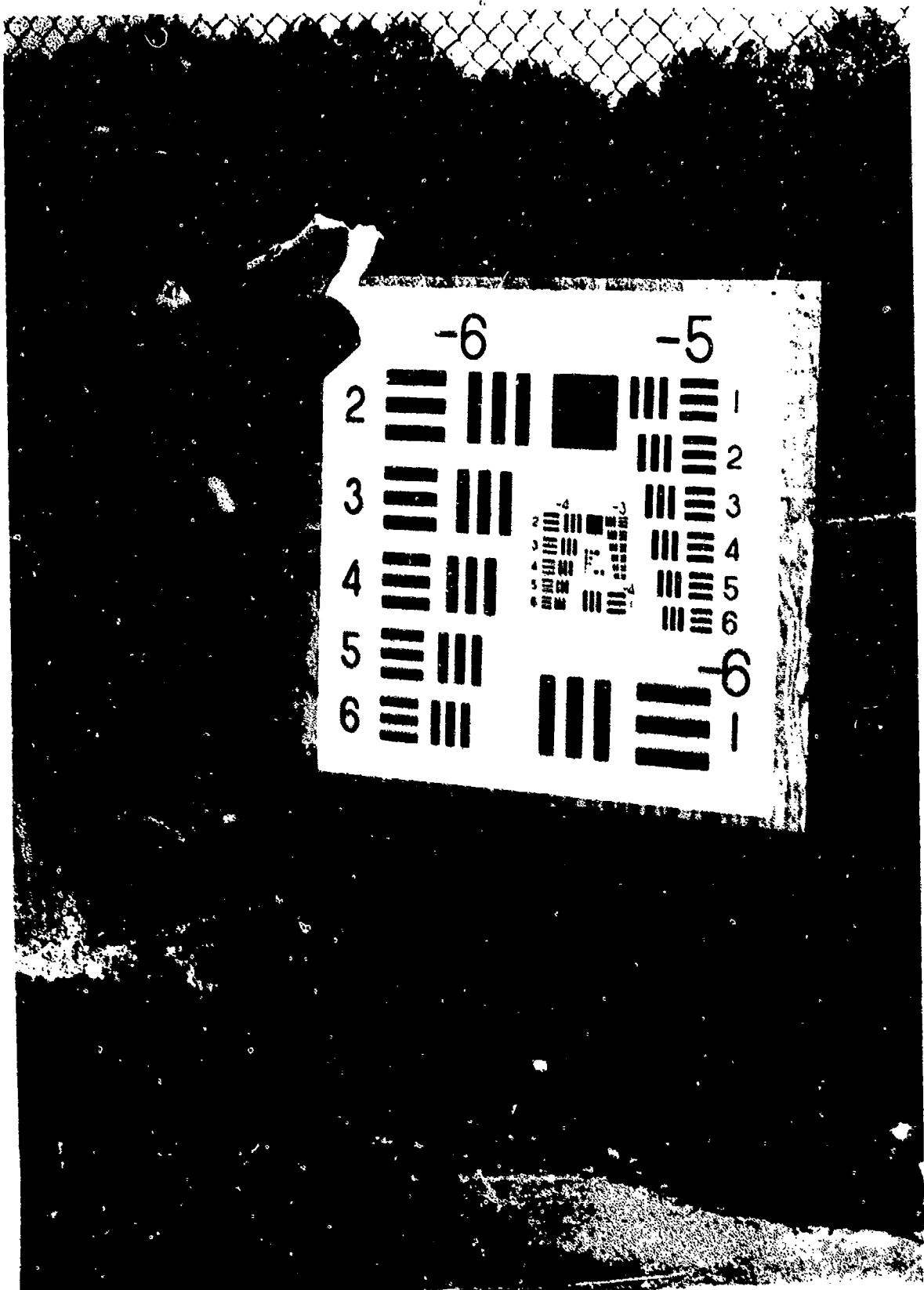


FIG. 1 LARGE-SCALE RESOLUTION TARGET

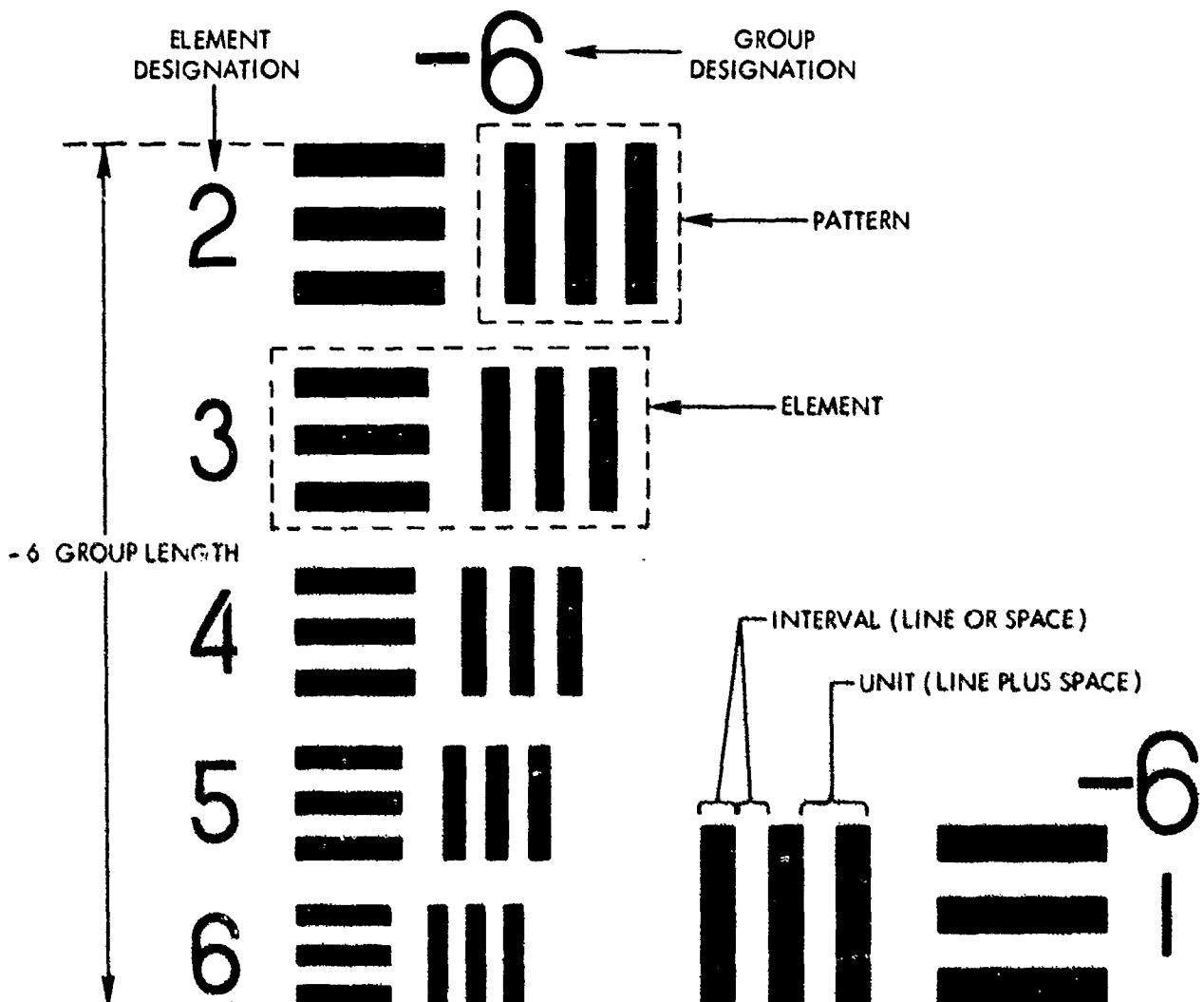


FIG. 2 RESOLUTION GROUP MINUS SIX SHOWING APPLICABLE TERMINOLOGY

target consists of groups "minus six" (-6) through "minus one" (-1). Each group in turn consists of six elements. The group number indicates, in terms of powers of two, the number of lines per millimeter of the largest pattern within the group:

$$\text{Resolution} = 2^K$$

where K is the group designation.

For example, in group "minus three":

$$R = 2^{-3}$$

$$R = \frac{1}{(2)^3}$$

$$R = 1/8 = 0.125 \text{ Lines/mm}$$

The resolution of any pattern can be computed using the formula:

$$R = 2^{K+\frac{N-1}{6}}$$

where K is the group designation and N is the element designation.

The targets were prepared using two techniques. A full size 40 x 42 inch high contrast negative was made on polyester-based lithographic film using a process camera and a smaller format master. This negative was then used to make contact prints on resin-coated (dimensionally stable) photographic paper. Contact prints were made at three levels of contrast. The contrast ratios and density differences of the target lines and spaces were as follows:

High Contrast -	100:1	(ΔD = 2.00)
Medium Contrast -	6.3:1	(ΔD = 0.80)
Low Contrast -	1.6:1	(ΔD = 0.20)

All targets consisted of dark lines on a light background.

Although very satisfactory, photographic targets were expensive to make due to the time required to accurately assemble the matrix of prints into a 40 x 42 inch target. A second set of relatively inexpensive targets was prepared by printing the targets on heavy card stock using offset lithography. These targets, 40 inches high by 42 inches wide, including margins, were produced in high contrast only, having black lines on a white background. The array of resolution patterns (excluding the element and group designations) is approximately thirty inches square.

The Graphic Arts Research Center of Rochester Institute of Technology, Rochester, New York, 14623, is planning to market large-scale resolution targets similar to those described in this report. The targets will be printed on both paper and card stock in high, medium, and low contrast.

DATA REDUCTION TABLES; DESCRIPTION

The Data Reduction Tables* which are included in this report as Appendix C consist of four sections, as follows:

- Section (A) Nominal Dimensions of Resolving Power Test Target;
- Section (B) Resolving Power Data Tables for Specific Lens Focal Length/Object Distance Combinations;
- Section (C) Tabulation of Camera System Magnifications and Resultant Image Sizes;
- Section (D) Resolving Power Data Tables for Specific Camera Magnifications.

A description of each section is provided below:

(A) NOMINAL DIMENSIONS OF RESOLVING POWER TEST TARGET. This single-page section presents the nominal dimensions of the interval widths and unit widths of elements one through six of groups "minus six" through "minus one". Dimensions are given in terms of inches as well as millimeters. The data reflects the theoretical design goals; the actual dimensions on the targets vary from these values due to limitations of the reproduction process. Definitions are presented for pertinent terminology.

(B) RESOLVING POWER DATA REDUCTION TABLES FOR SPECIFIC LENS FOCAL LENGTH/OBJECT DISTANCE COMBINATIONS. This section contains data reduction tables for 48 lens focal lengths at each of 12 selected object distances. The lens focal lengths presented range from 10mm to 2000mm. The 12 object distances vary depending on the lens focal length. (The tables for 35mm lenses range from 10 feet to 400 feet, whereas the tables for 1000mm lenses range from 150 feet to 5000 feet.) Above each data table is a four-line heading containing the following information:

- Lens focal length in millimeters;
- Object distance in feet and meters;
- Image magnification;
- Size of image in millimeters and inches.

*A description of the computer program used in generating the data reduction tables and the program itself are provided in Appendices A and B.

Each data table consists of a six-by-six array of resolution values. The vertical columns denote groups "minus six" through "minus one", while the horizontal rows denote the elements.

The resolution values, which are presented in terms of lines-per-millimeter, represent computed theoretical data, not test data. The data presented in the tables is independent of the quality of the optical system under evaluation. The quality of the optical system comes into play by determining the smallest target which is resolved. For a given lens focal length and object distance, a quality system may resolve the "minus four" group, "element three" target, (79.9 lines per millimeter); whereas a poorer system might resolve only the "minus five" group, element two target, (35.6 lines per millimeter).

Tests using a focal length/object distance combination not explicitly listed can often be readily evaluated by applying a simple factor to one of the existing tables. As an example, there is no table presented for evaluation of a 75mm lens at 750 feet. To compute the resolution of this combination, one refers to the 150mm/1500-foot table. The resolution value may be read directly from the table because the computed data for a 75mm lens at 750 feet would be identical to that provided for the 150mm lens at twice the distance. As long as the ratio of focal length to distance remains the same (e.g., 250mm at 1000 feet vs 1000mm at 4000 feet, etc.), the results can be read directly from any analogous table. This type of substitution does not result in any error.

If no ratio extension is available, another method may be employed. For example, data is not presented for evaluating a 135mm lenses at 125 feet and no multiples of the 135mm focal length are presented. However, a table does present data for 135mm lenses at 250 feet. Although the ratio is not the same, a resolution value can be approximated by reference to the 250-foot table and multiplying the value by two. This multiplication compensates for the two-to-one ratio of the object distances. Performance values determined by this method will generally be accurate within one percent. This is not a significant error considering that the selection of the target image resolved involves a choice of elements which vary by 12 percent.

To simplify the format of the data tables, all computed resolution values which are equal to or exceed 1000 lines per millimeter are given as 999.9.

The tables presented in Section B can be used to good advantage by anyone designing resolution experiments. If the object distance which is selected for a particular test is too short, all targets will be resolved and the test would yield no data. Conversely, if the distance is excessive, none of the targets will be resolved. The following procedures can be followed to eliminate these situations however:

1. Make an estimate of the number of lines per millimeter which can be resolved by the system. Past experience with the film/lens/camera combination is a good guide.

2. Refer to the page containing the lens focal length to be tested.

3. Scan the tables to locate a table based on any convenient object distance which lists the estimated system performance in groups "minus two" through "minus five." Groups "minus one" and "minus six" are for safety margins only and should not be used in determining the test distance.

As an example, consider a system which has an estimated resolving power of 80 lines per millimeter. If the test is to be performed at an object distance which lists 80 lines per millimeter at group "minus five," "element three." If the actual resolution of the system is only 40 lines per millimeter, a target will still be available to provide the data. In this case, it would be the group "minus six," "element three," target which the table indicates is equal to 40 lines per millimeter. Had we selected the distance where 80 lines per millimeter was listed at "minus six," "element three," no target would be resolved.

(C) TABULATION OF CAMERA SYSTEM MAGNIFICATIONS AND RESULTANT IMAGE SIZES. In some testing situations, the object distance, focal length, or both will be unknown. A determination of system resolution can still be made under these conditions by determining the image size of the target on the resulting test film. This measurement, referred to as the "-6 Group Length," will then allow the selection of an appropriate data table.

A traveling-stage microscope or other suitable instrument can be used to measure the length of the "minus six" group from the top of its second element to the bottom of its sixth element (Figure 2). The measurement may be in millimeters or inches, whichever is more convenient.

Turning to the "-6 Group Length" table (Section C of Appendix C), one then scans the appropriate inch or millimeter column to locate the entry closest to the measured value. The corresponding value of magnification can be read from the adjacent column. The tabulation of values in this table range from a magnification of 0.000139 to 0.034621 and vary with the 24th root of $2 (\sqrt[24]{2})$. Using the selected magnification value, one can refer to Section D which provides image plane resolution tables by magnification rather than by focal length and object distance.

(D) RESOLVING POWER DATA TABLES FOR SPECIFIC CAMERA MAGNIFICATIONS. Format and use of these tables are identical to those in Section B of Appendix C. System resolutions are determined from these tables in the manner previously described. Note that each table is valid for any system which produces the stated image size and magnification, regardless of the specific focal length and object distance used.

APPLICATIONS OF LARGE-SCALE RESOLUTION TESTS

There are numerous practical applications for large-scale resolution targets. Three typical examples are discussed below.

Example 1

Large-scale resolution targets allow photographic and other optical systems to be tested under conditions which are typical of their everyday applications. As such, these tests provide a quantitative measurement of the effectiveness of the system under the conditions normally encountered during actual use.

The data gathered by these tests reflect the effects of atmospheric haze and shimmer, focusing accuracy, camera mount stability, etc. In many applications, these degradations are the dominant factors in determining the performance of the system.

Example 2

It is frequently worthwhile to compare actual field tests with reference or "control" tests (laboratory tests of the same equipment, or field tests made under more stringent conditions). Comparison tests of this type can reveal (1) the percentage of resolution loss due to atmospheric haze, (2) the minimum shutter speed which can be used to hand-hold a long lens while still maintaining a desired level of resolution, (3) the minimum shutter speed required when photographing a moving object, or (4) the stability of one tripod versus another.

The comparison of the two test conditions can identify that point (a minimum shutter speed for example) where field data is not degraded with respect to control data, or it can be used to indicate percent resolution loss of field tests versus control tests.

Example 3

Large-scale resolution tests can be used to assess the object space resolution* of pictorial imagery. This technique was utilized in a recent NOL investigation which was concerned with determining the minimum image quality requirements necessary for identification of people. Typical results of increasing image quality and the associated increase in certainty of identification are shown in Figure 3.

This problem area was divided into three levels of pictorial quality:

*Object space resolution: The spatial frequency of the target or the width of the target bar which is resolved in the photographic record.

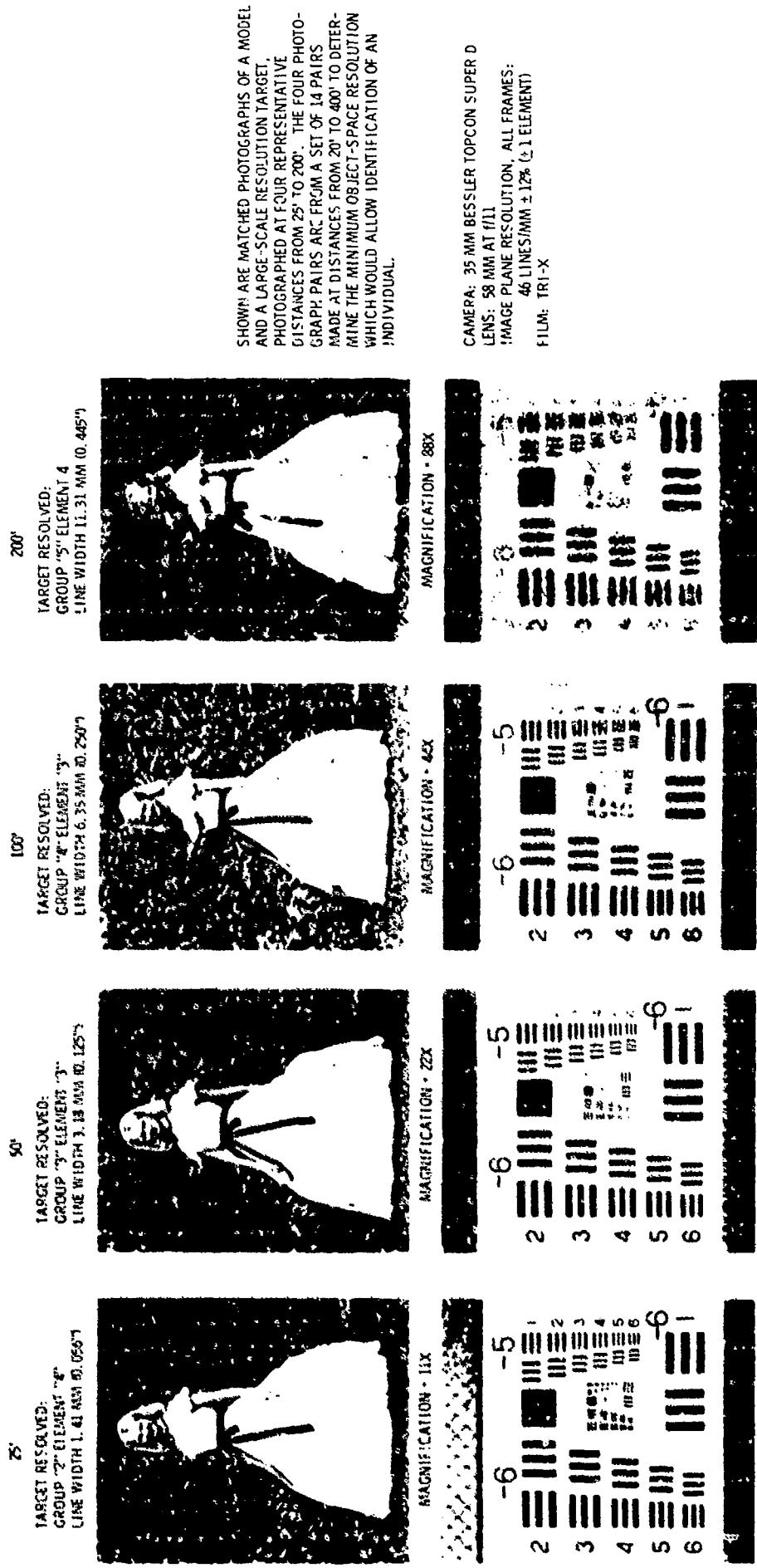


FIG. 3 DETERMINATION OF OBJECT-SPACE RESOLUTION

- (1) Personnel Detection: To differentiate personnel from the adjacent background and to count the number of people present in the photograph;
- (2) Personnel Recognition: To provide general descriptions of the personnel present in a photograph, i.e., sex, height, weight, hair color and length, presence of glasses, etc.; and
- (3) Personnel Identification: To identify beyond reasonable doubt the presence of a specific individual.

To meet each one of these standards successively, an increasing improvement in pictorial quality is required.

An experiment was performed to determine the degree of object space resolution required for the above levels. Using a 58mm lens and Tri-X film, a group of five people and a large-scale resolution target were photographed at 14 separate distances, varying from 50 to 2016 feet.* The resulting film was then analyzed to determine the smallest resolvable target at each distance. The width of the selected target bars was a direct measurement of the object-space resolution present in each negative. (Note that previous examples have been concerned with lines per millimeter on the film; here we are concerned with the minimum size of the actual target lines which were successfully recorded.) A set of 40X enlargements was then produced. These prints were then examined by several qualified interpreters to determine the lowest level of pictorial quality which could be tolerated and still enable the interpreter to extract the information at the three required levels. (Although final conclusions have not been made, it appears that an object-space resolution of 1/8 inch is necessary if one is to meet the "personnel identification" criteria.)

Other Applications

The NOL large-scale resolution targets and associated data reduction tables can also be used to evaluate night vision devices, surveyor's transits, telescopes, binoculars, and a variety of other optical devices under field conditions.

*For this experiment, a second set of data reduction tables were prepared similar to those in Appendix C. The 24 object distances per lens focal length varied with the $\sqrt[3]{z}$; e.g., 100, 126, 159, 200, 318 feet, etc.

REFERENCES

A Method of Determining the Resolving Power of Photographic Lenses; NBS Circular 533. Superintendant of Documents, Government Printing Office, Washington, D.C.

MIL-STD 150A; Photographic Lenses. Superintendant of Documents, Government Printing Office, Washington, D.C.

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APPENDIX A
DESCRIPTION OF COMPUTER PROGRAM

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DESCRIPTION OF COMPUTER PROGRAM

The computer program used to generate the Resolving Power Data Reduction Tables is presented in Appendix B. The following description of the program's functions and its data deck structure should enable others to modify the program to generate tables for focal lengths and object distances not contained in Appendix C.

The Fortran IV program was written to present resolving power data tables for (1) given lens focal lengths and associated object distances and (2) generated magnifications. The main program acts basically as an executive calling in the various subroutines to perform computations, printing, etc.

Subroutine FOCAL computes the image magnification, "-6 Group Length," and resolving power data for a given focal length and object distance. The resolving power for group "minus six," "element one" of each table (referred to in program as "result") is computed from the above variables, the remaining data in each six-by-six array is arrived at by multiplying the "result" by each of 35 stored constants. This routine also stores the resolution data along with the test conditions, magnification, and "-6 group length".

Subroutine GENER generates a series of magnification values based on chosen (by data card) limits and power of two.

Subroutine MAGNIFY computes the resolving power data tables for the generated magnifications values.

Subroutine IMAGPRT prints the tabulation of generated magnification values and the associated "-6 group lengths".

Subroutine HEADER prints the tabulation of nominal target dimensions, notes, and nomenclature.

Subroutine PAGPRT prints the 12 data tables per focal length and the heading above each table which lists the test conditions and associated data.

Constraints within the program limit the number of input object distances, per data card, and the number of tables per page in the output to 12. Also, the total number of magnifications at any one time during execution (either generated or computed from focal lengths) is limited to 900. It should also be noted that any resolution value equal to or in excess of 1000.0 is set to 999.9.

On a CDC 6400, the program required an octal field length of 31,000 during execution and required 33 seconds of central processor time to execute under the Fortran Extended Compiler.

The data deck is structured as follows:

<u>CARD NO.</u>	<u>COLUMNS</u>	<u>VARIABLE</u>	<u>DEFINITION</u>
1	1-5	N	- Number of tables per page, not to exceed 12 (Right Adjusted). To obtain 24 object distances per focal length, use two input data cards per lens.
	6-10	MAG	- Indicator of method of computation to be used: a value of minus one (-1) will produce both the focal length tables (Section B) and the magnification tables (Section D). A value of zero (0) will produce only the focal length tables; a value of plus one (+1) will produce only the magnification tables (Right adjusted).
	11-15	NF	- Total number of focal length data cards (Right adjusted).
2 through (NF+1)	1-5, 6-10 11-15---56-60, 61-65		- One focal length and up to 12 object distances (feet) per card (Right adjusted).
NF+2	1-10	XMAX	- Maximum desired value of generated magnifications (floating point).
	11-20	XMIN	- Minimum desired value of generated magnifications (floating point).
	21-30	ROOT 2	- Root of two (2) used to build magnification values (floating point). A value of 24 was used to obtain the Section D tables which vary the magnification value by the 24th root of 2.

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APPENDIX B
COMPUTER PROGRAM

PROGRAM FOLEG7 FORTRAN EXTENDED VERSION 2.0
 PAGE NO. 1
 05/01/72 10.55.56.
 PROGRAM FOLEG7(INPUT,OUTPUT)
 DIMENSION GROUP(36)
 COMMON RESULT,LENGTH,OBJECTD(12),A(12*36),SAVE1(900)
 1),SAVE2(900),SAVE3(900),K,XMAX,XMIN,XOUT2,NUMBER,N,II,NF
 COMMON SAVE4(900)
 05
 COMMON MAG
 COMMON NMN
 COMMON IN
 COMMON OBJECTD
 INTEGER OBJECTD
 DATA OBJECTD/1..1.1225,1.2599,1.4142,1.5674,1.7618,
 10 12..12.245,2.5198,2.8284,3.1748,3.5636,
 12..4..49..5..0397..5..6569..6..3496..7..1272..2544
 14..6..98..10..0794..11..3137..12..6992..14..2544
 16..17..96..20..1587..22..6274..25..3984..28..5088,
 15 332..35..92..40..3175..45..254d,50..7968..57..0175/
 NUMBER = 0
 K=0
 145C
 C READ IN THE NUMBER OF TABLES PER PAGE, OR THE NUMBER OF OBJECT DISTANCES
 C PER FOCAL LENGTH(N), WHETHER TO GENERATE MAGNIFICATIONS, COMPUTE THEM,
 C OR DO BOTH (MAG) AND THE NUMBER OF FOCAL LENGTHS(NF) IF NEEDED
 C READ I01, NMAG,NF
 101 FORMAT(3I5)
 101 IF(MAG,EG.O) GO TO 50
 NMAG
 C PRINTS THE PAGE OF NOMENCLATURE, ETC.
 CALL HEADER(GROUP)
 20 DO 40 I,K=1,NF
 C READ IN ONE FOCAL LENGTH AND THE ASSOCIATED OBJECT DISTANCES
 READ I02, LENGTH, OBJECTD(I),I=1,N
 102 FORMAT(13I5)
 102 DO 30 II=1,N
 C CALCULATES THE MAGNIFICATIONS AND RESULT FOR A GIVEN FOCAL LENGTH AND OBJECT
 C DISTANCE
 35 CALL FOCAL
 DO 30 I=1,36
 30 AI(I)= GROUP(I)*RESULT
 IF (AI(I,I) .GT. 999.9) AI(I,I) = 999.9
 30 CONTINUE
 C PRINTS THE TABLES(12/PAGE) ONE PAGE AT A TIME
 CALL PAGEPT
 *0 CONTINUE
 CTMIS ROUTINE PRINTS A SORTED CROSS-REFERENCE LISTING OF THE MAGNIFICATIONS AND
 CTMIS ROUTINE PRINTS ASSOCIATED LENGTHS
 40 IF(MAG .GT. 0) GO TO 1800
 MAG=0
 50 CONTINUE
 NF=0
 C READ IN A MAXIMUM ,MINIMUM AND THE POWER OF 2 TO BE USED IN COMPUTING THE
 CMAGIFICATIONS
 READ I03,XMAX,XMIN,XOUT2
 103 FORMAT(3F10.7)
 C TMIS ROUTINE GENERATES THE MAGNIFICATIONS

```

      CALL GENER
      CALL XASPART
      WHERE THE NUMBER OF TABLES NEEDED IS COMPUTED
      IF (ILOC(NUMBER,N)) 65,60,65
      QUOT(NUMBER/N)
      60
      60 TO 66
      A5  NUMBER(N/4)+1
      66  DO 75 K=1,MUM
      DO 76 I=1,N
      IF (I*(K-1)+N+1) .GT. NUMBER , 60 TO 73
      C73IS ROUTINE COMPUTES THE RESULT
      CALL "MASKIFY"
      NNNNN
      DO 70 I=1,36
      ALL,I,1 GROUP(I) RESULT
      70  IF (A(I,I) .GT. 999.9) A(I,I,I) = 999.9
      70  60 TO 75
      73  NNNNN
      N=1-1
      175  CALL PASPR
      75  CONTINUE
      180 STOP
      END

```

SUBROUTINE FOCAL FORTRAN EXTENDO VERSION 2.0

05/01/72 10.55.56.

PAGE NO. 1

SUBROUTINE FOCAL
COMMON RESULT, LENGTH, OBJECTID(12), A(12,36), SAVE(1900)
11, SAVE1(1900), SAVE2(1900), K, MAX_XMIN, MODE2, NUMBER, N, L, NF
COMMON SAVE4(1900);
COMMON HAD
COMMON FN
COMMON NMN
COMMON OBJECT
K=0
10 OBJECT=OBJECTD(11) OBJECTS;
K=MAX(104-RECLLENGTH)/OBJECT-LENGTH;
IMAGE= XIMAGE/OBJECT
RESULT= A1./16.0*IMAGE;
SAVE1(K)=XMAX
SAVE2(K)=LENGTH
SAVE3(K)= OBJECTD(11)
C HERE THE -6 GROUP LENGTHS ARE FORMED FROM THE MAGNIFICATIONS
SAVEA(K)= 763.*IMAGE
20 RETURN
END


```

SUBROUTINE XHAGPRT
COMMON RESULT.LENGTH,OBJECTD(12),A(12,36),SAVE(900),SAVE1(900)
1)•SAVE2(900),SAVE3(900),K,XMIN,XMAX,ROOT2,NUMBER,N,II,NF
COMMON SAVE4(900)
05 COMMON MAG
COMMON IN
COMMON NNN
INTEGER OBJECTD
1010 PRINT 1015
C THE CONVERSION OF OBJECT DISTANCES AND - 6 GROUP LENGTHS INTO INCHES
110 DC 100 J=1 K
C TS= SAVE3(J,*12,0,*0254
ST = SAVE4(J) /25.4
1020 PRINT 1025,SAVE4(J),ST
1025 FORMAT(F13.6,F14.3,F16.)
120 IN =IN +1
C THIS IS TO ENSURE PRINTING OF MORE THAN 56 LINES PER PAGE
N4=MOD(IN,56)
IF (N4 .NE. 0 ) GO TO 100
1030 PRINT 1015
100 CONTINUE
1C15 FORMAT(1H1,3X,*MAGNIFICATION*,9X,*-6 GROUP LENGTH*,10X/25X,*MH*1
11X,*INCH*)
RETURN
END
25

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SUBROUTINE PAPRT FORTAN EXTENDED VERSION 2.0

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SUBROUTINE PAPRT

DIMENSION TSAVE(1900),SAVE(1900)

COMMON RESULT,LENGTH,OBJECTID(12),A(112,36),SAVE(900),SAVE1(900)

11,SAVE2(900),SAVE3(900),K,MAX,KMIN,RCUT2,NUMBER,N,II,MF

COMMON SAVE(900)

COMMON MAG

COMMON IN

C*14UN MNM

INTEGER OBJECTD

KAL/25,4

IF (IMAG.EQ. 0) GO TO 1100

C FOR MAG ONE. 0 = K REPRESENTS THE KTH MAGNIFICATION VALUE, BUT FOR MAG,EQ. 0
C IT REPRESENTS THE PAGE NUMBER

KLM = K+L-N

KKLH = KLM + (L-N)

GOTO 960

KLM = (K-1)*NNN+1

KKLH = KLM + (N-1)

DO 100 IK= KLM, KKLH

ISAVE(IK) = SAVE3(IK) + 12.00 + 0.0254

100 QSAVE(IK) = SAVE4(IK) * X

IF (IMAG .EQ. 0) GO TO 210

PRINT 1 LENGTH

1 FORMAT (1X,29X,*IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR

X=15,0FM FOCAL LENGTH LENSES*/),

90 TO 260

210 PRINT 202

202 FORMAT (1H144X,*IMAGE PLANE RESOLUTION (LINES PER MILLIMETER)*)

250 N = (K-1) *NNN + 1

M1=M1

M2=M2

60 TO 1500

260 M=N+1-N

M1=M1

M2=M2

60 TO 1000 I=1:N + 3

11*1*

12*1*2

IF (IMAG .EQ. 0) 1 GO TO 240

PRINT 2 LENGTH,LENGTH ->,17,0MM,11X) + 9X,*FOCAL LENGTH

2 FORMAT (2(9X,*FOCAL LENGTH

A,17,0MM)

PRINT 3,SAVE3(M)+SAVE(M),TSAVE(M1),TSAVE(M2),TSAVE(M2)

3 FORMAT (2(9X,*OBJECT DISTANCE-->F6.0,F7.2,0N1)X),

9X,*OBJECT DISTANCE-->F6.0,F7.2,0N1)X),

4 IF (IMAG.NE. 0) GO TO 270

240 PRINT 1700

FORMAT (1H /*)

270 PRINT 4,SAVE(M),SAVE(M1),SAVE(M2)

4 FORMAT (2(9X,*MAGNIFICATION -->F10.6,0N0X),

*X,SAVE(M),SAVE(M1),SAVE(M2),SAVE(M1),SAVE(M2),QSAVE(M2)

5 FORMAT (2(9X,*GROUP LENGTH-->F6.3,0N1),*V6.4,*IN.,*1X),

```

      X PRINT 6
      6 FORMAT(3(2X,*E*,7X,*-6*,4X,*-5*,4X,*-4*,4X,*-3*,4X,*-2*,4X,*-1*)X,
      X)
      PRINT 8,A(I,1),A(I,7),A(I,13),A(I,19),A(I,25),A(I,31),
      1 A(I1,1),A(I1,7),A(I1,13),A(I1,19),A(I1,25),A(I1,31),
      1 A(I2,1),A(I2,7),A(I2,13),A(I2,19),A(I2,25),A(I2,31),
      1 PRINT 9,A(I,2),A(I,8),A(I,14),A(I,20),A(I,26),A(I,32),
      1 A(I1,2),A(I1,8),A(I1,14),A(I1,20),A(I1,26),A(I1,32),
      1 A(I2,2),A(I2,8),A(I2,14),A(I2,20),A(I2,26),A(I2,32),
      1 PRINT10,A(I,3),A(I,9),A(I,15),A(I,21),A(I,27),A(I,33),
      1 A(I1,3),A(I1,9),A(I1,15),A(I1,21),A(I1,27),A(I1,33),
      1 A(I2,3),A(I2,9),A(I2,15),A(I2,21),A(I2,27),A(I2,33),
      1 PRINT11,A(I,4),A(I,10),
      X A(I1,4),A(I1,10),
      X A(I2,4),A(I2,10),
      X PRINT12,A(I,5),A(I,11),
      X A(I1,5),A(I1,11),
      X A(I2,5),A(I2,11),
      X PRINT13,A(I,6),A(I,12),
      X A(I1,6),A(I1,12),
      X A(I2,6),A(I2,12),
      X FORMAT(3(2X,*E*,1X,*-2*,2X,6F6.1,2X),
      6 FORMAT(3(2X,*E*,1X,*-2*,2X,6F6.1,2X),
      9 FORMAT(3(2X,*E*,1X,*-3*,2X,6F6.1,2X),
      10 FORMAT(3(2X,*E*,1X,*-5*,2X,6F6.1,2X),
      11 FORMAT(3(2X,*E*,1X,*-6*,2X,6F6.1,2X),
      12 FORMAT(3(2X,*E*,1X,*-5*,2X,6F6.1,2X),
      13 FORMAT(3(2X,*E*,1X,*-6*,2X,6F6.1,2X),/,
      X)
      X M1=M1+3
      X M2=M2+3
      1000 CONTINUE
      IF IMAG .NE. 0 ) PRINT 1000,LENGTH
      1000 FORMAT(1M *29X,*IMAGE PLANE RESOLUTION (LINES PER MILLIMETER)FOR
      X=15,MM FOCAL LENGTH LENSES),
      RETURN
      END
      95

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SUBROUTINE	GENER	FORTRAN EXTENDED VERSION 2.0	03/01/72	10-55-56.
05	SUBROUTINE GENEV			
	DL4ESSN GUESS1(450),GUESS2(450)			GEN01100
	COMMON RESULT,LENGTH,OBJECTD(12),A(12,36),SAVE(1900)			
	11),SAVE2(900),SAVE3(900),K,XMAX,XMIN,ROOT2,NUMBER,N,I,INF			
	COMMON SAVE4(900)			
	COMMON NAD			
	COMMON IN			
	COMMON NAM			
10	INTEGER OBJECTD			
	QUESST1(11)=.01			GEN01110
	DO 20 LX1=2,300			GEN01120
	C GOING UP TO THE MAXIMUM			
	QUESST1(LX1)=QUESST1(LX1-1)*2.**(.1./ROOT2)			
	IF (QUESST1(LX1) .GE. XMAX) GO TO 25			9E+01150
	CONTINUE			9E+01160
	25 QUESST2(1)= .01			GEN01190
	ON 30 LX2= 2,300			
	C GOING DOWN TO THE MINIMUM VALUE			
	QUESST2(LX2)=QUESST2(LX2-1)/2.**(.1./ROOT2)			
	IF (QUESST2(LX2) .LE. XMIN , 60 TO 35			
	CONTINUE			
	30 C TOTAL NUMBER OF MAGNIFICATIONS GENERATED = NUMBER			GEN01220
	35 NUMBER = LX1+LX2-1			GEN01240
	DO 40 LX1=LX2-1,LX2			GEN01250
	LX2=LX2-1-LX1			GEN01260
	SAVE(LX1)= GUESST1(LX1)			GEN01270
	40 LX2=LX2+1			GEN01280
	DO 50 LX=LX1,NUMBER			GEN01290
	LX=LX1-LX2 +1			GEN01310
	SAVE(LX)= GUESST1(LX)			
	LIM1=1			
	LIM2=NUMBER			
	55 IF (MAG.NE.-1) GO TO 55			
	LIM1=NINF+1			
	LIM2=NINF+NUMBER			
	50 DO 60 K=LIM1,LIM2			
	SAVE4 (KK) = SAVE (KK) *766.			9E+01340
	SAVE2 (KK) = 9999.			GEN01350
	SAVE3 (KK) = 9999.			
	60 CONTINUE			
	LENGTH= 99999			
	RETURN			GEN01360
	END			GEN01370

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SUBROUTINE MAGNIFY FORTRAN EXTENDED VERSION 2.0 05/01/72 10.55.56.

MAG01400

SUBROUTINE MAGNIFY
COMMON RESULT,LENGTH,OBJECTD(12),A(12,36),SAVE 1000,MAG01400

11,SAVE2(900),SAVE3(900),K,XMAX,XMIN,ROOT2,NUMBER,N,II,INF

COMMON SAVE4(900)

COMMON MAG

COMMON IN

COMMON NNN

INTEGER OBJECTD

NN= (K-1)*4+II

RESULT = 1./ (64.*SAVE(NN))

RETURN

END

10

MAG01420

MAG01430

MAG01460

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APPENDIX C (DATA REDUCTION TABLES)

SECTION (A)

**NOMINAL DIMENSIONS OF RESOLVING
POWER TEST TARGETS**

NOMINAL DIMENSIONS OF RESOLVING POWER TEST TARGET

GROUP -6			GROUP -5			GROUP -4			GROUP -3			GROUP -2			GROUP -1		
	INTERVAL WIDTH MM	UNIT WIDTH INCH		INTERVAL WIDTH MM	UNIT WIDTH INCH		INTERVAL WIDTH MM	UNIT WIDTH INCH		INTERVAL WIDTH MM	UNIT WIDTH INCH		INTERVAL WIDTH MM	UNIT WIDTH INCH		INTERVAL WIDTH MM	UNIT WIDTH INCH
E-1	32.000	1.268	64.000	2.520	L-1	16.000	.630	32.000	1.260	L-1	8.000	.315	16.000	.630	L-1	8.000	.315
E-2	28.500	1.122	57.016	2.245	E-2	14.256	.561	28.500	1.122	E-2	7.127	.281	14.256	.561	E-2	7.127	.281
E-3	25.384	1.000	50.798	2.000	H-3	12.699	.500	25.399	1.000	H-3	6.350	.250	12.699	.500	H-3	6.350	.250
E-4	22.628	.691	45.255	1.782	E-4	11.314	.445	22.628	.891	E-4	5.657	.223	11.314	.445	E-4	5.657	.223
H-5	20.159	.794	40.318	1.587	N-5	10.779	.397	20.159	.794	N-5	5.040	.198	10.079	.397	N-5	5.040	.198
T-6	17.956	.707	35.919	1.414	T-6	8.980	.354	17.959	.707	T-6	4.490	.177	8.980	.354	T-6	4.490	.177
E-1	4.000	.157	8.000	.315	L-1	2.000	.079	4.000	.157	L-1	1.000	.039	2.000	.079	L-1	1.000	.039
E-2	3.563	.140	7.127	.281	E-2	1.782	.070	3.563	.140	E-2	.891	.035	1.782	.070	E-2	.891	.035
E-3	3.175	.125	6.350	.250	H-3	1.587	.062	3.175	.125	H-3	.794	.031	1.587	.062	H-3	.794	.031
E-4	2.828	.111	5.657	.223	E-4	1.414	.056	2.828	.111	E-4	.707	.029	1.414	.056	E-4	.707	.029
H-5	2.520	.099	5.040	.198	N-5	1.260	.050	2.520	.099	N-5	.630	.025	1.260	.099	N-5	.630	.025
T-6	2.245	.088	4.490	.177	T-6	1.122	.044	2.245	.088	T-6	.561	.022	1.122	.088	T-6	.561	.022

NOTES - (1) LENGTH OF -6 GROUP (TOP OF 2ND ELEMENT TO BOTTOM OF 6TH ELEMENT 176.6MM. 30.02 INCHES
(2) INTERVAL LENGTH EQUALS FIVE TIMES INTERVAL WIDTH

NOMENCLATURE

- INTERVAL - A LINE (BAR) OR A SPACE
- UNIT - A LINE AND ADJACENT SPACE
- PATTERN - THREE LINES AND TWO INCLUDED SPACES
- ELEMENT - AN ARRANGEMENT OF TWO PATTERNS SET AT RIGHT ANGLES TO EACH OTHER AND SEPARATED BY ONE UNIT SPACE
- GROUP - AN ARRAY OF SIX ELEMENTS

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SECTION (B)

RESOLVING POWER DATA TABLES FOR SPECIFIC
LENS FOCAL LENGTH/OBJECT DISTANCE COMBINATIONS

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR 10MM FOCAL LENGTH LENSES

	FOCAL LENGTH - 10MM	OBJECT DISTANCE - 5.5FT.1	MAGNIFICATION - .003605	-6 GROUP LENGTH - 5.060MM(.1984IN.)	FOCAL LENGTH - 10MM	OBJECT DISTANCE - 7.52MM(1.52IN.)	MAGNIFICATION - .004709	-6 GROUP LENGTH - 3.593MM(.1415IN.)											
E	-6	-5	-4	-3	-2	-1	E	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1
L 1	2.4	4.7	9.5	16.9	37.6	75.7	L 1	3.3	6.6	13.3	26.5	53.1	L 1	4.7	9.5	19.9	38.0	76.9	151.9
E 2	2.7	5.2	10.6	21.2	42.5	85.0	E 2	2.7	7.4	14.7	29.8	59.6	N 3	5.3	10.7	21.3	42.8	85.3	176.5
L 3	3.0	6.0	11.9	23.8	47.7	95.6	N 3	4.2	8.4	16.7	33.4	66.9	N 3	6.0	12.0	23.9	47.8	95.7	191.4
E 4	3.3	6.7	13.4	26.8	52.5	107.1	E 4	4.7	9.4	18.8	37.5	75.1	N 5	6.7	13.4	26.9	53.7	107.4	214.8
L 5	3.6	7.5	15.0	30.0	60.1	120.2	N 5	5.3	10.5	21.1	42.1	84.3	N 5	7.5	15.1	30.1	60.3	120.6	241.1
E 6	4.2	8.4	16.9	33.7	67.6	134.9	T 6	5.9	11.8	23.6	47.3	94.6	T 6	8.5	16.9	33.8	67.7	138.3	270.7

	FOCAL LENGTH - 10MM	OBJECT DISTANCE - 15.5FT.1	MAGNIFICATION - .002192	-6 GROUP LENGTH - 1.673MM(.0656IN.)	FOCAL LENGTH - 10MM	OBJECT DISTANCE - 25.5FT.1	MAGNIFICATION - .001316	-6 GROUP LENGTH - 1.003MM(.0395IN.)											
E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	E	-6	-5	-4	-3	-2	-1
L 1	7.1	14.3	28.5	57.0	114.1	220.1	L 1	11.9	23.8	47.6	95.1	190.2	L 1	16.7	33.9	68.6	133.2	266.5	322.9
E 2	8.0	16.0	32.0	64.0	128.0	256.0	E 2	13.3	26.7	53.4	106.8	213.6	E 2	18.7	37.4	74.8	149.5	299.1	358.2
L 3	9.0	18.0	35.9	71.8	143.7	281.4	N 3	15.0	30.0	59.9	119.9	239.7	N 3	21.0	42.0	83.9	167.9	335.7	371.4
E 4	10.1	20.2	40.3	80.6	161.3	322.6	E 4	16.8	33.6	67.3	134.5	269.1	E 4	23.6	47.1	94.2	186.4	376.8	393.6
L 5	11.3	22.6	45.5	90.5	182.0	382.1	N 5	18.9	37.8	75.5	151.0	302.0	N 5	26.0	52.9	105.7	213.5	423.9	445.9
E 6	12.7	25.0	50.6	101.6	203.2	406.4	T 6	21.2	42.4	84.7	169.5	339.0	T 6	29.7	56.3	116.7	237.4	474.9	499.5

	FOCAL LENGTH - 10MM	OBJECT DISTANCE - 50.5FT.1	MAGNIFICATION - .000657	-6 GROUP LENGTH - .501MM(.0197IN.)	FOCAL LENGTH - 10MM	OBJECT DISTANCE - 75.5FT.1	MAGNIFICATION - .000438	-6 GROUP LENGTH - .334MM(.0131IN.)											
E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	E	-6	-5	-4	-3	-2	-1
L 1	23.8	47.6	95.2	190.4	380.7	761.5	L 1	35.7	71.6	142.0	285.6	571.2	N 3	53.4	106.9	213.6	427.5	855.5	999.9
E 2	26.7	53.6	108.8	213.8	427.4	856.8	E 2	40.1	80.2	160.6	320.6	641.2	N 3	60.0	120.0	239.9	479.9	959.9	999.9
L 3	30.0	60.0	118.9	219.9	437.0	859.4	N 3	45.0	90.0	179.9	359.9	719.7	N 3	67.3	134.7	269.3	538.6	999.9	999.9
E 4	33.7	67.2	134.6	269.9	536.5	999.9	E 4	50.5	101.0	202.0	403.9	807.9	E 4	75.6	151.2	302.3	604.6	999.9	999.9
L 5	37.8	75.6	151.1	302.2	604.4	999.9	N 5	56.7	113.4	226.7	453.4	906.8	N 5	84.8	169.7	339.3	678.6	999.9	999.9
E 6	42.4	84.6	169.6	339.2	678.4	999.9	T 6	63.6	127.2	254.5	508.9	999.9	T 6						

	FOCAL LENGTH - 10MM	OBJECT DISTANCE - 150.5FT.1	MAGNIFICATION - .00219	-6 GROUP LENGTH - .167MM(.0066IN.)	FOCAL LENGTH - 10MM	OBJECT DISTANCE - 200.5FT.1	MAGNIFICATION - .00164	-6 GROUP LENGTH - .125MM(.0046IN.)											
E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	E	-6	-5	-4	-3	-2	-1
L 1	71.4	142.8	285.7	571.4	999.9	999.9	L 1	95.2	197.5	380.9	761.9	999.9	L 1	119.0	238.1	476.4	952.4	999.9	999.9
E 2	80.2	160.3	320.7	641.4	999.9	999.9	E 2	106.9	213.8	427.6	855.2	999.9	E 2	133.6	267.3	534.5	999.9	999.9	999.9
L 3	90.0	180.0	359.9	719.9	999.9	999.9	N 3	120.0	240.0	480.0	959.9	999.9	N 3	150.0	300.0	600.0	999.9	999.9	999.9
E 4	101.0	202.0	404.0	804.0	999.9	999.9	E 4	134.7	269.4	538.7	999.9	999.9	E 4	168.4	336.7	735.4	999.9	999.9	999.9
L 5	113.0	226.8	452.5	907.0	999.9	999.9	N 5	151.2	302.4	604.7	999.9	999.9	N 5	189.0	376.0	755.9	999.9	999.9	999.9
E 6	127.3	254.5	509.0	999.9	999.9	999.9	T 6	160.7	339.4	678.8	999.9	999.9	T 6	212.1	424.2	848.5	999.9	999.9	999.9

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR 10MM FOCAL LENGTH LENSES

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR 13MM FOCAL LENGTH LENSES

FOCAL LENGTH	13MM	13MM	13MM	13MM	13MM
OBJECT DISTANCE	5.FT. (1.52M)	OBJECT DISTANCE	7.FT.(2.13M)	OBJECT DISTANCE	10.FT. (3.05M)
MAGNIFICATION	.008604	MAGNIFICATION	.006130	MAGNIFICATION	.004283
-6 GROUP LENGTH	6.565MM(.2584IN.)	-6 GROUP LENGTH	4.677MM(.1842IN.)	-6 GROUP LENGTH	3.268MM(.1297IN.)
GROUP		GROUP		GROUP	
E -6 -5 -4	-3 -2 -1	E -6 -5 -4	-3 -2 -1	E -6 -5 -4	-3 -2 -1
L 1 1.8 2.6 3.4	7.3 16.5 29.1	L 1 2.5 5.1 10.2	20.4 40.8 81.6	L 1 3.6 7.3 14.6	29.2 58.4 116.7
E 2 2.0 4.1 6.2	16.3 32.6 45.2	E 2 2.9 5.7 11.4	22.9 45.8 91.6	E 2 4.1 8.2 16.4	32.8 65.5 131.0
N 3 2.3 4.6 7.3	36.0 73.0 132.0	N 3 3.2 6.4 12.0	25.7 102.8 157.7	N 3 4.6 9.2 18.4	36.4 73.5 147.1
E 4 2.6 5.1 10.3	20.5 41.1 82.2	E 4 3.6 7.2 14.4	28.8 57.7 115.3	E 4 5.2 10.3 20.3	41.3 82.5 165.0
N 5 2.9 5.8 11.5	23.1 46.1 92.3	N 5 4.0 8.1 16.2	32.4 64.7 129.5	N 5 5.8 11.6 23.2	46.3 92.6 185.3
T 6 3.2 6.5 12.9	25.9 51.6 103.5	T 6 4.5 9.1 16.2	36.3 72.7 145.3	T 6 6.5 13.0 26.0	52.0 104.0 208.0

FOCAL LENGTH	13MM	13MM	13MM	13MM	13MM
OBJECT DISTANCE	15.FT. (4.57M)	OBJECT DISTANCE	25.FT. (7.62M)	OBJECT DISTANCE	35.FT. (10.67M)
MAGNIFICATION	.002852	MAGNIFICATION	.001709	MAGNIFICATION	.001220
-6 GROUP LENGTH	2.176MM(.0857IN.)	-6 GROUP LENGTH	1.304MM(.0513IN.)	-6 GROUP LENGTH	.931MM(.0367IN.)
GROUP		GROUP		GROUP	
E -6 -5 -4	-3 -2 -1	E -6 -5 -4	-3 -2 -1	E -6 -5 -4	-3 -2 -1
L 1 5.5 11.0 21.9	43.6 87.7 175.3	L 1 9.1 18.3 36.6	73.1 146.3 292.6	L 1 12.6 25.4 51.2	102.5 204.9 469.8
E 2 6.2 12.3 24.6	49.2 98.4 196.6	E 2 10.3 20.5 41.1	82.1 164.2 328.4	E 2 14.4 28.8 57.5	115.0 238.0 466.0
N 3 6.9 13.8 27.6	55.2 110.5 220.9	N 3 11.5 23.0 52.0	92.1 184.3 368.6	N 3 16.1 32.3 64.5	120.1 258.2 516.3
E 4 7.7 15.5 31.0	62.0 124.0 248.0	E 4 12.9 25.9 51.7	103.4 206.9 413.8	E 4 18.1 36.2 72.4	144.9 269.8 579.6
N 5 8.7 17.4 34.8	69.6 132.2 278.3	N 5 14.5 29.0 58.1	116.1 232.2 464.4	N 5 20.3 40.7 81.3	162.6 325.3 650.5
T 6 9.8 19.5 39.1	78.1 156.2 312.4	T 6 16.3 32.6 65.2	130.9 260.7 521.3	T 6 22.8 45.6 91.3	162.5 365.1 730.2

FOCAL LENGTH	13MM	13MM	13MM	13MM	13MM
OBJECT DISTANCE	75.FT. (22.86M)	OBJECT DISTANCE	75.FT. (22.86M)	OBJECT DISTANCE	100.FT. (30.48M)
MAGNIFICATION	.000569	MAGNIFICATION	.000569	MAGNIFICATION	.000427
-6 GROUP LENGTH	.651MM(.0256IN.)	-6 GROUP LENGTH	.434MM(.0171IN.)	-6 GROUP LENGTH	.326MM(.0128IN.)
GROUP		GROUP		GROUP	
E -6 -5 -4	-3 -2 -1	E -6 -5 -4	-3 -2 -1	E -6 -5 -4	-3 -2 -1
L 1 18.3 36.6 73.2	146.4 292.6 585.7	L 1 27.5 54.9 109.8	219.7 459.4 878.7	L 1 36.6 73.2 146.5	293.0 585.9 999.9
E 2 20.5 41.1 82.2	164.3 328.7 657.4	E 2 30.5 61.6 123.3	246.4 493.2 986.4	E 2 41.1 82.2 164.4	328.8 657.7 999.9
N 3 46.1 92.0 184.5	368.9 737.9	N 3 35.6 69.2 138.4	276.6 553.0 999.9	N 3 46.1 92.3 184.5	369.7 738.2 999.9
E 4 51.6 103.5 207.1	414.1 826.2	E 4 38.6 77.7 152.3	210.7 621.4 999.9	E 4 51.6 103.5 207.1	414.3 826.6 999.9
N 5 58.1 116.2 232.4	464.8 929.7	N 5 43.6 87.2 174.7	348.7 697.4 999.9	N 5 58.1 116.3 232.5	465.0 930.1 999.9
T 6 65.2 130.4 260.9	521.8 999.9	T 6 48.9 97.9 159.7	391.4 782.9 999.9	T 6 65.2 130.5 261.6	522.0 999.9 999.9

FOCAL LENGTH	13MM	13MM	13MM	13MM	13MM
OBJECT DISTANCE	200.FT. (60.36M)	OBJECT DISTANCE	200.FT. (60.36M)	OBJECT DISTANCE	250.FT. (76.20M)
MAGNIFICATION	.0006213	MAGNIFICATION	.0006213	MAGNIFICATION	.0006217
-6 GROUP LENGTH	.217MM(.00851IN.)	-6 GROUP LENGTH	.163MM(.0064IN.)	-6 GROUP LENGTH	.138MM(.0051IN.)
GROUP		GROUP		GROUP	
E -6 -5 -4	-3 -2 -1	E -6 -5 -4	-3 -2 -1	E -6 -5 -4	-3 -2 -1
L 1 54.9 109.9 219.7	439.5 879.0 999.9	L 1 73.3 146.5 293.0	586.0 999.9 999.9	L 1 91.6 183.1 366.3	732.6 999.9 999.9
E 2 61.7 123.3 246.7	493.3 986.7 999.9	E 2 82.2 164.6 328.9	657.6 999.9 999.9	E 2 102.6 187.4 367.7	622.3 999.9 999.9
N 3 69.2 138.4 276.9	551.9 999.9 999.9	N 3 92.3 184.6 369.2	738.4 999.9 999.9	N 3 115.4 230.7 431.5	923.8 999.9 999.9
E 4 77.7 155.4 310.8	621.5 999.9 999.9	E 4 103.6 207.2 414.4	828.6 999.9 999.9	E 4 129.5 259.0 518.0	999.9 999.9 999.9
N 5 87.2 174.4 348.8	697.6 999.9 999.9	N 5 116.3 232.6 465.1	930.3 999.9 999.9	N 5 145.4 290.4 561.4	999.9 999.9 999.9
T 6 97.9 195.6 391.5	783.1 999.9 999.9	T 6 130.5 261.0 522.1	999.9 999.9 999.9	T 6 163.2 326.3 592.6	999.9 999.9 999.9

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR 13MM FOCAL LENGTH LENSES

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR 15MM FOCAL LENGTH LENSES

FOCAL LENGTH - 15MM		FOCAL LENGTH - 15MM		FOCAL LENGTH - 15MM	
OBJECT DISTANCE - 5.5FT. (1.52M)	MAGNIFICATION - .0059440 (.29861IN.)	OBJECT DISTANCE - 7.27' (2.13M)	MAGNIFICATION - .007080 (.402MM (.2127IN.)	OBJECT DISTANCE - 10.5FT. (3.05M)	MAGNIFICATION - .004946 (.3773MM (.1486IN.)
-6	-5	-3	-2	-1	-1
E 1.6	3.1	6.3	12.6	25.1	50.3
E 2.1	3.5	7.1	15.6	31.1	62.5
E 2.3	4.0	7.8	15.6	31.1	63.4
E 2.4	4.4	8.9	17.6	35.6	71.1
E 2.5	5.0	10.0	20.0	39.9	79.6
E 7.6	5.6	11.2	22.4	44.8	89.6

FOCAL LENGTH - 15MM		FOCAL LENGTH - 15MM		FOCAL LENGTH - 15MM	
OBJECT DISTANCE - 15FT. (4.57M)	MAGNIFICATION - .003292 (.08891IN.)	OBJECT DISTANCE - 25.FT. (7.62M)	MAGNIFICATION - .001972 (.0592IN.)	OBJECT DISTANCE - 35.FT. (10.67M)	MAGNIFICATION - .001463 (.0423IN.)
-6	-5	-3	-2	-1	-1
E 1.6	4.7	9.5	19.0	38.0	75.9
E 2.1	5.3	10.7	21.3	42.6	85.3
E 2.3	6.0	12.0	23.9	47.2	95.7
E 4	6.7	13.4	26.9	53.7	107.4
E 5	7.5	15.1	30.1	60.3	120.6
E 7.6	8.5	16.9	33.5	67.7	135.3

FOCAL LENGTH - 15MM		FOCAL LENGTH - 15MM		FOCAL LENGTH - 15MM	
OBJECT DISTANCE - 50.FT. (15.24M)	MAGNIFICATION - .000965 (.0296IN.)	OBJECT DISTANCE - 75.FT. (22.86M)	MAGNIFICATION - .000657 (.0197IN.)	OBJECT DISTANCE - 100.FT. (30.48M)	MAGNIFICATION - .000402 (.0148IN.)
-6	-5	-3	-2	-1	-1
E 1.6	4.7	9.5	19.0	38.0	76.0
E 2.1	5.3	10.7	21.3	42.6	85.6
E 2.3	6.0	12.0	23.9	47.2	95.7
E 4	6.7	13.4	26.9	53.7	107.4
E 5	7.5	15.1	30.1	60.3	120.6
E 7.6	8.5	16.9	33.5	67.7	135.3

FOCAL LENGTH - 15MM		FOCAL LENGTH - 15MM		FOCAL LENGTH - 15MM	
OBJECT DISTANCE - 150.FT. (45.72M)	MAGNIFICATION - .002932 (.00991IN.)	OBJECT DISTANCE - 200.FT. (60.96M)	MAGNIFICATION - .000246 (.0074IN.)	OBJECT DISTANCE - 250.FT. (76.20M)	MAGNIFICATION - .000197 (.0059IN.)
-6	-5	-3	-2	-1	-1
E 1.6	47.6	95.2	190.4	380.8	761.7
E 2.1	53.0	106.6	213.6	427.5	855.1
E 2.3	60.0	120.0	239.9	479.9	959.7
E 4	67.1	134.7	269.3	536.6	999.4
E 5	75.1	150.2	302.3	604.6	999.9
E 7.6	84.8	169.7	339.3	678.6	999.9

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR 15MM FOCAL LENGTH LENSES

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR 10MM FOCAL LENGTH LENSES

	FOCAL LENGTH - 10MM	OBJECT DISTANCE - 5.1FT. (1.52M)	MAGNIFICATION - .011952	-6 GROUP LENGTH - 4.120MM (.3540IN.)	GROUP	FOCAL LENGTH - 10MM	OBJECT DISTANCE - 7.5FT. (2.13M)	MAGNIFICATION - .008508	-6 GROUP LENGTH - 6.492MM (.2556IN.)	GROUP	FOCAL LENGTH - 10MM	OBJECT DISTANCE - 10.5FT. (2.61M)	MAGNIFICATION - .005441	-6 GROUP LENGTH - 4.533MM (.1785IN.)	GROUP					
E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1
E 1	1.3	2.0	2.9	3.9	5.0	6.5	L 1	1.8	2.7	3.2	4.7	5.4	6.0	L 1	2.6	5.3	10.5	21.0	42.1	84.2
E 2	1.5	2.2	3.2	4.2	5.2	6.7	E 2	2.1	4.1	8.2	16.5	33.0	66.0	E 2	3.0	5.9	12.6	23.6	47.2	94.5
E 3	1.6	2.4	3.4	4.4	5.5	7.0	N 3	2.3	4.6	9.3	16.5	37.0	74.0	N 3	3.3	6.6	13.2	26.5	53.5	106.0
E 4	1.8	2.7	3.7	4.7	5.8	7.4	E 4	2.6	5.2	10.4	20.3	41.6	83.1	E 4	3.7	7.4	16.9	29.4	59.5	119.9
E 5	2.1	4.2	6.3	8.3	10.6	12.6	N 5	2.9	5.8	11.7	23.3	46.6	93.1	N 5	4.2	8.4	16.7	33.4	66.8	133.6
E 6	2.3	4.7	6.9	9.3	11.6	14.5	T 6	3.3	6.5	13.1	26.2	52.4	104.7	T 6	4.7	9.4	18.7	37.5	75.0	150.0

	FOCAL LENGTH - 10MM	OBJECT DISTANCE - 15.1FT. (4.57M)	MAGNIFICATION - .003953	-6 GROUP LENGTH - 3.016MM (.3187IN.)	GROUP	FOCAL LENGTH - 10MM	OBJECT DISTANCE - 25.0FT. (7.62M)	MAGNIFICATION - .002368	-6 GROUP LENGTH - 1.807MM (.0711IN.)	GROUP	FOCAL LENGTH - 10MM	OBJECT DISTANCE - 35.0FT. (10.67M)	MAGNIFICATION - .001690	-6 GROUP LENGTH - 1.290MM (.0508IN.)	GROUP					
E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1
E 1	4.0	7.9	15.5	31.6	62.3	126.5	L 1	6.6	13.2	26.4	52.8	105.6	211.2	L 1	9.2	18.5	37.0	74.0	147.3	295.8
E 2	4.4	6.9	11.7	35.6	71.0	142.0	E 2	7.4	14.8	29.6	59.3	118.5	237.0	E 2	10.4	20.8	41.5	83.9	166.9	322.1
E 3	5.0	10.0	16.9	39.6	79.7	159.4	N 3	8.3	16.6	33.3	66.5	133.0	266.0	N 3	11.6	23.3	46.6	93.2	186.4	372.7
E 4	5.6	11.2	22.4	44.7	69.4	176.9	E 4	9.3	18.7	37.3	74.7	149.2	298.6	E 4	13.1	26.1	52.3	104.6	209.2	416.4
E 5	6.3	12.6	25.1	50.2	100.4	200.8	N 5	10.5	21.0	41.9	83.6	167.6	335.2	N 5	14.7	29.4	58.7	117.4	230.5	469.6
E 6	7.0	16.1	28.2	54.3	112.7	225.4	T 6	11.8	23.5	47.0	94.1	186.1	376.3	T 6	16.5	32.9	65.9	131.8	263.6	527.1

	FOCAL LENGTH - 10MM	OBJECT DISTANCE - 50.0FT. (15.24M)	MAGNIFICATION - .001182	-6 GROUP LENGTH - 1.902MM (.0355IN.)	GROUP	FOCAL LENGTH - 10MM	OBJECT DISTANCE - 75.0FT. (22.86M)	MAGNIFICATION - .000780	-6 GROUP LENGTH - 1.601MM (.02237IN.)	GROUP	FOCAL LENGTH - 10MM	OBJECT DISTANCE - 100.0FT. (30.48M)	MAGNIFICATION - .000589	-6 GROUP LENGTH - 1.451MM (.01781IN.)	GROUP					
E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1
E 1	13.2	26.4	52.9	105.9	211.4	422.8	L 1	19.2	39.7	79.3	158.6	317.2	634.2	L 1	26.4	53.9	105.8	211.5	422.7	846.2
E 2	14.8	29.7	59.3	118.7	237.3	474.6	E 2	22.3	44.5	89.0	178.1	356.1	712.5	E 2	29.7	59.4	118.7	237.5	474.7	949.8
E 3	16.6	33.3	66.6	133.2	266.4	532.7	N 3	25.0	50.0	99.9	199.9	399.7	799.4	N 3	33.3	66.6	133.3	266.5	533.1	999.9
E 4	18.7	37.6	74.7	149.5	299.0	598.0	E 4	28.0	56.1	112.2	224.3	448.7	897.3	E 4	37.4	74.8	149.2	299.2	598.3	999.9
E 5	21.0	42.0	87.8	167.8	335.6	671.2	N 5	31.5	63.0	125.9	251.8	503.6	999.9	N 5	42.0	84.0	167.9	335.8	671.6	999.9
E 6	22.5	47.1	94.2	184.4	376.7	753.6	T 6	35.3	70.7	141.3	282.6	565.3	999.9	T 6	47.1	94.2	188.5	376.9	753.8	999.9

	FOCAL LENGTH - 10MM	OBJECT DISTANCE - 150.0FT. (45.72M)	MAGNIFICATION - .003194	-6 GROUP LENGTH - .301MM (.01181IN.)	GROUP	FOCAL LENGTH - 10MM	OBJECT DISTANCE - 200.0FT. (60.96M)	MAGNIFICATION - .00295	-6 GROUP LENGTH - .225MM (.00891IN.)	GROUP	FOCAL LENGTH - 10MM	OBJECT DISTANCE - 250.0FT. (76.20M)	MAGNIFICATION - .00236	-6 GROUP LENGTH - .180MM (.0071IN.)	GROUP					
E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1
E 1	29.7	59.3	118.7	237.3	474.6	999.9	L 1	52.9	105.8	211.6	423.2	846.4	999.9	L 1	66.1	132.3	264.5	529.0	999.9	999.9
E 2	46.3	49.1	129.1	256.3	712.5	999.9	E 2	59.4	118.8	237.5	475.1	999.9	999.9	E 2	74.2	148.5	296.9	593.8	999.9	999.9
E 3	50.9	100.0	199.9	399.9	799.7	999.9	E 3	66.7	133.3	266.4	533.2	999.9	999.9	E 3	83.3	166.6	323.3	666.6	999.9	999.9
E 4	56.1	112.2	224.4	448.6	897.7	999.9	E 4	74.6	149.6	299.3	598.5	999.9	999.9	E 4	93.5	187.0	374.1	748.1	999.9	999.9
E 5	63.9	126.0	251.9	503.4	999.9	999.9	E 5	84.0	168.0	325.9	671.6	999.9	999.9	E 5	105.0	210.0	419.9	839.8	999.9	999.9
E 6	70.7	141.4	282.7	565.5	999.9	999.9	T 6	94.3	188.5	377.0	754.1	999.9	999.9	T 6	117.8	235.7	471.3	942.6	999.9	999.9

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR 10MM FOCAL LENGTH LENSES

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR 10MM FOCAL LENGTH LENSES

C-B-4

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR 21MM FOCAL LENGTH LENSES

FOCAL LENGTH - 21MM									
OBJECT DISTANCE - 5.5FT. (1.62M)									
MAGNIFICATION - 0.06940									
-6 GROUP LENGTH- 10.641IN(.6197IN.)									
GROUP	-6	-5	-4	-3	-2	-1	E	-6	-5
L 1	1.0	2.2	4.5	8.9	17.9	35.8	E 1	-6	-5
L 2	1.3	2.5	5.6	10.0	20.1	40.2	E 2	-5	-4
L 3	1.4	2.6	5.6	11.3	22.5	45.1	E 3	-5	-4
L 4	1.6	3.2	6.3	12.7	25.3	50.6	E 4	-5	-4
L 5	1.8	3.6	7.1	14.2	28.4	56.2	E 5	-5	-4
L 6	2.0	4.0	8.0	15.0	31.9	61.8	E 6	-5	-4

FOCAL LENGTH - 21MM									
OBJECT DISTANCE - 7.5FT. (2.13M)									
MAGNIFICATION - 0.584IN(.2986IN.)									
-6 GROUP LENGTH- 7.584IN(.2986IN.)									
GROUP	-6	-5	-4	-3	-2	-1	E	-6	-5
L 1	1.0	2.2	4.5	8.9	17.9	35.8	E 1	-6	-5
L 2	1.3	2.5	5.6	10.0	20.1	40.2	E 2	-5	-4
L 3	1.4	2.6	5.6	11.3	22.5	45.1	E 3	-5	-4
L 4	1.6	3.2	6.3	12.7	25.3	50.6	E 4	-5	-4
L 5	1.8	3.6	7.1	14.2	28.4	56.2	E 5	-5	-4
L 6	2.0	4.0	8.0	15.0	31.9	61.8	E 6	-5	-4

FOCAL LENGTH - 21MM									
OBJECT DISTANCE - 7.5FT. (2.13M)									
MAGNIFICATION - 0.584IN(.2986IN.)									
-6 GROUP LENGTH- 7.584IN(.2986IN.)									
GROUP	-6	-5	-4	-3	-2	-1	E	-6	-5
L 1	1.0	2.2	4.5	8.9	17.9	35.8	E 1	-6	-5
L 2	1.3	2.5	5.6	10.0	20.1	40.2	E 2	-5	-4
L 3	1.4	2.6	5.6	11.3	22.5	45.1	E 3	-5	-4
L 4	1.6	3.2	6.3	12.7	25.3	50.6	E 4	-5	-4
L 5	1.8	3.6	7.1	14.2	28.4	56.2	E 5	-5	-4
L 6	2.0	4.0	8.0	15.0	31.9	61.8	E 6	-5	-4

FOCAL LENGTH - 21MM									
OBJECT DISTANCE - 7.5FT. (2.13M)									
MAGNIFICATION - 0.584IN(.2986IN.)									
-6 GROUP LENGTH- 7.584IN(.2986IN.)									
GROUP	-6	-5	-4	-3	-2	-1	E	-6	-5
L 1	1.0	2.2	4.5	8.9	17.9	35.8	E 1	-6	-5
L 2	1.3	2.5	5.6	10.0	20.1	40.2	E 2	-5	-4
L 3	1.4	2.6	5.6	11.3	22.5	45.1	E 3	-5	-4
L 4	1.6	3.2	6.3	12.7	25.3	50.6	E 4	-5	-4
L 5	1.8	3.6	7.1	14.2	28.4	56.2	E 5	-5	-4
L 6	2.0	4.0	8.0	15.0	31.9	61.8	E 6	-5	-4

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER)FOR 21MM FOCAL LENGTH LENSES

FOCAL LENGTH - 21MM									
OBJECT DISTANCE - 7.5FT. (2.13M)									
MAGNIFICATION - 0.584IN(.2986IN.)									
-6 GROUP LENGTH- 7.584IN(.2986IN.)									
GROUP	-6	-5	-4	-3	-2	-1	E	-6	-5
L 1	1.0	2.2	4.5	8.9	17.9	35.8	E 1	-6	-5
L 2	1.3	2.5	5.6	10.0	20.1	40.2	E 2	-5	-4
L 3	1.4	2.6	5.6	11.3	22.5	45.1	E 3	-5	-4
L 4	1.6	3.2	6.3	12.7	25.3	50.6	E 4	-5	-4
L 5	1.8	3.6	7.1	14.2	28.4	56.2	E 5	-5	-4
L 6	2.0	4.0	8.0	15.0	31.9	61.8	E 6	-5	-4

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR 25MM FOCAL LENGTH LENSES

FOCAL LENGTH	25MM	FOCAL LENGTH	25MM	FOCAL LENGTH	25MM
OBJECT DISTANCE	10.1 ft.	OBJECT DISTANCE	15.9 ft.	OBJECT DISTANCE	25.9 ft.
MAGNIFICATION	3.05MM	MAGNIFICATION	4.57MM	MAGNIFICATION	7.62MM
-6 GROUP LENGTH	6.310MM (+2.841IN.)	-6 GROUP LENGTH	4.195MM (+1.652IN.) <th>-6 GROUP LENGTH</th> <td>2.612MM (.998IN.)</td>	-6 GROUP LENGTH	2.612MM (.998IN.)
GROUP		GROUP		GROUP	
E -6	-5	E -6	-5	E -6	-5
E 1 1.9	2.8	E 1 1.9	2.8	E 1 1.9	2.8
E 2 2.1	4.2	E 2 2.1	4.2	E 2 2.1	4.2
E 3 2.4	6.5	E 3 2.4	6.5	E 3 2.4	6.5
E 4 2.7	9.1	E 4 2.7	9.1	E 4 2.7	9.1
E 5 3.0	10.7	E 5 3.0	10.7	E 5 3.0	10.7
E 6 3.4	12.1	E 6 3.4	12.1	E 6 3.4	12.1
E 7 3.5	13.5	E 7 3.5	13.5	E 7 3.5	13.5

FOCAL LENGTH	25MM	FOCAL LENGTH	25MM	FOCAL LENGTH	25MM
OBJECT DISTANCE	15.9 ft.	OBJECT DISTANCE	50.9 ft.	OBJECT DISTANCE	75.9 ft.
MAGNIFICATION	4.57MM	MAGNIFICATION	15.24MM	MAGNIFICATION	22.86MM
-6 GROUP LENGTH	1.792MM (.073IN.)	-6 GROUP LENGTH	1.254MM (.0494IN.)	-6 GROUP LENGTH	.935MM (.0329IN.)
GROUP		GROUP		GROUP	
E -6	-5	E -6	-5	E -6	-5
E 1 1.9	2.8	E 1 1.9	2.8	E 1 1.9	2.8
E 2 2.1	4.2	E 2 2.1	4.2	E 2 2.1	4.2
E 3 2.4	6.5	E 3 2.4	6.5	E 3 2.4	6.5
E 4 2.7	9.1	E 4 2.7	9.1	E 4 2.7	9.1
E 5 3.0	10.7	E 5 3.0	10.7	E 5 3.0	10.7
E 6 3.4	12.1	E 6 3.4	12.1	E 6 3.4	12.1
E 7 3.5	13.5	E 7 3.5	13.5	E 7 3.5	13.5

FOCAL LENGTH	25MM	FOCAL LENGTH	25MM	FOCAL LENGTH	25MM
OBJECT DISTANCE	50.9 ft.	OBJECT DISTANCE	150.9 ft.	OBJECT DISTANCE	200.9 ft.
MAGNIFICATION	15.24MM	MAGNIFICATION	45.72MM	MAGNIFICATION	60.96MM
-6 GROUP LENGTH	0.626MM (.0247IN.)	-6 GROUP LENGTH	0.417MM (.0164IN.)	-6 GROUP LENGTH	.313MM (.0123IN.)
GROUP		GROUP		GROUP	
E -6	-5	E -6	-5	E -6	-5
E 1 1.9	2.8	E 1 1.9	2.8	E 1 1.9	2.8
E 2 2.1	4.2	E 2 2.1	4.2	E 2 2.1	4.2
E 3 2.4	6.5	E 3 2.4	6.5	E 3 2.4	6.5
E 4 2.7	9.1	E 4 2.7	9.1	E 4 2.7	9.1
E 5 3.0	10.7	E 5 3.0	10.7	E 5 3.0	10.7
E 6 3.4	12.1	E 6 3.4	12.1	E 6 3.4	12.1
E 7 3.5	13.5	E 7 3.5	13.5	E 7 3.5	13.5

FOCAL LENGTH	25MM	FOCAL LENGTH	25MM	FOCAL LENGTH	25MM
OBJECT DISTANCE	150.9 ft.	OBJECT DISTANCE	300.9 ft.	OBJECT DISTANCE	400.9 ft.
MAGNIFICATION	45.72MM	MAGNIFICATION	91.46MM	MAGNIFICATION	121.92MM
-6 GROUP LENGTH	0.0039MM (.0009IN.)	-6 GROUP LENGTH	0.0082MM (.0018IN.)	-6 GROUP LENGTH	.0153MM (.0032IN.)
GROUP		GROUP		GROUP	
E -6	-5	E -6	-5	E -6	-5
E 1 1.9	2.8	E 1 1.9	2.8	E 1 1.9	2.8
E 2 2.1	4.2	E 2 2.1	4.2	E 2 2.1	4.2
E 3 2.4	6.5	E 3 2.4	6.5	E 3 2.4	6.5
E 4 2.7	9.1	E 4 2.7	9.1	E 4 2.7	9.1
E 5 3.0	10.7	E 5 3.0	10.7	E 5 3.0	10.7
E 6 3.4	12.1	E 6 3.4	12.1	E 6 3.4	12.1
E 7 3.5	13.5	E 7 3.5	13.5	E 7 3.5	13.5

FOCAL LENGTH	25MM	FOCAL LENGTH	25MM	FOCAL LENGTH	25MM
OBJECT DISTANCE	300.9 ft.	OBJECT DISTANCE	601.8 ft.	OBJECT DISTANCE	802.7 ft.
MAGNIFICATION	91.46MM	MAGNIFICATION	182.92MM	MAGNIFICATION	243.87MM
-6 GROUP LENGTH	0.0082MM (.0018IN.)	-6 GROUP LENGTH	0.0153MM (.0032IN.)	-6 GROUP LENGTH	.0215MM (.0045IN.)
GROUP		GROUP		GROUP	
E -6	-5	E -6	-5	E -6	-5
E 1 1.9	2.8	E 1 1.9	2.8	E 1 1.9	2.8
E 2 2.1	4.2	E 2 2.1	4.2	E 2 2.1	4.2
E 3 2.4	6.5	E 3 2.4	6.5	E 3 2.4	6.5
E 4 2.7	9.1	E 4 2.7	9.1	E 4 2.7	9.1
E 5 3.0	10.7	E 5 3.0	10.7	E 5 3.0	10.7
E 6 3.4	12.1	E 6 3.4	12.1	E 6 3.4	12.1
E 7 3.5	13.5	E 7 3.5	13.5	E 7 3.5	13.5

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR 25MM FOCAL LENGTH LENSES

C-2-6

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR 28MM FOCAL LENGTH LENSES

FOCAL LENGTH = 28MM		FOCAL LENGTH = 28MM		FOCAL LENGTH = 28MM	
OBJECT DISTANCE = 15. FT. (4.57M)	MAGNIFICATION = 0.06162	OBJECT DISTANCE = 15. FT. (4.57M)	MAGNIFICATION = 0.06338	OBJECT DISTANCE = 25. FT. (7.62M)	MAGNIFICATION = 0.06638
-6 GROUP LENGTH = 7.074MM (.2765IN.)	GROUP	-6 GROUP LENGTH = 7.072MM (.1851IN.)	GROUP	-6 GROUP LENGTH = 2.014MM (.11081IN.)	GROUP
-6	-5	-3	-2	-1	E
E	L 1	1.7	3.4	6.7	13.5
E	L 2	1.9	3.8	7.6	15.1
E	L 3	2.1	4.2	8.5	17.0
E	L 4	2.4	4.8	9.5	19.1
E	L 5	2.7	5.4	10.7	21.4
E	L 6	3.0	6.0	12.0	24.0
E	L 7	3.4	6.7	13.5	27.0
E	L 8	3.8	7.6	15.1	30.3
E	L 9	4.2	8.5	17.0	34.0
E	L 10	4.8	9.5	19.1	38.1
E	L 11	5.4	10.7	21.4	42.8
E	L 12	6.0	12.0	24.0	46.0
E	L 13	6.7	13.5	27.0	53.9
E	L 14	7.6	15.1	30.3	60.5
E	L 15	8.5	17.0	34.0	67.9
E	L 16	9.5	19.1	38.1	76.3
E	L 17	10.7	21.4	42.8	85.6
E	L 18	12.0	24.0	46.0	96.1
E	L 19	13.5	27.0	53.9	104.6
E	L 20	15.1	30.3	60.5	114.6
E	L 21	17.0	34.0	67.9	124.6
E	L 22	19.1	38.1	76.3	134.6
E	L 23	21.4	42.8	85.6	144.6
E	L 24	24.0	46.0	96.1	154.6
E	L 25	27.0	53.9	104.6	164.6
E	L 26	30.3	60.5	114.6	174.6
E	L 27	34.0	67.9	124.6	184.6
E	L 28	38.1	76.3	134.6	194.6
E	L 29	42.8	85.6	144.6	204.6
E	L 30	46.0	96.1	154.6	214.6

FOCAL LENGTH = 28MM		FOCAL LENGTH = 28MM		FOCAL LENGTH = 28MM					
OBJECT DISTANCE = 35.FT.(10.67M)		OBJECT DISTANCE = 50.FT.(15.24M)		OBJECT DISTANCE = 75.FT.(22.86M)					
MAGNIFICATION = .002632		MAGNIFICATION = .001841		MAGNIFICATION = .001226					
-6 GROUP LENGTH = 2.008MM(.0791IN.)		-6 GROUP LENGTH = 1.404MM(.0553IN.)		-6 GROUP LENGTH = .935MM(.0368IN.)					
GROUP		GROUP		GROUP					
E	-5	-3	-2	-1	E	-5	-3	-2	-1
L	1	11.9	23.7	47.5	E	8.5	17.0	34.0	67.9
L	2	13.3	27.6	53.3	L	1	19.0	38.0	135.8
X	3	15.0	29.9	59.8	E	1	21.3	42.0	271.6
X	4	16.3	33.6	67.2	E	1	23.7	45.4	304.9
N	5	18.0	37.7	75.4	E	1	26.0	52.0	342.2
T	6	21.2	42.3	84.6	N	1	29.0	59.0	171.1
					N	5	32.0	66.0	342.2
					E	4	34.0	72.0	164.1
					E	4	36.0	72.0	164.1
					N	5	36.0	72.0	164.1
					T	6	36.0	72.0	164.1

FURTHER LENS DATA		FOCAL LENGTH = 28MM		FOCAL LENGTH = 28MM	
OBJECT DISTANCE = 250.FT. (76.20M)		OBJECT DISTANCE = 300.FT. (91.44M)		OBJECT DISTANCE = 400.FT. (121.92M)	
MAGNIFICATION = *000368		MAGNIFICATION = *000306		MAGNIFICATION = *000230	
*6 GROUP LENGTH = *280MM (.0110IN.)		*6 GROUP LENGTH = *234MM (.0092IN.)		*6 GROUP LENGTH = *175MM (.0069IN.)	
GROUP		GROUP		GROUP	
E	-4	E	-4	E	-4
L	1	L	1	L	1
E	2	E	2	E	2
L	3	L	3	L	3
E	4	E	4	E	4
L	5	L	5	L	5
E	6	E	6	E	6
L	7	L	7	L	7
E	8	E	8	E	8
L	9	L	9	L	9
E	10	E	10	E	10
L	11	L	11	L	11
E	12	E	12	E	12
L	13	L	13	L	13
E	14	E	14	E	14
L	15	L	15	L	15
E	16	E	16	E	16
L	17	L	17	L	17
E	18	E	18	E	18
L	19	L	19	L	19
E	20	E	20	E	20
L	21	L	21	L	21
E	22	E	22	E	22
L	23	L	23	L	23
E	24	E	24	E	24
L	25	L	25	L	25
E	26	E	26	E	26
L	27	L	27	L	27
E	28	E	28	E	28
L	29	L	29	L	29
E	30	E	30	E	30
L	31	L	31	L	31
E	32	E	32	E	32
L	33	L	33	L	33
E	34	E	34	E	34
L	35	L	35	L	35
E	36	E	36	E	36
L	37	L	37	L	37
E	38	E	38	E	38
L	39	L	39	L	39
E	40	E	40	E	40
L	41	L	41	L	41
E	42	E	42	E	42
L	43	L	43	L	43
E	44	E	44	E	44
L	45	L	45	L	45
E	46	E	46	E	46
L	47	L	47	L	47
E	48	E	48	E	48
L	49	L	49	L	49
E	50	E	50	E	50
L	51	L	51	L	51
E	52	E	52	E	52
L	53	L	53	L	53
E	54	E	54	E	54
L	55	L	55	L	55
E	56	E	56	E	56
L	57	L	57	L	57
E	58	E	58	E	58
L	59	L	59	L	59
E	60	E	60	E	60
L	61	L	61	L	61
E	62	E	62	E	62
L	63	L	63	L	63
E	64	E	64	E	64
L	65	L	65	L	65
E	66	E	66	E	66
L	67	L	67	L	67
E	68	E	68	E	68
L	69	L	69	L	69
E	70	E	70	E	70
L	71	L	71	L	71
E	72	E	72	E	72
L	73	L	73	L	73
E	74	E	74	E	74
L	75	L	75	L	75
E	76	E	76	E	76
L	77	L	77	L	77
E	78	E	78	E	78
L	79	L	79	L	79
E	80	E	80	E	80
L	81	L	81	L	81
E	82	E	82	E	82
L	83	L	83	L	83
E	84	E	84	E	84
L	85	L	85	L	85
E	86	E	86	E	86
L	87	L	87	L	87
E	88	E	88	E	88
L	89	L	89	L	89
E	90	E	90	E	90
L	91	L	91	L	91
E	92	E	92	E	92
L	93	L	93	L	93
E	94	E	94	E	94
L	95	L	95	L	95
E	96	E	96	E	96
L	97	L	97	L	97
E	98	E	98	E	98
L	99	L	99	L	99
E	100	E	100	E	100

IMAGE PLANE RESOLUTION 500 LINES OF 100% MTF FOR 20MM FOCAL LENGTH LENS

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR 35MM FOCAL LENGTH LENSES

	FOCAL LENGTH - 35MM	OBJECT DISTANCE - 16.5FT. (3.05M)	MAGNIFICATION - .01616 (.03489IN.)	-6 GROUP LENGTH - 8.863MM (.34589IN.)	FOCAL LENGTH - 35MM	OBJECT DISTANCE - 15.FT. (4.57M)	MAGNIFICATION - .007714 (.01866MM)	-6 GROUP LENGTH - 5.866MM (.2317IN.)	FOCAL LENGTH - 35MM	OBJECT DISTANCE - 25.FT. (7.62M)	MAGNIFICATION - .004614 (.01244MM)	-6 GROUP LENGTH - 3.521MM (.13261IN.)	
	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	
E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	
L 1	1.3	2.7	5.0	10.6	21.5	43.0	L 1	2.0	4.1	8.1	16.2	32.4	-1
E 2	1.5	3.0	5.3	12.1	24.2	54.3	E 2	2.3	4.5	9.1	18.2	36.4	-1
H 3	1.7	3.4	6.5	13.6	27.1	54.2	H 3	2.6	5.1	10.2	20.4	40.8	-1
E 4	1.9	3.8	7.0	15.2	30.4	60.9	E 4	2.9	5.7	11.5	22.9	45.8	-1
H 5	2.1	4.3	6.5	17.1	34.2	78.3	H 5	3.2	6.4	12.9	25.7	51.4	-1
T 6	2.4	4.8	9.0	19.2	36.3	76.7	T 6	3.6	7.2	14.4	28.9	57.7	115.5

	FOCAL LENGTH - 35MM	OBJECT DISTANCE - 35.FT. (10.67M)	MAGNIFICATION - .003292 (.00649IN.)	-6 GROUP LENGTH - 2.512MM (.09649IN.)	FOCAL LENGTH - 35MM	OBJECT DISTANCE - 50.FT. (15.24M)	MAGNIFICATION - .002302 (.00691IN.)	-6 GROUP LENGTH - 1.756MM (.0691IN.)	FOCAL LENGTH - 35MM	OBJECT DISTANCE - 75.FT. (22.86M)	MAGNIFICATION - .001533 (.00451IN.)	-6 GROUP LENGTH - 1.170MM (.0451IN.)	
	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	
E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	
L 1	4.7	9.5	19.0	39.0	78.0	151.9	L 1	6.8	13.6	27.2	54.3	108.6	-1
E 2	5.3	10.7	21.3	42.6	85.3	170.5	E 2	7.6	15.2	30.5	61.0	121.9	-1
H 3	6.0	12.0	23.9	47.8	95.7	191.4	H 3	8.3	17.1	34.2	68.4	136.8	-1
E 4	6.7	13.4	15.1	30.1	53.7	107.4	E 4	9.6	16.2	38.4	76.8	153.6	-1
H 5	7.5	15.1	30.1	69.3	129.0	216.1	H 5	10.6	21.6	43.1	86.2	172.4	-1
T 6	8.5	16.9	33.8	67.7	135.3	270.7	T 6	12.1	24.2	48.4	96.8	193.5	387.0

	FOCAL LENGTH - 35MM	OBJECT DISTANCE - 100.FT. (30.48M)	MAGNIFICATION - .001150 (.00345IN.)	-6 GROUP LENGTH - .877MM (.0345IN.)	FOCAL LENGTH - 35MM	OBJECT DISTANCE - 150.FT. (45.72M)	MAGNIFICATION - .000766 (.00230IN.)	-6 GROUP LENGTH - .585MM (.0230IN.)	FOCAL LENGTH - 35MM	OBJECT DISTANCE - 200.FT. (60.96M)	MAGNIFICATION - .000574 (.0173IN.)	-6 GROUP LENGTH - .438MM (.0173IN.)	
	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	
E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	
L 1	13.6	27.2	54.4	108.7	217.5	436.9	L 1	20.4	40.8	81.6	163.2	326.4	-1
E 2	15.3	30.5	61.0	122.3	244.0	488.2	E 2	22.9	45.9	91.6	183.1	366.3	-1
H 3	17.1	34.2	65.5	137.0	274.0	548.0	H 3	25.7	51.4	102.6	205.6	411.1	-1
E 4	19.2	38.4	76.9	153.6	307.5	615.1	E 4	28.6	57.7	115.4	230.7	461.5	-1
H 5	21.0	43.2	86.3	172.6	345.2	90.4	H 5	32.4	64.8	129.5	259.7	516.0	999.9
T 6	24.0	49.6	96.9	193.7	387.5	775.0	T 6	36.3	72.7	145.4	290.7	581.4	999.9

	FOCAL LENGTH - 35MM	OBJECT DISTANCE - 250.FT. (76.20M)	MAGNIFICATION - .000360 (.0138IN.)	-6 GROUP LENGTH - .351MM (.0138IN.)	FOCAL LENGTH - 35MM	OBJECT DISTANCE - 300.FT. (91.44M)	MAGNIFICATION - .000383 (.0115IN.)	-6 GROUP LENGTH - .292MM (.0115IN.)	FOCAL LENGTH - 35MM	OBJECT DISTANCE - 400.FT. (121.92M)	MAGNIFICATION - .000407 (.0173IN.)	-6 GROUP LENGTH - .219MM (.0173IN.)	
	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	
E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	
L 1	34.0	68.0	136.0	272.0	544.0	999.9	L 1	40.8	81.6	163.2	326.4	652.9	-1
E 2	35.2	76.3	152.7	305.3	610.7	999.9	E 2	45.8	91.6	183.2	366.4	732.9	-1
H 3	42.8	85.7	171.4	342.7	685.4	999.9	H 3	51.4	102.6	205.6	411.3	822.6	-1
E 4	48.1	98.2	192.3	384.7	769.9	999.9	E 4	57.7	115.7	230.6	461.7	923.3	-1
H 5	54.0	108.0	215.9	431.9	863.9	999.9	H 5	64.6	129.6	259.1	518.2	999.9	N 5
T 6	60.0	121.2	242.3	464.7	989.4	999.9	T 6	72.7	145.4	290.8	581.7	999.9	T 6

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR 35MM FOCAL LENGTH LENSES

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR 40MM FOCAL LENGTH LENSES

	FOCAL LENGTH - 40MM	OBJECT DISTANCE - 10.5FT. (3.05M)	MAGNIFICATION - .013298	-6 GROUP LENGTH - 10.1edcent .3995IN.1	GROUP	FOCAL LENGTH - 40MM	OBJECT DISTANCE - 15.5FT. (4.65M)	MAGNIFICATION - .006826	-6 GROUP LENGTH - 6.13MM (.2651IN.1	GROUP	FOCAL LENGTH - 40MM	OBJECT DISTANCE - 25.5FT. (7.62M)	MAGNIFICATION - .003277	-6 GROUP LENGTH - 4.02MM (.1585IN.1	GROUP	
E	-5	-5	2.3	2.0	E	-6	-5	3.5	7.1	E	-6	-5	5.9	11.6	47.4	-1
E 1	1.2	1.2	2.0	5.3	E 1	1.8	2.0	7.9	15.9	E 1	3.0	3.3	13.3	23.7	47.4	-2
E 2	1.3	2.0	5.9	11.8	E 2	2.0	4.5	8.9	17.8	E 2	3.3	6.6	13.3	23.7	47.4	-3
E 3	1.5	3.0	5.0	13.3	E 3	2.2	5.0	10.0	20.0	E 3	3.7	7.5	14.9	26.8	59.7	119.6
E 4	1.7	3.7	7.5	14.9	E 4	2.5	5.6	11.2	22.5	E 4	4.2	8.4	16.7	33.5	67.0	134.0
E 5	1.9	4.2	8.4	16.7	E 5	2.8	5.2	12.6	25.2	E 5	4.7	9.4	18.8	37.6	75.2	158.4
T 6	2.1	4.2	8.4	16.7	T 6	3.2	6.3	12.6	25.2	T 6	5.3	10.6	21.1	42.2	84.4	168.4

	FOCAL LENGTH - 40MM	OBJECT DISTANCE - 35.5FT. (10.67M)	MAGNIFICATION - .003764	-6 GROUP LENGTH - 2.872MM (.1131IN.1	GROUP	FOCAL LENGTH - 40MM	OBJECT DISTANCE - 50.5FT. (15.24M)	MAGNIFICATION - .002632	-6 GROUP LENGTH - 2.008MM (.0791IN.1	GROUP	FOCAL LENGTH - 40MM	OBJECT DISTANCE - 75.5FT. (22.06M)	MAGNIFICATION - .001753	-6 GROUP LENGTH - 1.337MM (.0527IN.1	GROUP	
E	-5	-5	6.3	16.0	E	-5	-2	13.2	24.4	E	-5	-2	17.8	35.7	71.3	142.6
E 1	1.2	6.2	6.3	16.0	E 1	1.8	5.2	13.2	24.4	E 1	3.0	6.6	10.6	20.0	40.0	80.0
E 2	1.3	6.7	9.3	18.6	E 2	2.0	4.5	13.2	24.4	E 2	3.3	7.5	14.9	26.8	59.7	119.6
E 3	1.5	10.5	20.9	37.3	E 3	2.2	5.0	15.0	29.9	E 3	3.7	7.5	16.7	33.5	67.0	134.0
E 4	1.7	11.7	23.5	41.8	E 4	2.5	5.6	16.8	33.6	E 4	4.2	8.4	18.8	37.6	75.2	158.4
E 5	1.9	13.2	26.4	47.0	E 5	2.8	5.2	17.9	37.7	E 5	4.7	9.4	20.0	40.0	80.0	168.4
T 6	2.1	14.8	29.6	52.7	T 6	3.2	6.3	21.2	42.3	T 6	5.3	10.6	34.6	64.6	121.1	254.1

	FOCAL LENGTH - 40MM	OBJECT DISTANCE - 100.5FT. (30.48M)	MAGNIFICATION - .0001314	-6 GROUP LENGTH - 1.003MM (.0395IN.1	GROUP	FOCAL LENGTH - 40MM	OBJECT DISTANCE - 150.5FT. (45.72M)	MAGNIFICATION - .0000876	-6 GROUP LENGTH - .668MM (.0263IN.1	GROUP	FOCAL LENGTH - 40MM	OBJECT DISTANCE - 200.5FT. (60.96M)	MAGNIFICATION - .0000511	-6 GROUP LENGTH - .501MM (.0197IN.1	GROUP	
E	-5	-5	47.6	95.1	E	-6	-2	190.2	360.5	E	-6	-2	95.6	190.4	380.7	761.6
E 1	11.9	23.8	47.6	95.1	E 1	1.8	5.2	190.2	360.5	E 1	3.0	6.6	106.6	213.7	427.4	854.8
E 2	13.3	26.7	53.4	106.8	E 2	2.0	4.5	213.6	390.9	E 2	3.3	7.5	119.9	229.9	479.7	959.4
E 3	15.0	30.0	59.9	119.9	E 3	2.2	5.0	213.6	390.9	E 3	3.7	7.5	134.6	269.6	538.5	999.9
E 4	16.8	33.6	67.3	134.5	E 4	2.5	5.6	201.9	393.8	E 4	3.7	7.5	151.1	302.2	694.4	999.9
E 5	18.9	37.8	75.5	151.0	E 5	2.8	5.2	226.6	453.2	E 5	4.2	8.4	168.6	339.2	678.4	999.9
T 6	21.2	42.4	84.7	169.5	T 6	3.2	6.3	31.6	63.6	T 6	5.3	10.6	127.2	254.4	508.7	999.9

	FOCAL LENGTH - 40MM	OBJECT DISTANCE - 250.5FT. (76.22M)	MAGNIFICATION - .0000525	-6 GROUP LENGTH - .401MM (.0158IN.1	GROUP	FOCAL LENGTH - 40MM	OBJECT DISTANCE - 300.5FT. (91.44M)	MAGNIFICATION - .0000436	-6 GROUP LENGTH - .334MM (.0131IN.1	GROUP	FOCAL LENGTH - 40MM	OBJECT DISTANCE - 400.5FT. (121.92M)	MAGNIFICATION - .0000326	-6 GROUP LENGTH - .266MM (.0099IN.1	GROUP	
E	-5	-5	119.0	238.0	E	-6	-2	190.2	360.5	E	-6	-2	99.9	190.4	380.7	761.6
E 1	29.7	59.5	119.0	238.0	E 1	1.8	5.2	190.2	360.5	E 1	3.0	6.6	106.6	213.7	427.4	854.8
E 2	33.4	66.8	133.6	267.2	E 2	2.0	4.5	213.6	390.9	E 2	3.3	7.5	119.9	229.9	479.7	959.7
E 3	37.5	75.0	149.9	299.3	E 3	2.2	5.0	213.6	390.9	E 3	3.7	7.5	134.7	269.6	538.5	999.9
E 4	42.1	84.1	168.3	336.6	E 4	2.5	5.6	201.9	393.8	E 4	3.7	7.5	151.2	302.3	694.4	999.9
E 5	47.2	94.5	188.9	377.8	E 5	2.8	5.2	226.6	453.2	E 5	4.2	8.4	168.6	339.2	678.4	999.9
T 6	53.0	106.0	212.0	422.1	T 6	3.2	6.3	63.6	127.2	T 6	5.3	10.6	127.2	254.4	508.9	999.9

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR 40MM FOCAL LENGTH LENSES

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR 45MM FOCAL LENGTH LENSES

	FOCAL LENGTH - 45MM	OBJECT DISTANCE - 100.FT.(3.05M)	MAGNIFICATION - .014985	-6 GROUP LENGTH-11.43MM(.4501IN.)	GROUP	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1		
L 1	1.0	2.1	4.2	6.3	16.7	33.4	L 1	1.6	3.1	6.3	12.6	25.1	50.3	L 1	2.6	5.3	10.5	21.6	42.1	84.6	L 1	42.3	84.6	169.3	338.5	677.1	999.9
E 2	1.2	2.3	4.7	9.4	18.7	37.5	E 2	1.8	3.5	7.1	14.1	28.2	56.5	E 2	3.0	5.5	11.8	23.6	47.2	94.5	E 2	47.5	95.0	190.0	380.0	760.0	999.9
H 3	1.3	2.6	5.3	10.5	21.0	42.0	H 3	2.0	4.0	7.9	15.8	31.7	63.4	H 3	3.3	6.6	13.3	26.5	53.0	106.0	H 3	53.3	106.0	213.0	426.0	853.1	999.9
E 4	1.5	2.9	5.9	11.8	23.6	47.2	E 4	2.2	4.4	8.9	17.8	35.6	71.1	E 4	3.7	7.4	14.9	29.8	59.5	116.0	E 4	56.8	116.0	239.4	478.8	957.5	999.9
N 5	1.7	3.1	6.6	13.2	26.5	53.0	N 5	2.5	5.0	10.0	20.0	39.6	79.8	N 5	4.2	8.4	16.7	33.4	66.8	133.6	N 5	66.8	133.6	266.0	532.0	1064.0	999.9
T 6	1.9	3.7	7.4	14.9	29.7	59.5	T 6	2.8	5.6	11.2	22.4	44.6	89.6	T 6	4.7	9.4	18.7	37.7	75.6	156.0	T 6	75.6	156.0	225.6	451.7	903.2	999.9

	FOCAL LENGTH - 45MM	OBJECT DISTANCE - 50.FT.(15.24M)	MAGNIFICATION - .02962	-6 GROUP LENGTH-2.26MM(.0890IN.)	GROUP	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1		
L 1	1.0	7.7	14.8	29.5	59.0	118.0	L 1	1.6	3.3	6.6	12.6	25.1	50.3	L 1	2.6	5.3	10.5	21.6	42.1	84.6	L 1	42.3	84.6	169.3	338.5	677.1	999.9
E 2	1.1	8.3	16.0	33.1	66.2	132.7	E 2	1.8	3.7	7.4	14.1	28.2	56.5	E 2	3.0	5.5	11.8	23.6	47.2	94.5	E 2	47.5	95.0	190.0	380.0	760.0	999.9
H 3	1.4	9.3	18.6	37.2	74.4	148.7	H 3	2.0	4.3	8.6	16.6	32.2	63.2	H 3	3.3	6.6	13.3	26.5	53.0	106.0	H 3	53.3	106.0	213.0	426.0	853.1	999.9
E 4	1.5	10.4	20.9	41.7	83.0	166.9	E 4	2.2	4.9	9.8	19.7	39.7	71.9	E 4	3.7	7.4	14.9	29.8	59.5	116.0	E 4	56.8	116.0	239.4	478.8	957.5	999.9
N 5	1.7	12.7	23.4	46.8	93.7	187.4	N 5	2.5	5.6	13.0	26.0	53.5	103.0	N 5	4.2	8.4	16.7	33.4	66.8	133.6	N 5	66.8	133.6	266.0	532.0	1064.0	999.9
T 6	1.9	13.1	26.3	52.6	105.2	210.3	T 6	2.8	6.0	13.6	27.6	55.2	105.4	T 6	4.7	9.4	18.7	37.7	75.6	156.0	T 6	75.6	156.0	225.6	451.7	903.2	999.9

	FOCAL LENGTH - 45MM	OBJECT DISTANCE - 50.FT.(15.24M)	MAGNIFICATION - .02962	-6 GROUP LENGTH-2.26MM(.0890IN.)	GROUP	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1			
L 1	1.0	10.6	21.1	42.3	84.5	169.1	338.2	L 1	1.6	3.1	6.3	12.6	25.1	50.3	L 1	2.6	5.3	10.5	21.6	42.1	84.6	L 1	42.3	84.6	169.3	338.5	677.1	999.9
E 2	1.1	11.9	23.7	47.4	94.9	189.8	379.6	E 2	1.8	3.5	7.1	14.1	28.2	56.5	E 2	3.0	5.5	11.8	23.6	47.2	94.5	E 2	47.5	95.0	190.0	380.0	760.0	999.9
H 3	1.3	13.3	26.6	53.3	106.5	213.0	426.1	H 3	2.0	4.0	7.9	15.8	31.7	63.4	H 3	3.3	6.6	13.3	26.5	53.0	106.0	H 3	53.3	106.0	213.0	426.0	853.1	999.9
E 4	1.4	14.9	29.9	59.8	119.6	239.1	476.2	E 4	2.2	4.4	8.9	17.8	35.6	71.7	E 4	3.7	7.4	14.9	29.8	59.5	116.0	E 4	56.8	116.0	239.4	478.8	957.5	999.9
N 5	1.6	13.6	30.0	67.1	134.1	268.4	536.8	N 5	2.5	5.0	10.0	20.1	40.2	80.5	N 5	4.2	8.4	16.7	33.4	66.8	133.6	N 5	66.8	133.6	266.0	532.0	1064.0	999.9
T 6	1.8	17.7	37.7	75.3	150.6	302.3	562.5	T 6	2.8	5.6	13.6	22.6	42.1	82.6	T 6	4.7	9.4	18.7	37.7	75.6	156.0	T 6	75.6	156.0	225.6	451.7	903.2	999.9

	FOCAL LENGTH - 45MM	OBJECT DISTANCE - 50.FT.(15.24M)	MAGNIFICATION - .02962	-6 GROUP LENGTH-2.26MM(.0890IN.)	GROUP	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1			
L 1	1.0	26.9	52.0	105.8	211.5	423.1	846.2	L 1	1.6	3.1	6.3	12.6	25.1	50.3	L 1	2.6	5.3	10.5	21.6	42.1	84.6	L 1	42.3	84.6	169.3	338.5	677.1	999.9
E 2	29.7	59.4	118.7	237.5	474.9	94.8	E 2	35.6	71.2	142.5	285.0	569.9	989.9	E 2	47.5	95.0	190.0	380.0	760.0	999.9	E 2	47.5	95.0	190.0	380.0	760.0	999.9	
H 3	33.3	66.6	133.3	266.5	533.1	999.9	H 3	40.0	80.0	159.9	319.9	639.7	999.9	H 3	53.3	106.0	213.0	426.0	853.1	999.9	H 3	53.3	106.0	213.0	426.0	853.1	999.9	
E 4	37.4	74.8	149.0	299.2	598.3	999.9	E 4	44.9	89.8	179.5	359.0	718.1	999.9	E 4	56.8	119.7	239.4	478.8	957.5	999.9	E 4	56.8	119.7	239.4	478.8	957.5	999.9	
N 5	42.0	84.0	167.9	335.8	671.6	999.9	N 5	50.4	100.8	201.5	403.0	806.0	999.9	N 5	67.2	134.4	260.7	537.4	999.9	999.9	N 5	67.2	134.4	260.7	537.4	999.9	999.9	
T 6	47.1	94.2	188.5	376.9	753.8	999.9	T 6	56.5	113.1	226.2	452.4	904.7	999.9	T 6	75.4	150.8	301.6	603.2	903.2	999.9	T 6	75.4	150.8	301.6	603.2	903.2	999.9	

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR 45MM FOCAL LENGTH LENSES

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR 50MM FOCAL LENGTH LENSES

	FOCAL LENGTH - 50MM	OBJECT DISTANCE - 10.FT.(3.05M)	MAGNIFICATION - .016676 (.5010IN.)	-6 GROUP LENGTH - 12.725MM(.5010IN.)
E	-5	-4	-3	-2
L 1	1.9	3.7	7.5	15.0
E 2	1.1	2.1	6.4	16.8
X 3	1.2	2.4	6.7	18.9
E 4	1.3	2.6	6.9	21.2
H 5	1.5	3.0	5.9	23.6
T 6	1.7	3.3	6.7	13.4

	FOCAL LENGTH - 50MM	OBJECT DISTANCE - 15.FT.(4.57M)	MAGNIFICATION - .011057	-6 GROUP LENGTH - 8.437MM(.3321IN.)
E	-6	-5	-4	-3
L 1	6.1	10.4	20.8	50.7
E 2	6.2	10.6	30.2	60.3
X 3	6.3	11.8	30.6	70.5
E 4	6.4	12.0	42.4	80.0
H 5	6.5	12.2	42.6	80.0
T 6	6.6	12.4	42.8	80.0

	FOCAL LENGTH - 50MM	OBJECT DISTANCE - 20.FT.(6.06M)	MAGNIFICATION - .002192	-6 GROUP LENGTH - 1.673MM(.0658IN.)
E	-6	-5	-4	-3
L 1	7.1	10.1	14.3	20.5
E 2	7.2	10.2	16.0	32.0
X 3	7.3	9.0	18.0	35.9
E 4	7.4	10.1	20.2	40.3
H 5	7.5	11.3	22.6	45.3
T 6	7.6	12.7	25.4	50.8

	FOCAL LENGTH - 50MM	OBJECT DISTANCE - 25.FT.(7.62M)	MAGNIFICATION - .000410	-6 GROUP LENGTH - .313MM(.0123IN.)
E	-6	-5	-4	-3
L 1	7.1	10.3	14.6	20.7
E 2	7.2	10.4	16.0	32.0
X 3	7.3	9.2	18.0	35.9
E 4	7.4	10.4	20.7	40.4
H 5	7.5	11.6	23.0	45.3
T 6	7.6	13.0	25.4	50.8

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR 50MM FOCAL LENGTH LENSES

	FOCAL LENGTH - 50MM	OBJECT DISTANCE - 400.FT.(121.92M)	MAGNIFICATION - .000328	-6 GROUP LENGTH - .250MM(.0099IN.)
E	-6	-5	-4	-3
L 1	7.1	10.1	13.0	20.4
E 2	7.2	10.2	12.8	20.5
X 3	7.3	9.0	14.3	20.7
E 4	7.4	10.4	16.1	20.7
H 5	7.5	11.6	16.1	20.7
T 6	7.6	13.0	17.0	20.7

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR 52MM FOCAL LENGTH LENSES

	FOCAL LENGTH 52MM	OBJECT DISTANCE 10.FT.(3.05M)	MAGNIFICATION 0.17354 -6 GROUP LENGTH=13.243MM(.5214IN.) GROUP	FOCAL LENGTH 52MM	OBJECT DISTANCE 15.FT.(4.57M)	MAGNIFICATION 0.11504 -6 GROUP LENGTH= 8.776MM(.3456IN.) GROUP	FOCAL LENGTH 52MM	OBJECT DISTANCE 25.FT.(7.62M)	MAGNIFICATION 0.06871 -6 GROUP LENGTH= 5.243MM(.2064IN.) GROUP
E 1	-6 -5	-3 -2	-1	E 1	-6	-5	-4	-3	-2
E 2	1.0 1.3	3.6 7.2	14.4 28.8	L 1	1.0 1.4	2.7 5.4	10.9 21.7	43.5	L 1
E 3	1.0 2.0	4.0 6.1	16.2 32.3	E 2	1.5	3.0	6.1	12.2	E 2
E 4	1.1 2.3	4.5 9.1	18.1 36.3	K 3	1.7	3.6	6.5	13.7 27.4	H 3
E 5	1.3 2.5	5.1 10.2	20.4 40.7	E 4	1.9	3.8	7.0	15.4 30.7	E 4
E 6	1.4 2.9	5.7 11.6	22.9 45.7	N 5	2.2	4.3	8.6	17.2 34.5	N 5
E 7	1.6 3.2	6.4 12.6	25.7 51.3	T 6	2.4	4.8	9.7	19.4 38.7	T 6

	FOCAL LENGTH 52MM	OBJECT DISTANCE 15.24M	MAGNIFICATION 0.003424 -6 GROUP LENGTH= 2.612MM(.1028IN.) GROUP	FOCAL LENGTH 52MM	OBJECT DISTANCE 22.886M	MAGNIFICATION 0.002280 -6 GROUP LENGTH= 1.740MM(.0685IN.) GROUP	FOCAL LENGTH 52MM	OBJECT DISTANCE 22.886M	MAGNIFICATION 0.001789 -6 GROUP LENGTH= 1.384MM(.0613IN.) GROUP
E 1	-6 -5	-3 -2	-1	E 1	-6	-5	-4	-3	-2
E 2	1.0 1.2	3.6 7.2	14.4 28.8	L 1	1.0 1.4	2.7 5.4	10.9 21.7	43.5	L 1
E 3	1.0 2.0	4.0 6.1	16.2 32.3	E 2	1.5	3.0	6.1	12.2	E 2
E 4	1.1 2.3	4.5 9.1	18.1 36.3	K 3	1.7	3.6	6.5	13.7 27.4	H 3
E 5	1.3 2.5	5.1 10.2	20.4 40.7	E 4	1.9	3.8	7.0	15.4 30.7	E 4
E 6	1.4 2.9	5.7 11.6	22.9 45.7	N 5	2.2	4.3	8.6	17.2 34.5	N 5
E 7	1.6 3.2	6.4 12.6	25.7 51.3	T 6	2.4	4.8	9.7	19.4 38.7	T 6

	FOCAL LENGTH 52MM	OBJECT DISTANCE 20.0FT. (6.096M)	MAGNIFICATION 0.000854 -6 GROUP LENGTH= 0.651MM(.0256IN.) GROUP	FOCAL LENGTH 52MM	OBJECT DISTANCE 20.5FT. (6.096M)	MAGNIFICATION 0.000854 -6 GROUP LENGTH= 0.521MM(.0205IN.) GROUP	FOCAL LENGTH 52MM	OBJECT DISTANCE 25.0FT. (7.62M)	MAGNIFICATION 0.000683 -6 GROUP LENGTH= 0.321MM(.0120IN.) GROUP
E 1	-6 -5	-3 -2	-1	E 1	-6	-5	-4	-3	-2
E 2	1.0 1.2	3.6 7.2	14.4 28.8	L 1	1.0 1.4	2.7 5.4	10.9 21.7	43.5	L 1
E 3	1.0 2.0	4.0 6.1	16.2 32.3	E 2	1.5	3.0	6.1	12.2	E 2
E 4	1.1 2.3	4.5 9.1	18.1 36.3	K 3	1.7	3.6	6.5	13.7 27.4	H 3
E 5	1.3 2.5	5.1 10.2	20.4 40.7	E 4	1.9	3.8	7.0	15.4 30.7	E 4
E 6	1.4 2.9	5.7 11.6	22.9 45.7	N 5	2.2	4.3	8.6	17.2 34.5	N 5
E 7	1.6 3.2	6.4 12.6	25.7 51.3	T 6	2.4	4.8	9.7	19.4 38.7	T 6

	FOCAL LENGTH 52MM	OBJECT DISTANCE 300.FT. (91.44M)	MAGNIFICATION 0.000569 -6 GROUP LENGTH= 0.346MM(.0171IN.) GROUP	FOCAL LENGTH 52MM	OBJECT DISTANCE 400.FT. (121.92M)	MAGNIFICATION 0.000427 -6 GROUP LENGTH= 0.326MM(.0128IN.) GROUP	FOCAL LENGTH 52MM	OBJECT DISTANCE 500.FT. (152.40M)	MAGNIFICATION 0.000341 -6 GROUP LENGTH= 0.268MM(.0103IN.) GROUP
E 1	-6 -5	-3 -2	-1	E 1	-6	-5	-4	-3	-2
E 2	1.0 1.2	3.6 7.2	14.4 28.8	L 1	1.0 1.4	2.7 5.4	10.9 21.7	43.5	L 1
E 3	1.0 2.0	4.0 6.1	16.2 32.3	E 2	1.5	3.0	6.1	12.2	E 2
E 4	1.1 2.3	4.5 9.1	18.1 36.3	K 3	1.7	3.6	6.5	13.7 27.4	H 3
E 5	1.3 2.5	5.1 10.2	20.4 40.7	E 4	1.9	3.8	7.0	15.4 30.7	E 4
E 6	1.4 2.9	5.7 11.6	22.9 45.7	N 5	2.2	4.3	8.6	17.2 34.5	N 5
E 7	1.6 3.2	6.4 12.6	25.7 51.3	T 6	2.4	4.8	9.7	19.4 38.7	T 6

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR 52MM FOCAL LENGTH LENSES

IMAGE PLATE RESOLUTION (LINES PER MILLIMETER) FOR 55MM FOCAL LENGTH LENSES

FOCAL LENGTH - 55MM		FOCAL LENGTH - 55MM		FOCAL LENGTH - 55MM	
OBJECT DISTANCE -	MAGNIFICATION -	OBJECT DISTANCE -	MAGNIFICATION -	OBJECT DISTANCE -	MAGNIFICATION -
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-15.0 FT. (4.57M)	-0.012176 (-0.0290MH (.03658IN.))	-25.0 FT. (7.62M)	-0.007270 (-0.0134MH (.02104IN.))
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-20.0 FT. (6.09M)	-0.014076 (-0.0341MH (.0411IN.))	-30.0 FT. (9.14M)	-0.009176 (-0.0184IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-25.0 FT. (7.62M)	-0.015976 (-0.0389MH (.0461IN.))	-40.0 FT. (12.19M)	-0.010976 (-0.02194IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-30.0 FT. (9.14M)	-0.017876 (-0.0438MH (.0511IN.))	-50.0 FT. (15.49M)	-0.012876 (-0.02384IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-35.0 FT. (10.67M)	-0.019776 (-0.0487MH (.0561IN.))	-60.0 FT. (18.05M)	-0.014776 (-0.02874IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-40.0 FT. (12.19M)	-0.021676 (-0.0536MH (.0611IN.))	-70.0 FT. (24.38M)	-0.015676 (-0.03364IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-45.0 FT. (14.59M)	-0.023576 (-0.0585MH (.0661IN.))	-80.0 FT. (30.57M)	-0.016576 (-0.04354IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-50.0 FT. (17.00M)	-0.025476 (-0.0634MH (.0711IN.))	-90.0 FT. (45.49M)	-0.017476 (-0.05344IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-55.0 FT. (19.41M)	-0.027376 (-0.0683MH (.0761IN.))	-100.0 FT. (63.60M)	-0.018376 (-0.06334IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-60.0 FT. (21.82M)	-0.029276 (-0.0732MH (.0811IN.))	-110.0 FT. (79.73M)	-0.019276 (-0.07324IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-65.0 FT. (24.23M)	-0.031176 (-0.0781MH (.0861IN.))	-120.0 FT. (95.84M)	-0.020176 (-0.08314IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-70.0 FT. (26.64M)	-0.033076 (-0.0830MH (.0911IN.))	-130.0 FT. (112.95M)	-0.021076 (-0.09804IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-75.0 FT. (29.05M)	-0.034976 (-0.0879MH (.0961IN.))	-140.0 FT. (129.06M)	-0.021976 (-0.10394IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-80.0 FT. (31.46M)	-0.036876 (-0.0928MH (.1011IN.))	-150.0 FT. (145.17M)	-0.022876 (-0.10884IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-85.0 FT. (33.87M)	-0.038776 (-0.0977MH (.1061IN.))	-160.0 FT. (161.28M)	-0.023776 (-0.11474IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-90.0 FT. (36.28M)	-0.040676 (-0.1026MH (.1111IN.))	-170.0 FT. (177.39M)	-0.024676 (-0.12064IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-95.0 FT. (38.69M)	-0.042576 (-0.1075MH (.1161IN.))	-180.0 FT. (193.50M)	-0.025576 (-0.12654IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-100.0 FT. (41.10M)	-0.044476 (-0.1124MH (.1211IN.))	-190.0 FT. (209.61M)	-0.026476 (-0.13244IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-105.0 FT. (43.51M)	-0.046376 (-0.1173MH (.1261IN.))	-200.0 FT. (225.72M)	-0.027376 (-0.13834IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-110.0 FT. (45.92M)	-0.048276 (-0.1222MH (.1311IN.))	-210.0 FT. (241.83M)	-0.028276 (-0.14424IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-115.0 FT. (48.33M)	-0.050176 (-0.1271MH (.1361IN.))	-220.0 FT. (257.94M)	-0.029176 (-0.15014IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-120.0 FT. (50.74M)	-0.052076 (-0.1320MH (.1411IN.))	-230.0 FT. (274.05M)	-0.030076 (-0.15604IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-125.0 FT. (53.15M)	-0.053976 (-0.1369MH (.1461IN.))	-240.0 FT. (290.16M)	-0.030976 (-0.16194IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-130.0 FT. (55.56M)	-0.055876 (-0.1418MH (.1511IN.))	-250.0 FT. (306.27M)	-0.031876 (-0.16784IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-135.0 FT. (57.97M)	-0.057776 (-0.1467MH (.1561IN.))	-260.0 FT. (322.38M)	-0.032776 (-0.17374IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-140.0 FT. (60.38M)	-0.059676 (-0.1516MH (.1611IN.))	-270.0 FT. (338.49M)	-0.033676 (-0.17964IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-145.0 FT. (62.79M)	-0.061576 (-0.1565MH (.1661IN.))	-280.0 FT. (354.60M)	-0.034576 (-0.18554IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-150.0 FT. (65.20M)	-0.063476 (-0.1614MH (.1711IN.))	-290.0 FT. (370.71M)	-0.035476 (-0.19144IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-155.0 FT. (67.61M)	-0.065376 (-0.1663MH (.1761IN.))	-300.0 FT. (386.82M)	-0.036376 (-0.19734IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-160.0 FT. (70.02M)	-0.067276 (-0.1712MH (.1811IN.))	-310.0 FT. (402.93M)	-0.037276 (-0.20324IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-165.0 FT. (72.43M)	-0.069176 (-0.1761MH (.1861IN.))	-320.0 FT. (419.04M)	-0.038176 (-0.21914IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-170.0 FT. (74.84M)	-0.071076 (-0.1810MH (.1911IN.))	-330.0 FT. (435.15M)	-0.039076 (-0.23504IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-175.0 FT. (77.25M)	-0.072976 (-0.1859MH (.1961IN.))	-340.0 FT. (451.26M)	-0.039976 (-0.25094IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-180.0 FT. (79.66M)	-0.074876 (-0.1908MH (.2011IN.))	-350.0 FT. (467.37M)	-0.040876 (-0.26684IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-185.0 FT. (82.07M)	-0.076776 (-0.1957MH (.2061IN.))	-360.0 FT. (483.48M)	-0.041776 (-0.28274IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-190.0 FT. (84.48M)	-0.078676 (-0.2006MH (.2111IN.))	-370.0 FT. (499.59M)	-0.042676 (-0.29864IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-195.0 FT. (86.89M)	-0.080576 (-0.2055MH (.2161IN.))	-380.0 FT. (515.70M)	-0.043576 (-0.31454IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-200.0 FT. (89.30M)	-0.082476 (-0.2104MH (.2211IN.))	-390.0 FT. (531.81M)	-0.044476 (-0.33044IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-205.0 FT. (91.71M)	-0.084376 (-0.2153MH (.2261IN.))	-400.0 FT. (547.92M)	-0.045376 (-0.34634IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-210.0 FT. (94.12M)	-0.086276 (-0.2202MH (.2311IN.))	-410.0 FT. (564.03M)	-0.046276 (-0.36224IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-215.0 FT. (96.53M)	-0.088176 (-0.2251MH (.2361IN.))	-420.0 FT. (580.14M)	-0.047176 (-0.37814IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-220.0 FT. (98.94M)	-0.090076 (-0.2300MH (.2411IN.))	-430.0 FT. (596.25M)	-0.048076 (-0.39404IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-225.0 FT. (101.35M)	-0.091976 (-0.2349MH (.2461IN.))	-440.0 FT. (612.36M)	-0.048976 (-0.40994IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-230.0 FT. (103.76M)	-0.093876 (-0.2398MH (.2511IN.))	-450.0 FT. (628.47M)	-0.049876 (-0.42584IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-235.0 FT. (106.17M)	-0.095776 (-0.2447MH (.2561IN.))	-460.0 FT. (644.58M)	-0.050776 (-0.44174IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-240.0 FT. (108.58M)	-0.097676 (-0.2496MH (.2611IN.))	-470.0 FT. (660.69M)	-0.051676 (-0.45764IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-245.0 FT. (110.99M)	-0.099576 (-0.2545MH (.2661IN.))	-480.0 FT. (676.80M)	-0.052576 (-0.47354IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-250.0 FT. (113.40M)	-0.101476 (-0.2594MH (.2711IN.))	-490.0 FT. (692.91M)	-0.053476 (-0.48944IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-255.0 FT. (115.81M)	-0.103376 (-0.2643MH (.2761IN.))	-500.0 FT. (709.02M)	-0.054376 (-0.50534IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-260.0 FT. (118.22M)	-0.105276 (-0.2692MH (.2811IN.))	-510.0 FT. (725.13M)	-0.055276 (-0.52124IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-265.0 FT. (120.63M)	-0.107176 (-0.2741MH (.2861IN.))	-520.0 FT. (741.24M)	-0.056176 (-0.53714IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-270.0 FT. (123.04M)	-0.109076 (-0.2790MH (.2911IN.))	-530.0 FT. (757.35M)	-0.057076 (-0.55304IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-275.0 FT. (125.45M)	-0.110976 (-0.2839MH (.2961IN.))	-540.0 FT. (773.46M)	-0.057976 (-0.56894IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-280.0 FT. (127.86M)	-0.112876 (-0.2888MH (.3011IN.))	-550.0 FT. (789.57M)	-0.058876 (-0.58484IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-285.0 FT. (130.27M)	-0.114776 (-0.2937MH (.3061IN.))	-560.0 FT. (805.68M)	-0.059776 (-0.59874IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-290.0 FT. (132.68M)	-0.116676 (-0.2986MH (.3111IN.))	-570.0 FT. (821.79M)	-0.060676 (-0.61464IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-295.0 FT. (135.09M)	-0.118576 (-0.3035MH (.3161IN.))	-580.0 FT. (837.90M)	-0.061576 (-0.63054IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-300.0 FT. (137.50M)	-0.120476 (-0.3084MH (.3211IN.))	-590.0 FT. (854.01M)	-0.062476 (-0.64644IN.)
-10.0 FT. (3.05M)	-0.010376 (-0.0210MP (.0210IN.))	-305.0 FT. (140.91M)	-0.122376 (-0.3133MH (.3261IN.))	-600.0 FT. (870.12M)	-0.063376 (-0.66234IN.)

IMAGE PLATE RESOLUTION (LINES PER MILLIMETER) FOR 55MM FOCAL LENGTH LENSES

FOCAL LENGTH - 55MM		FOCAL LENGTH - 55MM		FOCAL LENGTH - 55MM	
OBJECT DISTANCE -	MAGNIFICATION -	OBJECT DISTANCE -	MAGNIFICATION -	OBJECT DISTANCE -	MAGNIFICATION -
-10.0 FT. (3.05M)	-0.004051 (-0.004051)	-15.0 FT. (4.57M)	-0.0040451 (-0.0040451)	-25.0 FT. (7.62M)	-0.0040391 (-0.0040391)
-10.0 FT. (3.05M)	-0.004051 (-0.004051)	-20.0 FT. (6.09M)	-0.00404451 (-0.00404451)	-30.0 FT. (9.14M)	-0.00403851 (-0.00403851)
-10.0 FT. (3.05M)	-0.004051 (-0.004051)	-25.0 FT. (7.62M)	-0.00403451 (-0.00403451)	-40.0 FT. (12.19M)	-0.00402851 (-0.00402851)
-10.0 FT. (3.05M)	-0.004051 (-0.004051)	-30.0 FT. (9.14M)	-0.00402951 (-0.00402951)	-50.0 FT. (18.05M)	-0.00402251 (-0.00402251)
-10.0 FT. (3.05M)	-0.004051 (-0.004051)	-35.0 FT. (10.67M)	-0.00402451 (-0.00402451)	-60.0 FT. (24.38M)	-0.00401551 (-0.00401551)
-10.0 FT. (3.05M)	-0.004051 (-0.004051)	-40.0 FT. (12.19M)	-0.00401751 (-0.00401751)	-70.0 FT. (34.85M)	-0.00400651 (-0.00400651)
-10.0 FT. (3.05M)	-0.004051 (-0.004051)	-45.0 FT. (14.59M)	-0.00401951 (-0.00401951)	-80.0 FT. (49.25M)	-0.00400551

IMAGE 4.6A & RESOLUTION (LINES PER MILLIMETER) FOR 50MM FOCAL LENGTH LENSES

FOCAL LENGTH		58MM		58MM	
OBJECT DISTANCE		15 FT. (4.57M)		OBJECT DISTANCE	
MAGNIFICATION		-0.12849		MAGNIFICATION	
-0.6 GROUP LENGTH		-0.00770		-0.00770	
-0.6 GROUP LENGTH		5.652MM (.2304IN.)		5.652MM (.2304IN.)	
E	-0.4	-0.3	-0.2	-0.1	0
E L 1	1.0	1.0	1.0	1.0	1.0
E E 2	1.0	1.0	1.0	1.0	1.0
E E 3	1.0	1.0	1.0	1.0	1.0
E E 4	1.0	1.0	1.0	1.0	1.0
E E 5	1.0	1.0	1.0	1.0	1.0
E E 6	1.0	1.0	1.0	1.0	1.0
E E 7	1.0	1.0	1.0	1.0	1.0
E E 8	1.0	1.0	1.0	1.0	1.0
E E 9	1.0	1.0	1.0	1.0	1.0
E E 10	1.0	1.0	1.0	1.0	1.0
E E 11	1.0	1.0	1.0	1.0	1.0
E E 12	1.0	1.0	1.0	1.0	1.0
E E 13	1.0	1.0	1.0	1.0	1.0
E E 14	1.0	1.0	1.0	1.0	1.0
E E 15	1.0	1.0	1.0	1.0	1.0
E E 16	1.0	1.0	1.0	1.0	1.0
E E 17	1.0	1.0	1.0	1.0	1.0
E E 18	1.0	1.0	1.0	1.0	1.0
E E 19	1.0	1.0	1.0	1.0	1.0
E E 20	1.0	1.0	1.0	1.0	1.0
E E 21	1.0	1.0	1.0	1.0	1.0
E E 22	1.0	1.0	1.0	1.0	1.0
E E 23	1.0	1.0	1.0	1.0	1.0
E E 24	1.0	1.0	1.0	1.0	1.0
E E 25	1.0	1.0	1.0	1.0	1.0
E E 26	1.0	1.0	1.0	1.0	1.0
E E 27	1.0	1.0	1.0	1.0	1.0
E E 28	1.0	1.0	1.0	1.0	1.0
E E 29	1.0	1.0	1.0	1.0	1.0
E E 30	1.0	1.0	1.0	1.0	1.0
E E 31	1.0	1.0	1.0	1.0	1.0
E E 32	1.0	1.0	1.0	1.0	1.0
E E 33	1.0	1.0	1.0	1.0	1.0
E E 34	1.0	1.0	1.0	1.0	1.0
E E 35	1.0	1.0	1.0	1.0	1.0
E E 36	1.0	1.0	1.0	1.0	1.0
E E 37	1.0	1.0	1.0	1.0	1.0
E E 38	1.0	1.0	1.0	1.0	1.0
E E 39	1.0	1.0	1.0	1.0	1.0
E E 40	1.0	1.0	1.0	1.0	1.0
E E 41	1.0	1.0	1.0	1.0	1.0
E E 42	1.0	1.0	1.0	1.0	1.0
E E 43	1.0	1.0	1.0	1.0	1.0
E E 44	1.0	1.0	1.0	1.0	1.0
E E 45	1.0	1.0	1.0	1.0	1.0
E E 46	1.0	1.0	1.0	1.0	1.0
E E 47	1.0	1.0	1.0	1.0	1.0
E E 48	1.0	1.0	1.0	1.0	1.0
E E 49	1.0	1.0	1.0	1.0	1.0
E E 50	1.0	1.0	1.0	1.0	1.0
E E 51	1.0	1.0	1.0	1.0	1.0
E E 52	1.0	1.0	1.0	1.0	1.0
E E 53	1.0	1.0	1.0	1.0	1.0
E E 54	1.0	1.0	1.0	1.0	1.0
E E 55	1.0	1.0	1.0	1.0	1.0
E E 56	1.0	1.0	1.0	1.0	1.0
E E 57	1.0	1.0	1.0	1.0	1.0
E E 58	1.0	1.0	1.0	1.0	1.0
E E 59	1.0	1.0	1.0	1.0	1.0
E E 60	1.0	1.0	1.0	1.0	1.0
E E 61	1.0	1.0	1.0	1.0	1.0
E E 62	1.0	1.0	1.0	1.0	1.0
E E 63	1.0	1.0	1.0	1.0	1.0
E E 64	1.0	1.0	1.0	1.0	1.0
E E 65	1.0	1.0	1.0	1.0	1.0
E E 66	1.0	1.0	1.0	1.0	1.0
E E 67	1.0	1.0	1.0	1.0	1.0
E E 68	1.0	1.0	1.0	1.0	1.0
E E 69	1.0	1.0	1.0	1.0	1.0
E E 70	1.0	1.0	1.0	1.0	1.0
E E 71	1.0	1.0	1.0	1.0	1.0
E E 72	1.0	1.0	1.0	1.0	1.0
E E 73	1.0	1.0	1.0	1.0	1.0
E E 74	1.0	1.0	1.0	1.0	1.0
E E 75	1.0	1.0	1.0	1.0	1.0
E E 76	1.0	1.0	1.0	1.0	1.0
E E 77	1.0	1.0	1.0	1.0	1.0
E E 78	1.0	1.0	1.0	1.0	1.0
E E 79	1.0	1.0	1.0	1.0	1.0
E E 80	1.0	1.0	1.0	1.0	1.0
E E 81	1.0	1.0	1.0	1.0	1.0
E E 82	1.0	1.0	1.0	1.0	1.0
E E 83	1.0	1.0	1.0	1.0	1.0
E E 84	1.0	1.0	1.0	1.0	1.0
E E 85	1.0	1.0	1.0	1.0	1.0
E E 86	1.0	1.0	1.0	1.0	1.0
E E 87	1.0	1.0	1.0	1.0	1.0
E E 88	1.0	1.0	1.0	1.0	1.0
E E 89	1.0	1.0	1.0	1.0	1.0
E E 90	1.0	1.0	1.0	1.0	1.0
E E 91	1.0	1.0	1.0	1.0	1.0
E E 92	1.0	1.0	1.0	1.0	1.0
E E 93	1.0	1.0	1.0	1.0	1.0
E E 94	1.0	1.0	1.0	1.0	1.0
E E 95	1.0	1.0	1.0	1.0	1.0
E E 96	1.0	1.0	1.0	1.0	1.0
E E 97	1.0	1.0	1.0	1.0	1.0
E E 98	1.0	1.0	1.0	1.0	1.0
E E 99	1.0	1.0	1.0	1.0	1.0
E E 100	1.0	1.0	1.0	1.0	1.0

LOCAL LENGTH = 58MM
DISTANCE = 56MM
FACIAL LENGTH = 56MM

FOCAL LENGTH = 58MM
OBJECT DISTANCE = 300 ST'.

FOCAL LENGTH	50MM	50MM	50MM	50MM	50MM	50MM											
OBJECT DISTANCE	200 FT. (	60.96M)	200 FT. (	60.96M)	200 FT. (	60.96M)											
MAGNIFICATION	+0.00952		-6		-6												
-6 GROUP LENGTH	.727MM (	.0266IN.)															
GROUP																	
1	12.0	-4.0	1.0	2	-6	-5	-4	-3	-2	-1	-6	-5	-4	-3	-2	-1	
2	13.0	27.0	49.0	49.0	15.4	32.8	65.6	131.0	262.5	525.0	L 1	20.5	41.0	62.0	164.1	328.2	656.4
3	13.0	27.0	45.2	110.5	220.3	441.9	73.0	147.3	294.7	589.3	E 2	23.0	46.1	92.0	164.2	328.2	656.4
4	15.5	41.0	62.0	124.0	248.0	446.0	41.3	62.7	165.4	330.7	N 3	25.8	51.7	103.4	206.8	413.5	827.0
5	17.0	46.0	69.0	137.2	278.3	556.7	23.2	46.4	92.6	195.6	E 4	29.0	58.0	116.0	232.0	464.1	928.3
6	19.5	43.1	78.1	150.2	312.4	679.9	41.3	82.7	165.6	371.2	N 5	32.6	65.1	130.2	260.5	521.6	959.9
7	21.9	47.9	175.3	350.7	71.4	29.2	58.5	116.9	233.9	467.7	T 6	36.5	73.1	146.2	292.4	584.6	999.6

FOCAL LENGTH = 58MM
OBJECT DISTANCE = 400.0 FT. OR 121.9 M.

OBJECT DISTANCE -	FOCAL LENGTH -	FOCAL LENGTH -
MAGNIFICATION -	OBJECT DISTANCE -	MAGNIFICATION -
- GROUP LENGTH -	MAGNIFICATION -	- GROUP LENGTH -
100.0 ft. (30.48M)	50MM	50MM
.0000055	400.0 FT. (121.92M)	500.0 FT. (152.40M)
.0000010	.0000046	.0000381
GROUP	.0143IN.)	.0114IN.)
-6	-5	-5
-4	-3	-3
-2	-1	-1
E	E	E
1	32.8	65.0
2	36.9	73.7
3	41.0	82.7
4	46.0	92.0
5	51.7	103.4
6	58.0	116.1
7	65.1	130.3
8	73.1	146.3

IMAGE PLATE RESOLUTION (LINES PER MILLIMETER) FOR 50MM FOCAL LENGTH LENSES

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR 60MM FOCAL LENGTH LENSES

FOCAL LENGTH - 60MM		FOCAL LENGTH - 60MM		FOCAL LENGTH - 60MM	
OBJECT DISTANCE - 100.FT.(3.05M)	MAGNIFICATION - +0.20460	OBJECT DISTANCE - 150.FT.(4.57M)	MAGNIFICATION - +0.13298	OBJECT DISTANCE - 250.FT.(7.62M)	MAGNIFICATION - +0.07937
-6 GROUP LENGTH - 15.321MM(.4521IN.)	GROUP	-6 GROUP LENGTH - 10.146MM(.3995IN.)	GROUP	-6 GROUP LENGTH - 6.056MM(.2386IN.)	GROUP
E -6 -4 -3 -2 -1	E -6 -5 -4 -3 -2 -1	E -6 -5 -4 -3 -2 -1	E -6 -5 -4 -3 -2 -1	E -6 -5 -4 -3 -2 -1	E -6 -5 -4 -3 -2 -1
L 1 1.6 3.1 6.2 12.4 24.9	L 1 1.6 3.1 6.2 12.4 24.9	L 1 1.6 3.1 6.2 12.4 24.9	L 1 1.6 3.1 6.2 12.4 24.9	L 1 1.6 3.1 6.2 12.4 24.9	L 1 1.6 3.1 6.2 12.4 24.9
E 2 1.9 3.7 7.0 16.0 26.0	E 2 1.9 3.7 7.0 16.0 26.0	E 2 1.9 3.7 7.0 16.0 26.0	E 2 1.9 3.7 7.0 16.0 26.0	E 2 1.9 3.7 7.0 16.0 26.0	E 2 1.9 3.7 7.0 16.0 26.0
N 1 1.0 2.0 3.9 7.8 15.7	N 1 1.0 2.0 3.9 7.8 15.7	N 1 1.0 2.0 3.9 7.8 15.7	N 1 1.0 2.0 3.9 7.8 15.7	N 1 1.0 2.0 3.9 7.8 15.7	N 1 1.0 2.0 3.9 7.8 15.7
E 4 1.1 2.2 4.4 8.8 17.6	E 4 1.1 2.2 4.4 8.8 17.6	E 4 1.1 2.2 4.4 8.8 17.6	E 4 1.1 2.2 4.4 8.8 17.6	E 4 1.1 2.2 4.4 8.8 17.6	E 4 1.1 2.2 4.4 8.8 17.6
N 5 1.2 2.5 4.9 10.4 19.4	N 5 1.2 2.5 4.9 10.4 19.4	N 5 1.2 2.5 4.9 10.4 19.4	N 5 1.2 2.5 4.9 10.4 19.4	N 5 1.2 2.5 4.9 10.4 19.4	N 5 1.2 2.5 4.9 10.4 19.4
T 6 1.4 2.8 5.5 11.1 22.2	T 6 1.4 2.8 5.5 11.1 22.2	T 6 1.4 2.8 5.5 11.1 22.2	T 6 1.4 2.8 5.5 11.1 22.2	T 6 1.4 2.8 5.5 11.1 22.2	T 6 1.4 2.8 5.5 11.1 22.2

FOCAL LENGTH - 60MM		FOCAL LENGTH - 60MM		FOCAL LENGTH - 60MM	
OBJECT DISTANCE - 50.FT.(15.24M)	MAGNIFICATION - +0.03653	OBJECT DISTANCE - 50.FT.(15.24M)	MAGNIFICATION - +0.03653	OBJECT DISTANCE - 75.FT.(22.86M)	MAGNIFICATION - +0.02332
-6 GROUP LENGTH - 3.016MM(.1187IN.)	GROUP	-6 GROUP LENGTH - 3.016MM(.1187IN.)	GROUP	-6 GROUP LENGTH - 2.008MM(.0791IN.)	GROUP
E -6 -5 -4 -3 -2 -1	E -6 -5 -4 -3 -2 -1	E -6 -5 -4 -3 -2 -1	E -6 -5 -4 -3 -2 -1	E -6 -5 -4 -3 -2 -1	E -6 -5 -4 -3 -2 -1
L 1 2.0 5.3 11.0 22.1 44.2	L 1 2.0 5.3 11.0 22.1 44.2	L 1 2.0 5.3 11.0 22.1 44.2	L 1 2.0 5.3 11.0 22.1 44.2	L 1 2.0 5.3 11.0 22.1 44.2	L 1 2.0 5.3 11.0 22.1 44.2
E 2 3.1 6.2 12.4 27.6 59.6	E 2 3.1 6.2 12.4 27.6 59.6	E 2 3.1 6.2 12.4 27.6 59.6	E 2 3.1 6.2 12.4 27.6 59.6	E 2 3.1 6.2 12.4 27.6 59.6	E 2 3.1 6.2 12.4 27.6 59.6
N 3 3.5 7.0 13.4 27.4 55.7	N 3 3.5 7.0 13.4 27.4 55.7	N 3 3.5 7.0 13.4 27.4 55.7	N 3 3.5 7.0 13.4 27.4 55.7	N 3 3.5 7.0 13.4 27.4 55.7	N 3 3.5 7.0 13.4 27.4 55.7
E 4 3.9 7.6 15.6 22.1 42.1	E 4 3.9 7.6 15.6 22.1 42.1	E 4 3.9 7.6 15.6 22.1 42.1	E 4 3.9 7.6 15.6 22.1 42.1	E 4 3.9 7.6 15.6 22.1 42.1	E 4 3.9 7.6 15.6 22.1 42.1
N 5 4.4 9.1 17.5 35.1 70.2	N 5 4.4 9.1 17.5 35.1 70.2	N 5 4.4 9.1 17.5 35.1 70.2	N 5 4.4 9.1 17.5 35.1 70.2	N 5 4.4 9.1 17.5 35.1 70.2	N 5 4.4 9.1 17.5 35.1 70.2
T 6 4.9 9.6 19.7 38.4 78.4	T 6 4.9 9.6 19.7 38.4 78.4	T 6 4.9 9.6 19.7 38.4 78.4	T 6 4.9 9.6 19.7 38.4 78.4	T 6 4.9 9.6 19.7 38.4 78.4	T 6 4.9 9.6 19.7 38.4 78.4

FOCAL LENGTH - 60MM		FOCAL LENGTH - 60MM		FOCAL LENGTH - 60MM	
OBJECT DISTANCE - 150.FT.(45.72M)	MAGNIFICATION - +0.01314	OBJECT DISTANCE - 150.FT.(45.72M)	MAGNIFICATION - +0.01314	OBJECT DISTANCE - 200.FT.(60.96M)	MAGNIFICATION - +0.00985
-6 GROUP LENGTH - 2.003MM(.0795IN.)	GROUP	-6 GROUP LENGTH - 2.003MM(.0795IN.)	GROUP	-6 GROUP LENGTH - .752MM(.0296IN.)	GROUP
E -6 -5 -4 -3 -2 -1	E -6 -5 -4 -3 -2 -1	E -6 -5 -4 -3 -2 -1	E -6 -5 -4 -3 -2 -1	E -6 -5 -4 -3 -2 -1	E -6 -5 -4 -3 -2 -1
L 1 7.9 15.4 31.7 63.4 126.7	L 1 7.9 15.4 31.7 63.4 126.7	L 1 7.9 15.4 31.7 63.4 126.7	L 1 7.9 15.4 31.7 63.4 126.7	L 1 7.9 15.4 31.7 63.4 126.7	L 1 7.9 15.4 31.7 63.4 126.7
E 2 8.9 17.3 35.0 71.1 142.3	E 2 8.9 17.3 35.0 71.1 142.3	E 2 8.9 17.3 35.0 71.1 142.3	E 2 8.9 17.3 35.0 71.1 142.3	E 2 8.9 17.3 35.0 71.1 142.3	E 2 8.9 17.3 35.0 71.1 142.3
N 3 10.0 20.0 39.7 79.6 159.7	N 3 10.0 20.0 39.7 79.6 159.7	N 3 10.0 20.0 39.7 79.6 159.7	N 3 10.0 20.0 39.7 79.6 159.7	N 3 10.0 20.0 39.7 79.6 159.7	N 3 10.0 20.0 39.7 79.6 159.7
E 4 11.2 22.4 44.4 84.4 179.3	E 4 11.2 22.4 44.4 84.4 179.3	E 4 11.2 22.4 44.4 84.4 179.3	E 4 11.2 22.4 44.4 84.4 179.3	E 4 11.2 22.4 44.4 84.4 179.3	E 4 11.2 22.4 44.4 84.4 179.3
N 5 12.6 25.2 50.3 100.6 201.2	N 5 12.6 25.2 50.3 100.6 201.2	N 5 12.6 25.2 50.3 100.6 201.2	N 5 12.6 25.2 50.3 100.6 201.2	N 5 12.6 25.2 50.3 100.6 201.2	N 5 12.6 25.2 50.3 100.6 201.2
T 6 14.1 33.2 66.7 112.9 225.4	T 6 14.1 33.2 66.7 112.9 225.4	T 6 14.1 33.2 66.7 112.9 225.4	T 6 14.1 33.2 66.7 112.9 225.4	T 6 14.1 33.2 66.7 112.9 225.4	T 6 14.1 33.2 66.7 112.9 225.4

FOCAL LENGTH - 60MM		FOCAL LENGTH - 60MM		FOCAL LENGTH - 60MM	
OBJECT DISTANCE - 300.FT.(91.44M)	MAGNIFICATION - +0.00657	OBJECT DISTANCE - 300.FT.(91.44M)	MAGNIFICATION - +0.00657	OBJECT DISTANCE - 400.FT.(121.92M)	MAGNIFICATION - +0.00492
-6 GROUP LENGTH - .501MM(.0197IN.)	GROUP	-6 GROUP LENGTH - .501MM(.0197IN.)	GROUP	-6 GROUP LENGTH - .376MM(.0148IN.)	GROUP
E -6 -5 -4 -3 -2 -1	E -6 -5 -4 -3 -2 -1	E -6 -5 -4 -3 -2 -1	E -6 -5 -4 -3 -2 -1	E -6 -5 -4 -3 -2 -1	E -6 -5 -4 -3 -2 -1
L 1 19.4 39.7 79.3 159.6 317.2	L 1 19.4 39.7 79.3 159.6 317.2	L 1 19.4 39.7 79.3 159.6 317.2	L 1 19.4 39.7 79.3 159.6 317.2	L 1 19.4 39.7 79.3 159.6 317.2	L 1 19.4 39.7 79.3 159.6 317.2
E 2 22.3 44.5 89.0 179.1 359.7	E 2 22.3 44.5 89.0 179.1 359.7	E 2 22.3 44.5 89.0 179.1 359.7	E 2 22.3 44.5 89.0 179.1 359.7	E 2 22.3 44.5 89.0 179.1 359.7	E 2 22.3 44.5 89.0 179.1 359.7
N 3 25.0 49.0 99.9 199.9 399.7	N 3 25.0 49.0 99.9 199.9 399.7	N 3 25.0 49.0 99.9 199.9 399.7	N 3 25.0 49.0 99.9 199.9 399.7	N 3 25.0 49.0 99.9 199.9 399.7	N 3 25.0 49.0 99.9 199.9 399.7
E 4 28.0 46.1 112.2 224.3 468.7	E 4 28.0 46.1 112.2 224.3 468.7	E 4 28.0 46.1 112.2 224.3 468.7	E 4 28.0 46.1 112.2 224.3 468.7	E 4 28.0 46.1 112.2 224.3 468.7	E 4 28.0 46.1 112.2 224.3 468.7
N 5 31.5 43.0 125.7 252.6 503.5	N 5 31.5 43.0 125.7 252.6 503.5	N 5 31.5 43.0 125.7 252.6 503.5	N 5 31.5 43.0 125.7 252.6 503.5	N 5 31.5 43.0 125.7 252.6 503.5	N 5 31.5 43.0 125.7 252.6 503.5
T 6 35.3 70.7 141.3 282.6 565.9	T 6 35.3 70.7 141.3 282.6 565.9	T 6 35.3 70.7 141.3 282.6 565.9	T 6 35.3 70.7 141.3 282.6 565.9	T 6 35.3 70.7 141.3 282.6 565.9	T 6 35.3 70.7 141.3 282.6 565.9

IMAGE PLATE-E RESOLUTION (LINES PER MILLIMETER) FOR 60MM FOCAL LENGTH LENSES

IMAGE PLATE RESOLUTION (LINES PER MILLIMETER) FOR 63MM FOCAL LENGTH LENSES

FOCAL LENGTH	63MM	63MM	63MM	63MM
OBJECT DISTANCE	11.0 FT. (3.35M)	15.0 FT. (4.57M)	15.0 FT. (4.57M)	25.0 FT. (7.62M)
MAGNIFICATION	+0.13972	+0.13971	-0.06337	-0.06337
-6 GROUP LENGTH	-10.661MM (+0.197IN.)	-6 GROUP LENGTH	-6 GROUP LENGTH	-6 GROUP LENGTH
GROUP	GROUP	GROUP	GROUP	GROUP
E -6	-5	-4	-3	-2
E 1 0.7	1.0	1.0	1.0	1.0
E 2 1.1	1.7	2.1	2.5	3.0
E 3 1.9	2.9	4.0	5.0	6.0
E 4 2.1	2.1	2.6	3.2	4.0
E 5 1.0	1.2	1.4	1.6	1.8
E 6 1.3	2.0	2.7	3.5	4.2
E 7 1.6	2.6	3.4	4.4	5.2
E 8 1.3	2.0	2.6	3.1	3.6
E 9 1.0	1.6	2.1	2.6	3.0
E 10 1.3	2.0	2.6	3.1	3.6
E 11 1.6	2.6	3.4	4.4	5.2
E 12 1.3	2.0	2.6	3.1	3.6
E 13 1.0	1.6	2.1	2.6	3.0
E 14 1.3	2.0	2.6	3.1	3.6
E 15 1.6	2.6	3.4	4.4	5.2
E 16 1.3	2.0	2.6	3.1	3.6
E 17 1.0	1.6	2.1	2.6	3.0
E 18 1.3	2.0	2.6	3.1	3.6
E 19 1.6	2.6	3.4	4.4	5.2
E 20 1.3	2.0	2.6	3.1	3.6
E 21 1.0	1.6	2.1	2.6	3.0
E 22 1.3	2.0	2.6	3.1	3.6
E 23 1.6	2.6	3.4	4.4	5.2
E 24 1.3	2.0	2.6	3.1	3.6
E 25 1.0	1.6	2.1	2.6	3.0
E 26 1.3	2.0	2.6	3.1	3.6
E 27 1.6	2.6	3.4	4.4	5.2
E 28 1.3	2.0	2.6	3.1	3.6
E 29 1.0	1.6	2.1	2.6	3.0
E 30 1.3	2.0	2.6	3.1	3.6
E 31 1.6	2.6	3.4	4.4	5.2
E 32 1.3	2.0	2.6	3.1	3.6
E 33 1.0	1.6	2.1	2.6	3.0
E 34 1.3	2.0	2.6	3.1	3.6
E 35 1.6	2.6	3.4	4.4	5.2
E 36 1.3	2.0	2.6	3.1	3.6
E 37 1.0	1.6	2.1	2.6	3.0
E 38 1.3	2.0	2.6	3.1	3.6
E 39 1.6	2.6	3.4	4.4	5.2
E 40 1.3	2.0	2.6	3.1	3.6
E 41 1.0	1.6	2.1	2.6	3.0
E 42 1.3	2.0	2.6	3.1	3.6
E 43 1.6	2.6	3.4	4.4	5.2
E 44 1.3	2.0	2.6	3.1	3.6
E 45 1.0	1.6	2.1	2.6	3.0
E 46 1.3	2.0	2.6	3.1	3.6
E 47 1.6	2.6	3.4	4.4	5.2
E 48 1.3	2.0	2.6	3.1	3.6
E 49 1.0	1.6	2.1	2.6	3.0
E 50 1.3	2.0	2.6	3.1	3.6
E 51 1.6	2.6	3.4	4.4	5.2
E 52 1.3	2.0	2.6	3.1	3.6
E 53 1.0	1.6	2.1	2.6	3.0
E 54 1.3	2.0	2.6	3.1	3.6
E 55 1.6	2.6	3.4	4.4	5.2
E 56 1.3	2.0	2.6	3.1	3.6
E 57 1.0	1.6	2.1	2.6	3.0
E 58 1.3	2.0	2.6	3.1	3.6
E 59 1.6	2.6	3.4	4.4	5.2
E 60 1.3	2.0	2.6	3.1	3.6
E 61 1.0	1.6	2.1	2.6	3.0
E 62 1.3	2.0	2.6	3.1	3.6
E 63 1.6	2.6	3.4	4.4	5.2
E 64 1.3	2.0	2.6	3.1	3.6
E 65 1.0	1.6	2.1	2.6	3.0
E 66 1.3	2.0	2.6	3.1	3.6
E 67 1.6	2.6	3.4	4.4	5.2
E 68 1.3	2.0	2.6	3.1	3.6
E 69 1.0	1.6	2.1	2.6	3.0
E 70 1.3	2.0	2.6	3.1	3.6
E 71 1.6	2.6	3.4	4.4	5.2
E 72 1.3	2.0	2.6	3.1	3.6
E 73 1.0	1.6	2.1	2.6	3.0
E 74 1.3	2.0	2.6	3.1	3.6
E 75 1.6	2.6	3.4	4.4	5.2
E 76 1.3	2.0	2.6	3.1	3.6
E 77 1.0	1.6	2.1	2.6	3.0
E 78 1.3	2.0	2.6	3.1	3.6
E 79 1.6	2.6	3.4	4.4	5.2
E 80 1.3	2.0	2.6	3.1	3.6
E 81 1.0	1.6	2.1	2.6	3.0
E 82 1.3	2.0	2.6	3.1	3.6
E 83 1.6	2.6	3.4	4.4	5.2
E 84 1.3	2.0	2.6	3.1	3.6
E 85 1.0	1.6	2.1	2.6	3.0
E 86 1.3	2.0	2.6	3.1	3.6
E 87 1.6	2.6	3.4	4.4	5.2
E 88 1.3	2.0	2.6	3.1	3.6
E 89 1.0	1.6	2.1	2.6	3.0
E 90 1.3	2.0	2.6	3.1	3.6
E 91 1.6	2.6	3.4	4.4	5.2
E 92 1.3	2.0	2.6	3.1	3.6
E 93 1.0	1.6	2.1	2.6	3.0
E 94 1.3	2.0	2.6	3.1	3.6
E 95 1.6	2.6	3.4	4.4	5.2
E 96 1.3	2.0	2.6	3.1	3.6
E 97 1.0	1.6	2.1	2.6	3.0
E 98 1.3	2.0	2.6	3.1	3.6
E 99 1.6	2.6	3.4	4.4	5.2
E 100 1.3	2.0	2.6	3.1	3.6
E 101 1.0	1.6	2.1	2.6	3.0
E 102 1.3	2.0	2.6	3.1	3.6
E 103 1.6	2.6	3.4	4.4	5.2
E 104 1.3	2.0	2.6	3.1	3.6
E 105 1.0	1.6	2.1	2.6	3.0
E 106 1.3	2.0	2.6	3.1	3.6
E 107 1.6	2.6	3.4	4.4	5.2
E 108 1.3	2.0	2.6	3.1	3.6
E 109 1.0	1.6	2.1	2.6	3.0
E 110 1.3	2.0	2.6	3.1	3.6
E 111 1.6	2.6	3.4	4.4	5.2
E 112 1.3	2.0	2.6	3.1	3.6
E 113 1.0	1.6	2.1	2.6	3.0
E 114 1.3	2.0	2.6	3.1	3.6
E 115 1.6	2.6	3.4	4.4	5.2
E 116 1.3	2.0	2.6	3.1	3.6
E 117 1.0	1.6	2.1	2.6	3.0
E 118 1.3	2.0	2.6	3.1	3.6
E 119 1.6	2.6	3.4	4.4	5.2
E 120 1.3	2.0	2.6	3.1	3.6
E 121 1.0	1.6	2.1	2.6	3.0
E 122 1.3	2.0	2.6	3.1	3.6
E 123 1.6	2.6	3.4	4.4	5.2
E 124 1.3	2.0	2.6	3.1	3.6
E 125 1.0	1.6	2.1	2.6	3.0
E 126 1.3	2.0	2.6	3.1	3.6
E 127 1.6	2.6	3.4	4.4	5.2
E 128 1.3	2.0	2.6	3.1	3.6
E 129 1.0	1.6	2.1	2.6	3.0
E 130 1.3	2.0	2.6	3.1	3.6
E 131 1.6	2.6	3.4	4.4	5.2
E 132 1.3	2.0	2.6	3.1	3.6
E 133 1.0	1.6	2.1	2.6	3.0
E 134 1.3	2.0	2.6	3.1	3.6
E 135 1.6	2.6	3.4	4.4	5.2
E 136 1.3	2.0	2.6	3.1	3.6
E 137 1.0	1.6	2.1	2.6	3.0
E 138 1.3	2.0	2.6	3.1	3.6
E 139 1.6	2.6	3.4	4.4	5.2
E 140 1.3	2.0	2.6	3.1	3.6
E 141 1.0	1.6	2.1	2.6	3.0
E 142 1.3	2.0	2.6	3.1	3.6
E 143 1.6	2.6	3.4	4.4	5.2
E 144 1.3	2.0	2.6	3.1	3.6
E 145 1.0	1.6	2.1	2.6	3.0
E 146 1.3	2.0	2.6	3.1	3.6
E 147 1.6	2.6	3.4	4.4	5.2
E 148 1.3	2.0	2.6	3.1	3.6
E 149 1.0	1.6	2.1	2.6	3.0
E 150 1.3	2.0	2.6	3.1	3.6
E 151 1.6	2.6	3.4	4.4	5.2
E 152 1.3	2.0	2.6	3.1	3.6
E 153 1.0	1.6	2.1	2.6	3.0
E 154 1.3	2.0	2.6	3.1	3.6
E 155 1.6	2.6	3.4	4.4	5.2
E 156 1.3	2.0	2.6	3.1	3.6
E 157 1.0	1.6	2.1	2.6	3.0
E 158 1.3	2.0	2.6	3.1	3.6
E 159 1.6	2.6	3.4	4.4	5.2
E 160 1.3	2.0	2.6	3.1	3.6
E 161 1.0	1.6	2.1	2.6	3.0
E 162 1.3	2.0	2.6	3.1	3.6
E 163 1.6	2.6	3.4	4.4	5.2
E 164 1.3	2.0	2.6	3.1	3.6
E 165 1.0	1.6	2.1	2.6	3.0
E 166 1.3	2.0	2.6	3.1	3.6
E 167 1.6	2.6	3.4	4.4	5.2
E 168 1.3	2.0	2.6	3.1	3.6
E 169 1.0	1.6	2.1	2.6	3.0
E 170 1.3	2.0	2.6	3.1	3.6
E 171 1.6	2.6	3.4	4.4	5.2
E 172 1.3	2.0	2.6	3.1	3.6
E 173 1.0	1.6	2.1	2.6	3.0
E 174 1.3	2.0	2.6	3.1	3.6
E 175 1.6	2.6	3.4	4.4	5.2
E 176 1.3	2.0	2.6	3.1	3.6
E 177 1.0	1.6	2.1	2.6	3.0
E 178 1.3	2.0	2.6	3.1	3.6
E 179 1.6	2.6	3.4	4.4	5.2
E 180 1.3	2.0	2.6	3.1	3.6
E 181 1.0	1.6	2.1	2.6	3.0
E 182 1.3	2.0	2.6	3.1	3.6
E 183 1.6	2.6	3.4	4.4	5.2
E 184 1.3	2.0	2.6	3.1	3.6
E 185 1.0	1.6	2.1	2.6	3.0
E 186 1.3	2.0	2.6	3.1	3.6
E 187 1.6	2.6	3.4	4.4	5.2
E 188 1.3	2.0	2.6	3.1	3.6
E 189 1.0	1.6	2.1	2.6	3.0
E 190 1.3	2.0	2.6	3.1	3.6
E 191 1.6	2.6	3.4	4.4	5.2
E 192 1.3	2.0	2.6	3.1	3.6
E 193 1.0	1.6	2.1	2.6	3.0
E 194 1.3	2.0	2.6	3.1	3.6
E 195 1.6	2.6	3.4	4.4	5.2
E 196 1.3	2.0	2.6	3.1	3.6
E 197 1.0	1.6	2.1	2.6	3.0
E 198 1.3	2.0	2.6	3.1	3.6
E 199 1.6	2.6	3.4	4.4	5.2
E 200 1.3	2.0	2.6	3.1	3.6
E 201 1.0	1.6	2.1	2.6	3.0
E 202 1.3	2.0	2.6	3.1	3.6
E 203 1.6	2.6	3.4	4.4	5.2
E 204 1.3	2.0	2.6	3.1	3.6
E 205 1.0	1.6	2.1	2.6	3.0
E 206 1.3	2.0	2.6	3.1	3.6
E 207 1.6	2.6	3.4	4.4	5.2
E 208 1.3	2.0	2.6	3.1	3.6
E 209 1.0	1.6	2.1	2.6	3.0
E 210 1.3	2.0	2.6	3.1	3.6
E 211 1.6	2.6	3.4	4.4	5.2
E 212 1.3	2.0	2.6	3.1	3.6
E 213 1.0	1.6	2.1	2.6	3.0
E 214 1.3	2.0	2.6	3.1	3.6
E 215 1.6	2.6	3.4	4.4	5.2
E 216 1.3	2.0	2.6	3.1	3.6
E 217 1.0	1.6	2.1	2.6	3.0
E 218 1.3	2.0	2.6	3.1	3.6
E 219 1.6	2.6	3.4	4.4	5.2
E 220 1.3	2.0	2.6	3.1	3.6
E 221 1.0	1.6	2.1	2.6	3.0
E 222 1.3	2.0	2.6	3.1	3.6
E 223 1.6	2.6	3.4	4.4	

IMAGE PLATE RESOLUTION (LINES PER MILLIMETER) FOR 65MM FOCAL LENGTH LENSES

FOCAL LENGTH		65MM		75MM		7.62M	
OBJECT DISTANCE		15.5FT. (4.57M)		25.5FT. (7.62M)		0006606	
MAGNIFICATION		0.014422		0.0065MM (.2564IN.)		6.665MM (.2534IN.)	
GROUP LENGTH		11.006MM (.4332IN.)		GROUP		GROUP	
GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP
-6	-5	-4	-3	-2	-1	-6	-5
E	E	E	E	E	E	E	E
0.7	1.4	2.1	5.7	11.5	22.9	1.8	3.6
E 1	E 2	E 3	E 4	E 5	E 6	E 1	E 2
0.6	1.0	2.0	6.4	12.9	25.8	2.0	4.1
E 2	E 3	E 4	E 5	E 6	E 7	E 2	E 3
0.4	1.1	2.6	7.2	14.5	28.9	1.4	2.3
E 3	E 4	E 5	E 6	E 7	E 8	E 3	E 4
0.6	1.0	2.0	4.1	9.1	16.2	1.5	2.6
E 4	E 5	E 6	E 7	E 8	E 9	E 4	E 5
0.5	1.1	2.3	4.7	9.1	18.2	1.5	2.9
E 5	E 6	E 7	E 8	E 9	E 10	E 5	E 6
1.3	2.6	5.1	10.2	20.6	40.9	1.9	3.2
T A	T B	T C	T D	T E	T F	T A	T B
1.0	2.0	4.0	8.0	16.0	32.0	0.9	1.8

FOCAL LENGTH		OBJECT DISTANCE		MAGNIFICATION		GROUP LENGTH		GROUP	
F	G	O	D	M	M	G	G	G	G
65mm	65mm	150.0 FT.	(	45.724)		-	-	-	-
30.0mm	30.0mm	150.0 FT.	(	0.01624		-	-	-	-
30.0mm	30.0mm	1.06mm	(	0.04281IN.)		-	-	-	-
30.0mm	30.0mm	1.06mm	(	0.0321IN.)		-	-	-	-
65mm	65mm	150.0 FT.	(	60.96M)		-	-	-	-
30.0mm	30.0mm	150.0 FT.	(	0.01067		-	-	-	-
30.0mm	30.0mm	1.06mm	(	0.0316MM)	-	-	-	-
30.0mm	30.0mm	1.06mm	(	0.0321IN.)		-	-	-	-

IMAGE PLATE: M-5 SOLIUM LINES PER MILLIMETER FOR 65MM FOCAL LENGTH LENSES

IMAGE PLATE RESOLUTION (LINES PER MILLIMETER) FOR 75MM FOCAL LENGTH LENSES

FOCAL LENGTH - 75MM						
OBJECT DISTANCE - 15 FT. (4.57M)						
MAGNIFICATION - .016678						
#6 GROUP LENGTH - 12.725MM (.5010IN.)						
GROUP	1	2	3	4	5	
E	-6	-5	-4	-3	-2	-1
L 1	6	1.2	2.0	3.0	4.0	5.0
L 2	7	1.0	1.6	2.1	2.6	3.1
L 3	8	1.0	1.6	2.1	2.6	3.1
L 4	9	1.0	1.6	2.1	2.6	3.1
L 5	10	1.0	1.6	2.1	2.6	3.1
L 6	11	1.0	1.6	2.1	2.6	3.1
L 7	12	1.0	1.6	2.1	2.6	3.1
L 8	13	1.0	1.6	2.1	2.6	3.1
L 9	14	1.0	1.6	2.1	2.6	3.1
L 10	15	1.0	1.6	2.1	2.6	3.1
L 11	16	1.0	1.6	2.1	2.6	3.1
L 12	17	1.0	1.6	2.1	2.6	3.1
L 13	18	1.0	1.6	2.1	2.6	3.1
L 14	19	1.0	1.6	2.1	2.6	3.1
L 15	20	1.0	1.6	2.1	2.6	3.1
L 16	21	1.0	1.6	2.1	2.6	3.1
L 17	22	1.0	1.6	2.1	2.6	3.1
L 18	23	1.0	1.6	2.1	2.6	3.1
L 19	24	1.0	1.6	2.1	2.6	3.1
L 20	25	1.0	1.6	2.1	2.6	3.1
L 21	26	1.0	1.6	2.1	2.6	3.1
L 22	27	1.0	1.6	2.1	2.6	3.1
L 23	28	1.0	1.6	2.1	2.6	3.1
L 24	29	1.0	1.6	2.1	2.6	3.1
L 25	30	1.0	1.6	2.1	2.6	3.1
L 26	31	1.0	1.6	2.1	2.6	3.1
L 27	32	1.0	1.6	2.1	2.6	3.1
L 28	33	1.0	1.6	2.1	2.6	3.1
L 29	34	1.0	1.6	2.1	2.6	3.1
L 30	35	1.0	1.6	2.1	2.6	3.1
L 31	36	1.0	1.6	2.1	2.6	3.1
L 32	37	1.0	1.6	2.1	2.6	3.1
L 33	38	1.0	1.6	2.1	2.6	3.1
L 34	39	1.0	1.6	2.1	2.6	3.1
L 35	40	1.0	1.6	2.1	2.6	3.1
L 36	41	1.0	1.6	2.1	2.6	3.1
L 37	42	1.0	1.6	2.1	2.6	3.1
L 38	43	1.0	1.6	2.1	2.6	3.1
L 39	44	1.0	1.6	2.1	2.6	3.1
L 40	45	1.0	1.6	2.1	2.6	3.1
L 41	46	1.0	1.6	2.1	2.6	3.1
L 42	47	1.0	1.6	2.1	2.6	3.1
L 43	48	1.0	1.6	2.1	2.6	3.1
L 44	49	1.0	1.6	2.1	2.6	3.1
L 45	50	1.0	1.6	2.1	2.6	3.1
L 46	51	1.0	1.6	2.1	2.6	3.1
L 47	52	1.0	1.6	2.1	2.6	3.1
L 48	53	1.0	1.6	2.1	2.6	3.1
L 49	54	1.0	1.6	2.1	2.6	3.1
L 50	55	1.0	1.6	2.1	2.6	3.1
L 51	56	1.0	1.6	2.1	2.6	3.1
L 52	57	1.0	1.6	2.1	2.6	3.1
L 53	58	1.0	1.6	2.1	2.6	3.1
L 54	59	1.0	1.6	2.1	2.6	3.1
L 55	60	1.0	1.6	2.1	2.6	3.1
L 56	61	1.0	1.6	2.1	2.6	3.1
L 57	62	1.0	1.6	2.1	2.6	3.1
L 58	63	1.0	1.6	2.1	2.6	3.1
L 59	64	1.0	1.6	2.1	2.6	3.1
L 60	65	1.0	1.6	2.1	2.6	3.1
L 61	66	1.0	1.6	2.1	2.6	3.1
L 62	67	1.0	1.6	2.1	2.6	3.1
L 63	68	1.0	1.6	2.1	2.6	3.1
L 64	69	1.0	1.6	2.1	2.6	3.1
L 65	70	1.0	1.6	2.1	2.6	3.1
L 66	71	1.0	1.6	2.1	2.6	3.1
L 67	72	1.0	1.6	2.1	2.6	3.1
L 68	73	1.0	1.6	2.1	2.6	3.1
L 69	74	1.0	1.6	2.1	2.6	3.1
L 70	75	1.0	1.6	2.1	2.6	3.1
L 71	76	1.0	1.6	2.1	2.6	3.1
L 72	77	1.0	1.6	2.1	2.6	3.1
L 73	78	1.0	1.6	2.1	2.6	3.1
L 74	79	1.0	1.6	2.1	2.6	3.1
L 75	80	1.0	1.6	2.1	2.6	3.1
L 76	81	1.0	1.6	2.1	2.6	3.1
L 77	82	1.0	1.6	2.1	2.6	3.1
L 78	83	1.0	1.6	2.1	2.6	3.1
L 79	84	1.0	1.6	2.1	2.6	3.1
L 80	85	1.0	1.6	2.1	2.6	3.1
L 81	86	1.0	1.6	2.1	2.6	3.1
L 82	87	1.0	1.6	2.1	2.6	3.1
L 83	88	1.0	1.6	2.1	2.6	3.1
L 84	89	1.0	1.6	2.1	2.6	3.1
L 85	90	1.0	1.6	2.1	2.6	3.1
L 86	91	1.0	1.6	2.1	2.6	3.1
L 87	92	1.0	1.6	2.1	2.6	3.1
L 88	93	1.0	1.6	2.1	2.6	3.1
L 89	94	1.0	1.6	2.1	2.6	3.1
L 90	95	1.0	1.6	2.1	2.6	3.1
L 91	96	1.0	1.6	2.1	2.6	3.1
L 92	97	1.0	1.6	2.1	2.6	3.1
L 93	98	1.0	1.6	2.1	2.6	3.1
L 94	99	1.0	1.6	2.1	2.6	3.1
L 95	100	1.0	1.6	2.1	2.6	3.1
L 96	101	1.0	1.6	2.1	2.6	3.1
L 97	102	1.0	1.6	2.1	2.6	3.1
L 98	103	1.0	1.6	2.1	2.6	3.1
L 99	104	1.0	1.6	2.1	2.6	3.1
L 100	105	1.0	1.6	2.1	2.6	3.1
L 101	106	1.0	1.6	2.1	2.6	3.1
L 102	107	1.0	1.6	2.1	2.6	3.1
L 103	108	1.0	1.6	2.1	2.6	3.1
L 104	109	1.0	1.6	2.1	2.6	3.1
L 105	110	1.0	1.6	2.1	2.6	3.1
L 106	111	1.0	1.6	2.1	2.6	3.1
L 107	112	1.0	1.6	2.1	2.6	3.1
L 108	113	1.0	1.6	2.1	2.6	3.1
L 109	114	1.0	1.6	2.1	2.6	3.1
L 110	115	1.0	1.6	2.1	2.6	3.1
L 111	116	1.0	1.6	2.1	2.6	3.1
L 112	117	1.0	1.6	2.1	2.6	3.1
L 113	118	1.0	1.6	2.1	2.6	3.1
L 114	119	1.0	1.6	2.1	2.6	3.1
L 115	120	1.0	1.6	2.1	2.6	3.1
L 116	121	1.0	1.6	2.1	2.6	3.1
L 117	122	1.0	1.6	2.1	2.6	3.1
L 118	123	1.0	1.6	2.1	2.6	3.1
L 119	124	1.0	1.6	2.1	2.6	3.1
L 120	125	1.0	1.6	2.1	2.6	3.1
L 121	126	1.0	1.6	2.1	2.6	3.1
L 122	127	1.0	1.6	2.1	2.6	3.1
L 123	128	1.0	1.6	2.1	2.6	3.1
L 124	129	1.0	1.6	2.1	2.6	3.1
L 125	130	1.0	1.6	2.1	2.6	3.1
L 126	131	1.0	1.6	2.1	2.6	3.1
L 127	132	1.0	1.6	2.1	2.6	3.1
L 128	133	1.0	1.6	2.1	2.6	3.1
L 129	134	1.0	1.6	2.1	2.6	3.1
L 130	135	1.0	1.6	2.1	2.6	3.1
L 131	136	1.0	1.6	2.1	2.6	3.1
L 132	137	1.0	1.6	2.1	2.6	3.1
L 133	138	1.0	1.6	2.1	2.6	3.1
L 134	139	1.0	1.6	2.1	2.6	3.1
L 135	140	1.0	1.6	2.1	2.6	3.1
L 136	141	1.0	1.6	2.1	2.6	3.1
L 137	142	1.0	1.6	2.1	2.6	3.1
L 138	143	1.0	1.6	2.1	2.6	3.1
L 139	144	1.0	1.6	2.1	2.6	3.1
L 140	145	1.0	1.6	2.1	2.6	3.1
L 141	146	1.0	1.6	2.1	2.6	3.1
L 142	147	1.0	1.6	2.1	2.6	3.1
L 143	148	1.0	1.6	2.1	2.6	3.1
L 144	149	1.0	1.6	2.1	2.6	3.1
L 145	150	1.0	1.6	2.1	2.6	3.1
L 146	151	1.0	1.6	2.1	2.6	3.1
L 147	152	1.0	1.6	2.1	2.6	3.1
L 148	153	1.0	1.6	2.1	2.6	3.1
L 149	154	1.0	1.6	2.1	2.6	3.1
L 150	155	1.0	1.6	2.1	2.6	3.1
L 151	156	1.0	1.6	2.1	2.6	3.1
L 152	157	1.0	1.6	2.1	2.6	3.1
L 153	158	1.0	1.6	2.1	2.6	3.1
L 154	159	1.0	1.6	2.1	2.6	3.1
L 155	160	1.0	1.6	2.1	2.6	3.1
L 156	161	1.0	1.6	2.1	2.6	3.1
L 157	162	1.0	1.6	2.1	2.6	3.1
L 158	163	1.0	1.6	2.1	2.6	3.1
L 159	164	1.0	1.6	2.1	2.6	3.1
L 160	165	1.0	1.6	2.1	2.6	3.1
L 161	166	1.0	1.6	2.1	2.6	3.1
L 162	167	1.0	1.6	2.1	2.6	3.1
L 163	168	1.0	1.6	2.1	2.6	3.1
L 164	169	1.0	1.6	2.1	2.6	3.1
L 165	170	1.0	1.6	2.1	2.6	3.1
L 166	171	1.0	1.6	2.1	2.6	3.1
L 167	172	1.0	1.6	2.1	2.6	3.1
L 168	173	1.0	1.6	2.1	2.6	3.1
L 169	174	1.0	1.6	2.1	2.6	3.1
L 170	175	1.0	1.6	2.1	2.6	3.1
L 171	176	1.0	1.6	2.1	2.6	3.1
L 172	177	1.0	1.6	2.1	2.6	3.1
L 173	178	1.0	1.6	2.1	2.6	3.1
L 174	179	1.0	1.6	2.1	2.6	3.1
L 175	180	1.0	1.6	2.1	2.6	3.1
L 176	181	1.0	1.6	2.1	2.6	3.1
L 177	182	1.0	1.6	2.1	2.6	3.1
L 178	183	1.0	1.6	2.1	2.6	3.1
L 179	184	1.0	1.6	2.1	2.6	3.1
L 180	185	1.0	1.6	2.1	2.6	3.1
L 181	186	1.0	1.6</td			

IMAGE PLATE RESOLUTION (LINES PER MILLIMETER) FOR 80MM FOCAL LENGTH LENSES

FOCAL LENGTH =	80MM	80MM	FOCAL LENGTH =	80MM	80MM	FOCAL LENGTH =	80MM	80MM
OBJECT DISTANCE =	10.5 ft. 1 in 26454	3.05M	OBJECT DISTANCE =	15.5 ft. 1 in 17809	4.57M	OBJECT DISTANCE =	25.5 ft. 1 in 01610	7.62M
MAGNIFICATION =	-6.0	0.0	MAGNIFICATION =	-6.0	0.0	MAGNIFICATION =	-6.0	0.0
-6 GROUP LENGTH =	0.017461	0.007161	-6 GROUP LENGTH =	0.017461	0.007161	-6 GROUP LENGTH =	0.017461	0.007161
E 1 -6 -4.5 -2.1 E -6 -4.5 -2.1	1.0 1.2 2.0 2.4 3.2 4.0 5.0 5.8 6.6 7.4 8.2 9.0 9.8 10.6 11.4 12.2 13.0 13.8 14.6 15.4 16.2 17.0 17.8 18.6 19.4 20.4 21.2 22.0 22.8 23.6 24.4 25.2 26.0 26.8 27.6 28.4 29.2 29.4 30.0 30.8 31.6 32.4 33.2 34.0 34.8 35.6 36.4 37.2 38.0 38.8 39.6 39.8 40.4 41.2 42.0 42.8 43.6 44.4 45.2 46.0 46.8 47.6 48.4 49.2 49.8 50.4 51.2 52.0 52.8 53.6 54.4 55.2 56.0 56.8 57.6 58.4 59.2 59.8 60.4 61.2 62.0 62.8 63.6 64.4 65.2 66.0 66.8 67.6 68.4 69.2 69.8 70.4 71.2 72.0 72.8 73.6 74.4 75.2 76.0 76.8 77.6 78.4 79.2 79.8 80.4 81.2 82.0 82.8 83.6 84.4 85.2 86.0 86.8 87.6 88.4 89.2 89.8 90.4 91.2 92.0 92.8 93.6 94.4 95.2 96.0 96.8 97.6 98.4 99.2 99.8 100.4 101.2 102.0 102.8 103.6 104.4 105.2 106.0 106.8 107.6 108.4 109.2 109.8 110.4 111.2 112.0 112.8 113.6 114.4 115.2 116.0 116.8 117.6 118.4 119.2 119.8 120.4 121.2 122.0 122.8 123.6 124.4 125.2 126.0 126.8 127.6 128.4 129.2 129.8 130.4 131.2 132.0 132.8 133.6 134.4 135.2 136.0 136.8 137.6 138.4 139.2 139.8 140.4 141.2 142.0 142.8 143.6 144.4 145.2 146.0 146.8 147.6 148.4 149.2 149.8 150.4 151.2 152.0 152.8 153.6 154.4 155.2 156.0 156.8 157.6 158.4 159.2 159.8 160.4 161.2 162.0 162.8 163.6 164.4 165.2 166.0 166.8 167.6 168.4 169.2 169.8 170.4 171.2 172.0 172.8 173.6 174.4 175.2 176.0 176.8 177.6 178.4 179.2 179.8 180.4 181.2 182.0 182.8 183.6 184.4 185.2 186.0 186.8 187.6 188.4 189.2 189.8 190.4 191.2 192.0 192.8 193.6 194.4 195.2 196.0 196.8 197.6 198.4 199.2 199.8 200.4 201.2 202.0 202.8 203.6 204.4 205.2 206.0 206.8 207.6 208.4 209.2 209.8 210.4 211.2 212.0 212.8 213.6 214.4 215.2 216.0 216.8 217.6 218.4 219.2 219.8 220.4 221.2 222.0 222.8 223.6 224.4 225.2 226.0 226.8 227.6 228.4 229.2 229.8 230.4 231.2 232.0 232.8 233.6 234.4 235.2 236.0 236.8 237.6 238.4 239.2 239.8 240.4 241.2 242.0 242.8 243.6 244.4 245.2 246.0 246.8 247.6 248.4 249.2 249.8 250.4 251.2 252.0 252.8 253.6 254.4 255.2 256.0 256.8 257.6 258.4 259.2 259.8 260.4 261.2 262.0 262.8 263.6 264.4 265.2 266.0 266.8 267.6 268.4 269.2 269.8 270.4 271.2 272.0 272.8 273.6 274.4 275.2 276.0 276.8 277.6 278.4 279.2 279.8 280.4 281.2 282.0 282.8 283.6 284.4 285.2 286.0 286.8 287.6 288.4 289.2 289.8 290.4 291.2 292.0 292.8 293.6 294.4 295.2 296.0 296.8 297.6 298.4 299.2 299.8 300.4 301.2 302.0 302.8 303.6 304.4 305.2 306.0 306.8 307.6 308.4 309.2 309.8 310.4 311.2 312.0 312.8 313.6 314.4 315.2 316.0 316.8 317.6 318.4 319.2 319.8 320.4 321.2 322.0 322.8 323.6 324.4 325.2 326.0 326.8 327.6 328.4 329.2 329.8 330.4 331.2 332.0 332.8 333.6 334.4 335.2 336.0 336.8 337.6 338.4 339.2 339.8 340.4 341.2 342.0 342.8 343.6 344.4 345.2 346.0 346.8 347.6 348.4 349.2 349.8 350.4 351.2 352.0 352.8 353.6 354.4 355.2 356.0 356.8 357.6 358.4 359.2 359.8 360.4 361.2 362.0 362.8 363.6 364.4 365.2 366.0 366.8 367.6 368.4 369.2 369.8 370.4 371.2 372.0 372.8 373.6 374.4 375.2 376.0 376.8 377.6 378.4 379.2 379.8 380.4 381.2 382.0 382.8 383.6 384.4 385.2 386.0 386.8 387.6 388.4 389.2 389.8 390.4 391.2 392.0 392.8 393.6 394.4 395.2 396.0 396.8 397.6 398.4 399.2 399.8 400.4 401.2 402.0 402.8 403.6 404.4 405.2 406.0 406.8 407.6 408.4 409.2 409.8 410.4 411.2 412.0 412.8 413.6 414.4 415.2 416.0 416.8 417.6 418.4 419.2 419.8 420.4 421.2 422.0 422.8 423.6 424.4 425.2 426.0 426.8 427.6 428.4 429.2 429.8 430.4 431.2 432.0 432.8 433.6 434.4 435.2 436.0 436.8 437.6 438.4 439.2 439.8 440.4 441.2 442.0 442.8 443.6 444.4 445.2 446.0 446.8 447.6 448.4 449.2 449.8 450.4 451.2 452.0 452.8 453.6 454.4 455.2 456.0 456.8 457.6 458.4 459.2 459.8 460.4 461.2 462.0 462.8 463.6 464.4 465.2 466.0 466.8 467.6 468.4 469.2 469.8 470.4 471.2 472.0 472.8 473.6 474.4 475.2 476.0 476.8 477.6 478.4 479.2 479.8 480.4 481.2 482.0 482.8 483.6 484.4 485.2 486.0 486.8 487.6 488.4 489.2 489.8 490.4 491.2 492.0 492.8 493.6 494.4 495.2 496.0 496.8 497.6 498.4 499.2 499.8 500.4 501.2 502.0 502.8 503.6 504.4 505.2 506.0 506.8 507.6 508.4 509.2 509.8 510.4 511.2 512.0 512.8 513.6 514.4 515.2 516.0 516.8 517.6 518.4 519.2 519.8 520.4 521.2 522.0 522.8 523.6 524.4 525.2 526.0 526.8 527.6 528.4 529.2 529.8 530.4 531.2 532.0 532.8 533.6 534.4 535.2 536.0 536.8 537.6 538.4 539.2 539.8 540.4 541.2 542.0 542.8 543.6 544.4 545.2 546.0 546.8 547.6 548.4 549.2 549.8 550.4 551.2 552.0 552.8 553.6 554.4 555.2 556.0 556.8 557.6 558.4 559.2 559.8 560.4 561.2 562.0 562.8 563.6 564.4 565.2 566.0 566.8 567.6 568.4 569.2 569.8 570.4 571.2 572.0 572.8 573.6 574.4 575.2 576.0 576.8 577.6 578.4 579.2 579.8 580.4 581.2 582.0 582.8 583.6 584.4 585.2 586.0 586.8 587.6 588.4 589.2 589.8 590.4 591.2 592.0 592.8 593.6 594.4 595.2 596.0 596.8 597.6 598.4 599.2 599.8 600.4 601.2 602.0 602.8 603.6 604.4 605.2 606.0 606.8 607.6 608.4 609.2 609.8 610.4 611.2 612.0 612.8 613.6 614.4 615.2 616.0 616.8 617.6 618.4 619.2 619.8 620.4 621.2 622.0 622.8 623.6 624.4 625.2 626.0 626.8 627.6 628.4 629.2 629.8 630.4 631.2 632.0 632.8 633.6 634.4 635.2 636.0 636.8 637.6 638.4 639.2 639.8 640.4 641.2 642.0 642.8 643.6 644.4 645.2 646.0 646.8 647.6 648.4 649.2 649.8 650.4 651.2 652.0 652.8 653.6 654.4 655.2 656.0 656.8 657.6 658.4 659.2 659.8 660.4 661.2 662.0 662.8 663.6 664.4 665.2 666.0 666.8 667.6 668.4 669.2 669.8 670.4 671.2 672.0 672.8 673.6 674.4 675.2 676.0 676.8 677.6 678.4 679.2 679.8 680.4 681.2 682.0 682.8 683.6 684.4 685.2 686.0 686.8 687.6 688.4 689.2 689.8 690.4 691.2 692.0 692.8 693.6 694.4 695.2 696.0 696.8 697.6 698.4 699.2 699.8 700.4 701.2 702.0 702.8 703.6 704.4 705.2 706.0 706.8 707.6 708.4 709.2 709.8 710.4 711.2 712.0 712.8 713.6 714.4 715.2 716.0 716.8 717.6 718.4 719.2 719.8 720.4 721.2 722.0 722.8 723.6 724.4 725.2 726.0 726.8 727.6 728.4 729.2 729.8 730.4 731.2 732.0 732.8 733.6 734.4 735.2 736.0 736.8 737.6 738.4 739.2 739.8 740.4 741.2 742.0 742.8 743.6 744.4 745.2 746.0 746.8 747.6 748.4 749.2 749.8 750.4 751.2 752.0 752.8 753.6 754.4 755.2 756.0 756.8 757.6 758.4 759.2 759.8 760.4 761.2 762.0 762.8 763.6 764.4 765.2 766.0 766.8 767.6 768.4 769.2 769.8 770.4 771.2 772.0 772.8 773.6 774.4 775.2 776.0 776.8 777.6 778.4 779.2 779.8 780.4 781.2 782.0 782.8 783.6 784.4 785.2 786.0 786.8 787.6 788.4 789.2 789.8 790.4 791.2 792.0 792.8 793.6 794.4 795.2 796.0 796.8 797.6 798.4 799.2 799.8 800.4 801.2 802.0 802.8 803.6 804.4 805.2 806.0 806.8 807.6 808.4 809.2 809.8 810.4 811.2 812.0 812.8 813.6 814.4 815.2 816.0 816.8 817.6 818.4 819.2 819.8 820.4 821.2 822.0 822.8 823.6 824.4 825.2 826.0 826.8 827.6 828.4 829.2 829.8 830.4 831.2 832.0 832.8 833.6 834.4 835.2 836.0 836.8 837.6 838.4 839.2 839.8 840.4 841.2 842.0 842.8 843.6 844.4 845.2 846.0 846.8 847.6 848.4 849.2 849.8 850.4 851.2 852.0 852.8 853.6 854.4 855.2 856.0 856.8 857.6 858.4 859.2 859.8 860.4 861.2 862.0 862.8 863.6 864.4 865.2 866.0 866.8 867.6 868.4 869.2 869.8 870.4 871.2 872.0 872.8 873.6 874.4 875.2 876.0 876.8 877.6 878.4 879.2 879.8 880.4 881.2 882.0 882.8 883.6 884.4 885.2 886.0 886.8 887.6 888.4 889.2 889.8 890.4 891.2 892.0 892.8 893.6 894.4 895.2 896.0 896.8 897.6 898.4 899.2 899.8 900.4 901.2 902.0 902.8 903.6 904.4 905.2 906.0 906.8 907.6 908.4 909.2 909.8 910.4 911.2 912.0 912.8 913.6 914.4 915.2 916.0 916.8 917.6 918.4 919.2 919.8 920.4 921.2 922.0 922.8 923.6 924.4 925.2 926.0 926.8 927.6 928.4 929.2 929.8 930.4 931.2 932.0 932.8 933.6 934.4 935.2 936.0 936.8 937.6 938.4 939.2 939.8 940.4 941.2 942.0 942.8 943.6 944.4 945.2 946.0 946.8 947.6 948.4 949.2 949.8 950.4 951.2 952.0 952.8 953.6 954.4 955.2 956.0 956.8 957.6 958.4 959.2 959.8 960.4 961.2 962.0 962.8 963.6 964.4 965.2 966.0 966.8 967.6 968.4 969.2 969.8 970.4 971.2 972.0 972.8 973.6 974.4 975.2 976.0 976.8 977.6 978.4 979.2 979.8 980.4 981.2 982.0 982.8 983.6 984.4 985.2 986.0 986.8 987.6 988.4 989.2 989.8 990.4 991.2 992.0 992.8 993.6 994.4 995.2 996.0 996.8 997.6 998.4 999.2 999.8 1000.4 1001.2 1002.0 1002.8 1003.6 1004.4 1005.2 1006.0 1006.8 1007.6 1008.4 1009.2 1009.8 1010.4 1011.2 1012.0 1012.8 1013.6 1014.4 1015.2 1016.0 1016.8 1017.6 1018.4 1019.2 1019.8 1020.4 1021.2 1022.0 1022.8 1023.6 1024.4 1025.2 1026.0 1026.8 1027.6 1028.4 1029.2 1029.8 1030.4 1031.2 1032.0 1032.8 1033.6 1034.4 1035.2 1036.0 1036.8 1037.6 1038.4 1039.2 1039.8 1040.4 1041.2 1042.0 1042.8 1043.6 1044.4 1045.2 1046.0 1046.8 1047.6 1048.4 1049.2 1049.8 1050.4 1051.2 1052.0 1052.8 1053.6 1054.4 1055.2 1056.0 1056.8 1057.6 1058.4 1059.2 1059.8 1060.4 1061.2 1062.0 1062.8 1063.6 1064.4 1065.2 1066.0 1066.8 1067.6 1068.4 1069.2 1069.8 1070.4 1071.2 1072.0 1072.8 1073.6 1074.4 1075.2 1076.0 1076.8 1077.6 1078.4 1079.2 1079.8 1080.4 1081.2 1082.0 1082.8 1083.6 1084.4 1085.2 1086.0 1086.8 1087.6 1088.4 1089.2 1089.8 1090.4 1091.2 1092.0 1092.8 1093.6 1094.4 1095.2 1096.0 1096.8 1097.6 1098.4 1099.2 1099.8 1100.4 1101.2 1102.0 1102.8 1103.6 1104.4 1105.2 1106.0 1106.8 1107.6 1108.4 1109.2 1109.8 1110.4 1111.2 1112.0 1112.8 1113.6 1114.4 1115.2 1116.0 1116.8 1117.6 1118.4 1119.2 1119.8 1120.4 1121.2 1122.0 1122.8 1123.6 1124.4 1125.2 1126.0 1126.8 1127.6 1128.4 1129.2 1129.8 1130.4 1131.2 1132.0 1132.8 1133.6 1134.4 1135.2 1136.0 1136.8 1137.6 1138.4 1139.2 1139.8 1140.4 1141.2 1142.0 1142.8 1143.6 1144.4 1145.2 1146.0 1146.8 1147.6 1148.4 1149.2 1149.8 1150.4 1151.2 1152.0 1152.8 1153.6 1154.4 1155.2 1156.0 1156.8 1157.6 1158.4 1159.2 1159.8 1160.4 1161.2 1162.0 1162.8 1163.6 1164.4 1165.2 1166.0 1166.8 1167.6 1168.4 1169.2 1169.8 1170.4 1171.2 1172.0 1172.8 1173.6 1174.4 1175.2 1176.0 1176.8 1177.6 1178.4 1179.2 1179.8 1180.4 1181.2 1182.0 1182.8 1183.6 1184.4 1185.2 1186.0 1186.8 1187.6 1188.4 1189.2 1189.8 1190.4 1191.2 1192.0 1192.8 1193.6 1194.4 1195.2 1196.0 1196.8 1197.6 1198.4 1199.2 1199.8 1200.4 1201.2 1202.0 1202.8 1203.6 1204.4 1205.2 1206.0 1206.8 1207.6 1208.4 1209.2 1209.8 1210.4 1211.2 1212.0 1212.8 1213.6 1214.4 1215.2 1216.0 1216.8 1217.6 1218.4 1219.2 1219.8 1220.4 1221.2 1222.0 1222.8 1223.6 1224.4 1225.2 1226.0 1226.8 1227.6 1228.4 1229.2 1229.8 1230.4 1231.2 1232.0 1232.8 1233.6 1234.4 1235.2 1236.0 1236.8 1237.6 1238.4 1239.2 1239.8 1240.4 1241.2 1242.0 1242.8 1243.6 1244.4 1245.2 1246.0 1246.8 1247.6 1248.4 1249.2 1249.8 1250.4 1251.2 1252.0 1252.8 1253.6 1254.4 1255.2 1256.0 1256.8 1257.6 1258.4 1259.2 1259.8 1260.4 1261.2 1262.0 1262.8 1263.6 1264.4 1265.2 1266.0 1266.8 1267.6 1268.4 1269.2 1269.8 1270.4 1271.2 1272.0 1272.8 1273.6 1274.4 1275.2 1276.0 1276.8 1277.6 1278.4 1279.2 1279.8 1280.4 1281.2 1282.0 1282.8 1283.6 1284.4 1285.2 1286.0 1286.8 1287.6 1288.4 1289.2 1289.8 1290.4 1291.2 1292.0 1292.8 1293.6 1294.4 1295.2 1296.0 1296.8 1297.6 1298.4 1299.2 1299.8 1300.4 1301.2 1302.0 1302.8 1303							

IMAGE PLATE RESOLUTION (LINES PER MILLIMETER) FOR 65MM FOCAL LENGTH LENSES

FOCAL LENGTH	65MM	FOCAL LENGTH	65MM												
OBJECT DISTANCE	150.0 FT. (70.2 M)	OBJECT DISTANCE	50.0 FT. (15.24 M)												
MAGNIFICATION	+0.05609	MAGNIFICATION	+0.879MM (+16851M.)												
-6 GROUP LENGTH	GROUP	-6 GROUP LENGTH	GROUP												
L 1 -1	-0.5	-0.1	-0.6	-0.5	-0.3	-0.2	-0.1	E	-6	-5	-4	-3	-2	-1	
L 2 0	2.0	5.0	1.1	22.3	0.9	1.1	2.0	1.1	L 1	4.2	6.4	16.7	33.5	67.0	134.0
L 3 1	1.0	6.0	1.2	2.4	9.0	2.2	3.1	1.5	E 2	4.7	9.4	18.8	37.5	75.0	150.0
L 4 2	1.0	1.0	1.0	27.4	35.6	1.3	1.5	7.0	H 3	5.3	10.5	21.1	42.2	84.4	168.4
L 5 3	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	E 4	5.9	11.8	23.7	47.4	94.7	189.5
L 6 4	2.0	1.0	1.7	31.1	2.4	2.5	3.9	7.0	N 5	6.6	13.3	26.6	52.2	106.3	212.7
L 7 5	2.0	0.5	1.0	1.0	35.2	1.5	6.4	8.8	T 6	7.5	14.9	29.8	59.7	119.4	238.7
L 8 6	2.0	0.5	1.0	1.0	1.0	1.0	1.0	1.0							
L 9 7	2.0	0.5	1.0	1.0	39.4	1.0	6.0	9.0							
L 10 8	2.0	0.5	1.0	1.0	1.0	1.0	1.0	1.0							
L 11 9	2.0	0.5	1.0	1.0	1.0	1.0	1.0	1.0							
L 12 0	2.0	0.5	1.0	1.0	1.0	1.0	1.0	1.0							

FOCAL LENGTH	65MM	FOCAL LENGTH	65MM												
OBJECT DISTANCE	150.0 FT. (45.72 M)	OBJECT DISTANCE	50.0 FT. (15.24 M)												
MAGNIFICATION	+0.05609	MAGNIFICATION	+0.879MM (+16851M.)												
-6 GROUP LENGTH	GROUP	-6 GROUP LENGTH	GROUP												
C 1 -1	-0.5	-0.1	-0.6	-0.5	-0.3	-0.2	-0.1	E	-6	-5	-4	-3	-2	-1	
C 2 0	6.0	11.2	4.7	49.4	17.0	6.1	6.4	16.0	L 1	11.2	22.4	44.8	89.3	179.0	358.1
C 3 1	6.0	1.0	1.0	50.7	10.0	2.0	9.6	18.6	E 2	12.6	25.1	50.2	100.5	201.0	482.0
C 4 2	6.0	1.0	1.0	57.4	12.6	2.0	9.6	21.1	H 3	14.8	28.2	56.4	112.8	225.6	451.2
C 5 3	7.0	16.1	2.0	51.2	12.6	2.0	9.6	12.9	E 4	15.8	31.8	63.3	126.6	253.2	506.4
C 6 4	7.0	15.6	2.0	63.2	24.2	2.0	9.6	21.1	N 5	17.6	35.5	71.1	142.1	284.2	568.4
C 7 5	8.0	17.7	2.0	71.0	18.1	2.0	9.6	13.3	T 6	19.9	39.9	79.8	159.5	319.0	638.0
C 8 6	10.0	19.4	2.0	79.2	15.0	2.0	9.6	16.9							
C 9 7	10.0	19.4	2.0	79.2	15.0	2.0	9.6	16.9							
C 10 8	10.0	19.4	2.0	79.2	15.0	2.0	9.6	16.9							
C 11 9	10.0	19.4	2.0	79.2	15.0	2.0	9.6	16.9							
C 12 0	10.0	19.4	2.0	79.2	15.0	2.0	9.6	16.9							

FOCAL LENGTH	65MM	FOCAL LENGTH	65MM												
OBJECT DISTANCE	300.0 FT. (91.44 M)	OBJECT DISTANCE	50.0 FT. (15.24 M)												
MAGNIFICATION	+0.02791	MAGNIFICATION	+0.879MM (+16851M.)												
-6 GROUP LENGTH	GROUP	-6 GROUP LENGTH	GROUP												
S 1 -1	-0.5	-0.1	-0.6	-0.5	-0.3	-0.2	-0.1	E	-6	-5	-4	-3	-2	-1	
S 2 0	16.0	1.0	1.0	111.9	22.3	0.7	1.1	16.6	L 1	22.4	44.8	89.6	179.2	358.3	716.7
S 3 1	15.7	1.0	1.0	125.4	25.1	0.3	1.2	17.7	E 2	25.1	50.3	100.5	201.1	402.2	804.9
S 4 2	17.0	15.3	2.0	70.5	16.1	2.0	9.6	14.3	H 3	28.2	56.4	112.8	225.6	451.5	903.0
S 5 3	16.0	12.6	1.0	161.0	26.1	0.1	1.2	21.2	E 4	31.7	63.3	126.7	253.4	506.8	999.9
S 6 4	22.0	46.4	4.0	146.3	31.6	4.2	4.4	22.7	N 5	35.6	71.1	142.2	284.4	568.8	999.9
S 7 5	26.0	49.4	4.0	146.4	35.5	4.6	4.8	24.0	T 6	39.9	79.8	159.6	319.2	638.5	999.9
S 8 6	28.0	49.4	4.0	146.4	39.4	4.7	5.0	26.0							
S 9 7	31.0	49.4	4.0	146.4	43.4	4.7	5.0	28.0							
S 10 8	35.0	49.4	4.0	146.4	47.4	4.7	5.0	30.0							
S 11 9	35.0	49.4	4.0	146.4	51.4	4.7	5.0	32.0							
S 12 0	35.0	49.4	4.0	146.4	55.4	4.7	5.0	34.0							

FOCAL LENGTH	65MM	FOCAL LENGTH	65MM												
OBJECT DISTANCE	750.0 FT. (228.60 M)	OBJECT DISTANCE	50.0 FT. (15.24 M)												
MAGNIFICATION	+0.00372	MAGNIFICATION	+0.879MM (+16851M.)												
-6 GROUP LENGTH	GROUP	-6 GROUP LENGTH	GROUP												
E 1 -1	-0.5	-0.1	-0.6	-0.5	-0.3	-0.2	-0.1	E	-6	-5	-4	-3	-2	-1	
E 2 0	62.0	1.0	1.0	62.1	1.0	1.0	1.1	62.1	L 1	56.0	112.0	224.1	448.1	896.2	999.9
E 3 1	31.4	1.0	1.0	125.7	25.1	0.3	1.2	47.2	E 2	62.9	125.8	251.5	503.0	999.9	999.9
E 4 2	35.0	70.5	1.0	161.1	24.2	0.1	1.2	42.9	H 3	70.6	141.1	282.3	564.6	999.9	999.9
E 5 3	35.0	70.5	1.0	161.1	24.2	0.1	1.2	42.9	E 4	70.2	158.4	316.9	613.7	999.9	999.9
E 6 4	62.0	177.4	2.0	352.4	131.1	9.9	10.5	66.7	N 5	68.0	177.8	355.7	711.3	999.9	999.9
E 7 5	62.0	177.4	2.0	352.4	131.1	9.9	10.5	66.7	T 6	70.8	149.7	299.4	591.9	999.9	999.9
E 8 6	62.0	177.4	2.0	352.4	131.1	9.9	10.5	66.7							
E 9 7	62.0	177.4	2.0	352.4	131.1	9.9	10.5	66.7							
E 10 8	62.0	177.4	2.0	352.4	131.1	9.9	10.5	66.7							
E 11 9	62.0	177.4	2.0	352.4	131.1	9.9	10.5	66.7							
E 12 0	62.0	177.4	2.0	352.4	131.1	9.9	10.5	66.7							

IMAGE PLATE RESOLUTION (LINES PER MILLIMETER) FOR 65MM FOCAL LENGTH LENSES

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER)FOR 90MM FOCAL LENGTH LENSES

	FOCAL LENGTH	90MM	FOCAL LENGTH	90MM									
	OBJECT DISTANCE	25.FT.(7.62M)	OBJECT DISTANCE	50.FT.(15.24M)									
	MAGNIFICATION	.011.12	MAGNIFICATION	.005941									
	-6 GROUP LENGTH	9.120MM(.3590IN.)	-6 GROUP LENGTH	4.533MM(.1785IN.)									
	GROUP		GROUP										
E	-6	*5	-4	-3	-2	-1	E	-6	*5	-4	-3	-2	-1
L 1	1.3	2.6	5.2	10.5	20.9	41.8	L 1	2.6	5.3	10.5	21.0	42.1	84.2
E 2	1.5	2.9	5.4	11.7	23.5	47.0	E 2	5.9	11.8	23.6	47.1	94.5	E 2
H 3	1.6	3.3	6.5	13.2	26.4	52.7	H 3	3.3	6.6	13.3	26.5	53.0	H 3
E 4	1.7	3.7	7.4	14.9	29.6	59.2	E 4	3.7	7.4	14.9	29.8	59.5	E 4
N 5	2.1	4.2	8.3	16.6	33.2	66.4	N 5	4.2	8.4	16.7	33.4	66.8	N 5
T 6	2.3	4.7	9.3	18.6	37.3	74.5	T 6	4.7	9.4	18.7	37.5	75.0	T 6

	FOCAL LENGTH	90MM	FOCAL LENGTH	90MM									
	OBJECT DISTANCE	100.FT.(30.48M)	OBJECT DISTANCE	150.FT.(45.72M)									
	MAGNIFICATION	.002962	MAGNIFICATION	.001972									
	-6 GROUP LENGTH	2.260MM(.0899IN.)	-6 GROUP LENGTH	1.505MM(.0592IN.)									
	GROUP		GROUP										
E	-6	*5	-4	-3	-2	-1	E	-6	*5	-4	-3	-2	-1
L 1	5.3	10.6	21.1	42.2	84.4	168.8	L 1	7.9	15.8	31.7	63.4	126.7	L 1
E 2	5.5	11.8	23.7	47.4	94.9	185.5	E 2	9.9	17.8	35.6	71.1	142.0	E 2
H 3	6.6	11.2	26.6	53.2	106.4	212.7	H 3	10.0	20.0	39.9	79.8	159.4	H 3
E 4	7.5	14.9	29.4	59.7	119.4	238.6	E 4	11.2	22.4	44.8	89.6	179.3	E 4
N 5	8.4	16.8	33.3	67.0	134.0	268.0	N 5	12.6	25.2	50.3	100.6	201.2	N 5
T 6	9.4	19.8	37.6	75.2	150.4	310.8	T 6	14.1	28.2	56.5	112.9	225.8	T 6

	FOCAL LENGTH	90MM	FOCAL LENGTH	90MM									
	OBJECT DISTANCE	300.FT.(91.44M)	OBJECT DISTANCE	400.FT.(121.92M)									
	MAGNIFICATION	.000985	MAGNIFICATION	.000979									
	-6 GROUP LENGTH	0.92MM(.0355IN.)	-6 GROUP LENGTH	0.752MM(.0296IN.)									
	GROUP		GROUP										
E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1
L 1	13.2	25.4	52.9	105.7	211.4	422.8	L 1	15.9	31.7	63.4	126.9	253.8	L 1
E 2	14.9	29.7	49.3	114.7	237.3	474.6	E 2	17.8	35.6	71.2	142.3	284.8	E 2
H 3	16.6	33.4	66.3	133.2	266.4	512.7	H 3	20.0	40.0	79.9	159.9	319.7	H 3
E 4	18.7	37.4	74.7	149.5	299.0	598.0	E 4	22.4	44.9	89.7	179.4	358.9	E 4
N 5	21.0	42.6	93.9	167.8	335.6	671.2	N 5	25.2	50.4	100.7	201.4	402.8	N 5
T 6	23.5	47.1	94.2	185.4	376.7	753.4	T 6	28.3	56.5	113.0	226.1	452.1	T 6

	FOCAL LENGTH	90MM	FOCAL LENGTH	90MM									
	OBJECT DISTANCE	750.FT.(228.60M)	OBJECT DISTANCE	1000.FT.(304.80M)									
	MAGNIFICATION	.000591	MAGNIFICATION	.000595									
	-6 GROUP LENGTH	0.51MM(.0178IN.)	-6 GROUP LENGTH	0.301MM(.0118IN.)									
	GROUP		GROUP										
E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1
L 1	26.4	52.9	105.4	211.5	423.1	846.2	L 1	39.7	79.3	158.7	317.4	634.7	L 1
E 2	29.7	58.4	118.7	237.5	474.9	949.5	E 2	44.5	89.1	178.1	356.3	712.5	E 2
H 3	33.3	65.0	133.3	266.5	533.1	969.9	H 3	50.0	100.0	199.9	399.9	799.7	H 3
E 4	37.4	74.8	149.0	299.2	598.3	999.9	E 4	56.1	112.0	224.4	468.8	897.7	E 4
N 5	42.0	84.2	167.4	335.6	671.6	1151.6	N 5	63.0	126.0	251.9	503.8	999.9	N 5
T 6	47.1	94.1	185.5	376.4	753.9	1414.4	T 6	70.7	141.4	282.7	565.5	999.9	T 6

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER)FOR 90MM FOCAL LENGTH LENSES

IMAGE PLANE RESOLUTION LINES PER MILLIMETER FOR 100MM FOCAL LENGTH LENSES

	FOCAL LENGTH = 100MM																			
	OBJECT DISTANCE = 25.5 FT. (7.62M)																			
	MAGNIFICATION = 0.13295 (.3995IN.)																			
-6 GROUP LENGTH = 10.14IN (.3995IN.)																				
GROUP																				
E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4										
L 1	1.2	2.3	4.7	9.4	18.4	37.6	L 1	2.4	4.7	9.5										
E 2	2.0	5.3	10.6	21.1	42.2	E 2	2.7	5.3	10.6	21.2										
L 3	3.0	5.0	5.4	11.8	23.7	L 3	3.0	6.0	11.9	23.8										
E 4	4.3	6.3	6.4	11.3	26.5	E 4	4.3	6.7	13.4	26.8										
L 5	5.7	7.7	7.4	14.9	29.4	L 5	5.7	7.5	14.7	30.0										
E 6	6.2	8.4	16.7	33.5	E 6	6.2	8.4	16.9	33.7	T 6										

	FOCAL LENGTH = 100MM																			
	OBJECT DISTANCE = 50 FT. (15.24M)																			
	MAGNIFICATION = 0.06605 (.040MM (.1964IN.)																			
-6 GROUP LENGTH = 5.040MM (.1964IN.)																				
GROUP																				
E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4										
L 1	1.2	2.3	4.7	9.4	18.4	37.6	L 1	2.4	4.7	9.5										
E 2	2.0	5.3	10.6	21.1	42.2	E 2	2.7	5.3	10.6	21.2										
L 3	3.0	5.0	5.4	11.8	23.7	L 3	3.0	6.0	11.9	23.8										
E 4	4.3	6.3	6.4	11.3	26.5	E 4	4.3	6.7	13.4	26.8										
L 5	5.7	7.7	7.4	14.9	29.4	L 5	5.7	7.5	14.7	30.0										
E 6	6.2	8.4	16.7	33.5	E 6	6.2	8.4	16.9	33.7	T 6										

	FOCAL LENGTH = 100MM																			
	OBJECT DISTANCE = 75 FT. (22.86M)																			
	MAGNIFICATION = 0.04394 (.0352MM (.1320IN.)																			
-6 GROUP LENGTH = 3.52MM (.1320IN.)																				
GROUP																				
E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4										
L 1	1.2	2.3	4.7	9.4	18.4	37.6	L 1	2.4	4.7	9.5										
E 2	2.0	5.3	10.6	21.1	42.2	E 2	2.7	5.3	10.6	21.2										
L 3	3.0	5.0	5.4	11.8	23.7	L 3	3.0	6.0	11.9	23.8										
E 4	4.3	6.3	6.4	11.3	26.5	E 4	4.3	6.7	13.4	26.8										
L 5	5.7	7.7	7.4	14.9	29.4	L 5	5.7	7.5	14.7	30.0										
E 6	6.2	8.4	16.7	33.5	E 6	6.2	8.4	16.9	33.7	T 6										

IMAGE PLANE RESOLUTION LINES PER MILLIMETER FOR 100MM FOCAL LENGTH LENSES

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR 105MM FOCAL LENGTH LENSES

FOCAL LENGTH - 105MM		FOCAL LENGTH - 105MM		FOCAL LENGTH - 105MM	
OBJECT DISTANCE - 25.0 FT. (7.62M)	MAGNIFICATION - .013472	OBJECT DISTANCE - 50.0 FT. (15.24M)	MAGNIFICATION - .006938	OBJECT DISTANCE - 75.0 FT. (22.60M)	MAGNIFICATION - .004614
-6 GROUP LENGTH - 10.661MM (.41971IN.)		-6 GROUP LENGTH - 5.293MM (.20841IN.)		-6 GROUP LENGTH - 3.521MM (.13861IN.)	
E	-5	-4	-3	-2	-1
L 1	2.2	4.5	8.0	17.9	35.6
L 2	1.3	5.0	10.0	20.1	40.2
L 3	1.4	5.6	11.3	22.5	45.1
L 4	1.6	3.2	6.3	12.7	25.3
L 5	1.8	3.6	7.1	14.2	28.4
L 6	2.0	4.0	8.0	15.6	31.9
T 1	-5	-4	-3	-2	-1
T 2	2.5	5.0	10.0	20.1	40.2
T 3	1.4	5.6	11.3	22.5	45.1
T 4	1.6	3.2	6.3	12.7	25.3
T 5	1.8	3.6	7.1	14.2	28.4
T 6	2.0	4.0	8.0	15.6	31.9

FOCAL LENGTH - 105MM		FOCAL LENGTH - 105MM		FOCAL LENGTH - 105MM	
OBJECT DISTANCE - 100.0 FT. (30.48M)	MAGNIFICATION - .003457	OBJECT DISTANCE - 150.0 FT. (45.72M)	MAGNIFICATION - .002302	OBJECT DISTANCE - 200.0 FT. (60.96M)	MAGNIFICATION - .001725
-6 GROUP LENGTH - 2.638MM (.10341IN.)		-6 GROUP LENGTH - 1.756MM (.06911IN.)		-6 GROUP LENGTH - 1.316MM (.05161IN.)	
E	-5	-4	-3	-2	-1
L 1	18.1	36.2	72.3	144.6	289.8
L 2	10.1	20.3	40.6	81.2	162.6
L 3	11.4	22.8	45.6	91.1	182.6
L 4	12.8	25.6	51.2	102.3	204.9
L 5	14.0	28.7	57.4	114.8	229.6
L 6	14.4	32.2	64.6	128.9	257.7
T 1	-5	-4	-3	-2	-1
T 2	10.1	20.3	40.6	81.2	162.6
T 3	11.4	22.8	45.6	91.1	182.6
T 4	12.8	25.6	51.2	102.3	204.9
T 5	14.0	28.7	57.4	114.8	229.6
T 6	14.4	32.2	64.6	128.9	257.7

FOCAL LENGTH - 105MM		FOCAL LENGTH - 105MM		FOCAL LENGTH - 105MM	
OBJECT DISTANCE - 200.0 FT. (60.96M)	MAGNIFICATION - .001725	OBJECT DISTANCE - 300.0 FT. (91.44M)	MAGNIFICATION - .00115C	OBJECT DISTANCE - 400.0 FT. (121.92M)	MAGNIFICATION - .000862
-6 GROUP LENGTH - 1.316MM (.05161IN.)		-6 GROUP LENGTH - .877MM (.03451IN.)		-6 GROUP LENGTH - .558MM (.02559IN.)	
E	-5	-4	-3	-2	-1
L 1	11.3	22.6	45.3	90.6	181.2
L 2	12.7	25.4	50.4	101.7	203.4
L 3	14.3	28.5	57.1	114.1	228.3
L 4	16.0	32.0	64.0	124.1	256.2
L 5	18.0	36.0	71.9	143.8	287.6
L 6	20.2	40.4	80.7	161.3	322.9
T 1	-5	-4	-3	-2	-1
T 2	11.3	22.6	45.3	90.6	181.2
T 3	12.7	25.4	50.4	101.7	203.4
T 4	14.3	28.5	57.1	114.1	228.3
T 5	16.0	32.0	64.0	124.1	256.2
T 6	18.0	36.0	71.9	143.8	287.6

FOCAL LENGTH - 105MM		FOCAL LENGTH - 105MM		FOCAL LENGTH - 105MM	
OBJECT DISTANCE - 300.0 FT. (91.44M)	MAGNIFICATION - .000862	OBJECT DISTANCE - 400.0 FT. (121.92M)	MAGNIFICATION - .000614	OBJECT DISTANCE - 500.0 FT. (154.94M)	MAGNIFICATION - .000460
-6 GROUP LENGTH - .877MM (.03451IN.)		-6 GROUP LENGTH - .558MM (.02559IN.)		-6 GROUP LENGTH - .363MM (.01382IN.)	
E	-5	-4	-3	-2	-1
L 1	22.7	45.3	90.7	141.3	362.4
L 2	25.4	50.9	101.9	203.5	407.0
L 3	28.5	57.1	114.2	228.4	456.9
L 4	32.0	64.1	124.2	256.4	512.6
L 5	36.0	71.9	143.9	287.8	575.4
L 6	40.4	80.8	161.7	323.0	646.1
T 1	-5	-4	-3	-2	-1
T 2	22.7	45.3	90.7	141.3	362.4
T 3	25.4	50.9	101.9	203.5	407.0
T 4	28.5	57.1	114.2	228.4	456.9
T 5	32.0	64.1	124.2	256.4	512.6
T 6	36.0	71.9	143.9	287.8	575.4

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR 105MM FOCAL LENGTH LENSES

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR 120MM FOCAL LENGTH LENSES

	FOCAL LENGTH - 120MM	OBJECT DISTANCE - 25.0 FT. (7.62M)	MAGNIFICATION - +0.016000 (+0.0014IN.)	-6 GROUP LENGTH (mm)	FOCAL LENGTH - 120MM	OBJECT DISTANCE - 50.0 FT. (15.24M)	MAGNIFICATION - +0.007937 (+0.0005IN.)	-6 GROUP LENGTH (mm)	FOCAL LENGTH - 120MM	OBJECT DISTANCE - 75.0 FT. (22.86M)	MAGNIFICATION - +0.005277 (+0.0003IN.)	-6 GROUP LENGTH (mm)
E	-6	-5	-4	-3	-2	-1	-1	-1	E	-6	-5	-4
L 1	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	L 1	3.0	5.0	7.0
L 2	1.1	2.2	3.3	4.4	5.5	6.6	7.7	8.8	E 2	3.3	6.0	10.0
L 3	1.2	2.4	3.6	4.8	6.0	7.2	8.4	9.6	N 3	3.7	7.5	14.0
E 4	1.4	2.8	4.0	5.2	6.4	7.6	8.8	10.0	E 4	4.2	8.4	16.7
N 5	1.6	3.1	4.2	5.4	6.6	7.8	9.0	10.0	N 5	4.7	9.4	18.0
T 6	1.7	3.5	4.7	5.9	7.1	8.3	9.5	10.6	T 6	5.3	10.6	21.1

	FOCAL LENGTH - 120MM	OBJECT DISTANCE - 50.0 FT. (15.24M)	MAGNIFICATION - +0.002632 (+0.0002IN.)	-6 GROUP LENGTH (mm)	FOCAL LENGTH - 120MM	OBJECT DISTANCE - 75.0 FT. (22.86M)	MAGNIFICATION - +0.001972 (+0.0001IN.)	-6 GROUP LENGTH (mm)	FOCAL LENGTH - 120MM	OBJECT DISTANCE - 100.0 FT. (60.96M)	MAGNIFICATION - +0.000921 (+0.0000IN.)	-6 GROUP LENGTH (mm)
E	-6	-5	-4	-3	-2	-1	-1	-1	E	-6	-5	-4
L 1	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	L 1	7.0	15.0	31.0
L 2	1.1	2.2	3.3	4.4	5.5	6.6	7.7	8.8	E 2	8.0	17.0	35.0
L 3	1.2	2.4	3.6	4.8	6.0	7.2	8.4	9.6	N 3	10.0	20.0	39.0
E 4	1.4	2.8	4.0	5.2	6.4	7.6	8.8	10.0	E 4	11.0	22.0	44.0
N 5	1.6	3.1	4.2	5.4	6.6	7.8	9.0	10.0	N 5	12.0	25.0	50.0
T 6	1.7	3.5	4.7	5.9	7.1	8.3	9.5	10.6	T 6	14.0	28.0	56.0

	FOCAL LENGTH - 120MM	OBJECT DISTANCE - 75.0 FT. (22.86M)	MAGNIFICATION - +0.003951 (+0.0003IN.)	-6 GROUP LENGTH (mm)	FOCAL LENGTH - 120MM	OBJECT DISTANCE - 100.0 FT. (60.96M)	MAGNIFICATION - +0.000985 (+0.0000IN.)	-6 GROUP LENGTH (mm)	FOCAL LENGTH - 120MM	OBJECT DISTANCE - 120.0 FT. (92.9M)	MAGNIFICATION - +0.000296 (+0.0000IN.)	-6 GROUP LENGTH (mm)
E	-6	-5	-4	-3	-2	-1	-1	-1	E	-6	-5	-4
L 1	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	L 1	7.0	15.0	31.0
L 2	1.1	2.2	3.3	4.4	5.5	6.6	7.7	8.8	E 2	8.0	17.0	35.0
L 3	1.2	2.4	3.6	4.8	6.0	7.2	8.4	9.6	N 3	10.0	20.0	39.0
E 4	1.4	2.8	4.0	5.2	6.4	7.6	8.8	10.0	E 4	11.0	22.0	44.0
N 5	1.6	3.1	4.2	5.4	6.6	7.8	9.0	10.0	N 5	12.0	25.0	50.0
T 6	1.7	3.5	4.7	5.9	7.1	8.3	9.5	10.6	T 6	14.0	28.0	56.0

	FOCAL LENGTH - 120MM	OBJECT DISTANCE - 100.0 FT. (60.96M)	MAGNIFICATION - +0.00525 (+0.0005IN.)	-6 GROUP LENGTH (mm)	FOCAL LENGTH - 120MM	OBJECT DISTANCE - 120.0 FT. (92.9M)	MAGNIFICATION - +0.000394 (+0.0000IN.)	-6 GROUP LENGTH (mm)	FOCAL LENGTH - 120MM	OBJECT DISTANCE - 100.0 FT. (60.96M)	MAGNIFICATION - +0.00118 (+0.0001IN.)	-6 GROUP LENGTH (mm)
E	-6	-5	-4	-3	-2	-1	-1	-1	E	-6	-5	-4
L 1	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	L 1	3.0	5.0	7.0
L 2	1.1	2.2	3.3	4.4	5.5	6.6	7.7	8.8	E 2	3.3	6.0	12.0
L 3	1.2	2.4	3.6	4.8	6.0	7.2	8.4	9.6	N 3	3.7	7.5	15.0
E 4	1.4	2.8	4.0	5.2	6.4	7.6	8.8	10.0	E 4	4.2	8.4	16.7
N 5	1.6	3.1	4.2	5.4	6.6	7.8	9.0	10.0	N 5	4.7	9.4	18.0
T 6	1.7	3.5	4.7	5.9	7.1	8.3	9.5	10.6	T 6	5.3	10.6	21.1

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR 120MM FOCAL LENGTH LENSES

IMAGE PLATE RESOLUTION (LINES PER MILLIMETER) FOR 127MM FOCAL LENGTH LENSES

FOCAL LENGTH		127MM		127MM		127MM	
OBJECT DISTANCE		50 FT. (		75 FT. (		22.84M)	
MAGNIFICATION		0.00403		0.005587		0.005587	
GROUP LENGTH		6.412MM (		4.263MM (		1.672IN.)	
GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP
-6	-5	-4	-3	-2	-1	-6	-5
-6	-5	-4	-3	-2	-1	-6	-5
-9	-8	-7	-6	-5	-4	-9	-8
-1.0	-2.1	-4.1	-8.3	-16.6	-33.0	-1.0	-2.1
-1.2	-2.3	-4.6	-9.3	-18.4	-37.2	-1.2	-2.3
-1.3	-2.4	-5.2	-10.4	-20.9	-41.7	-1.3	-2.4
-1.5	-2.9	-5.4	-11.7	-23.4	-46.8	-1.5	-2.9
-1.6	-3.3	-6.6	-13.0	-26.3	-52.0	-1.6	-3.3

FOCAL LENGTH = 127MM		FOCAL LENGTH = 127MM	
OBJECT DISTANCE = 150.0 FT. (		OBJECT DISTANCE = 200.0 FT. (
MAGNIFICATION = +0.02786		MAGNIFICATION = +0.02986	
-6 GROUP LENGTH = 2.125MM (.0837IN.)		-6 GROUP LENGTH = 1.593MM (.0627IN.)	
GROUP	GROUP	GROUP	GROUP
-6	-5	-4	-3
E	E	E	E
5.6	5.7	5.8	5.9
1.4	1.4	1.4	1.4
7.5	7.5	7.5	7.5
100.0 FT. (	100.0 FT. (	100.0 FT. (	100.0 FT. (
30.48M)	30.48M)	30.48M)	30.48M)
+0.02786	+0.02786	+0.02786	+0.02786
3.125MM (.1257IN.)	3.125MM (.1257IN.)	3.125MM (.1257IN.)	3.125MM (.1257IN.)

FOCAL LENGTH - 127MM
OBJECT DISTANCE - 760.FT.(228.60M)
MAGNIFICATION - +000556
+6 GROUP LENGTH - .424MM(.0167IN.)
GROUP

LENS LENGTH 1.15 EYES

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER)FOR 135MM FOCAL LENGTH LENSES

	FOCAL LENGTH - 135MM	OBJECT DISTANCE - 7.62M	MAGNIFICATION - 0.14M ⁻¹	GROUP G01	FOCAL LENGTH - 135MM	OBJECT DISTANCE - 50.FT.(15.24M)	MAGNIFICATION - 0.06937	GROUP G01	FOCAL LENGTH - 135MM	OBJECT DISTANCE - 75.FT.(22.86M)	MAGNIFICATION - 0.05941	GROUP G01
E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-1
E 1	1.0	1.7	2.7	3.9	13.4	27.7	L 1	1.7	3.9	7.0	14.0	28.0
E 2	1.0	1.9	3.7	5.4	15.4	31.1	L 2	2.0	4.4	7.1	15.7	31.4
E 3	1.1	2.2	4.4	6.7	17.5	34.9	L 3	2.2	4.4	6.8	17.6	35.2
E 4	1.2	2.5	6.7	9.8	19.6	34.2	L 4	2.5	4.9	9.9	19.8	39.6
E 5	1.4	2.6	5.1	11.0	22.0	36.0	L 5	2.8	5.6	11.1	22.2	44.4
E 6	1.5	3.1	6.2	12.3	26.7	49.4	L 6	3.1	6.2	12.5	24.9	49.8

	FOCAL LENGTH - 135MM	OBJECT DISTANCE - 30.48M	MAGNIFICATION - 0.0667	GROUP G01	FOCAL LENGTH - 135MM	OBJECT DISTANCE - 150.FT.(45.72M)	MAGNIFICATION - 0.02962	GROUP G01	FOCAL LENGTH - 135MM	OBJECT DISTANCE - 200.FT.(60.96M)	MAGNIFICATION - 0.02219	GROUP G01
E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-1
E 1	3.5	7.0	14.0	24.1	56.2	112.4	L 1	5.3	10.6	21.0	42.1	84.2
E 2	3.9	7.9	15.7	31.5	63.1	126.2	L 2	5.9	11.8	23.6	47.2	94.5
E 3	4.4	8.4	17.7	70.4	141.6	241.6	L 3	6.6	13.0	25.0	53.0	106.0
E 4	5.0	9.4	19.7	79.7	155.9	266.6	L 4	7.5	14.9	26.9	59.5	119.0
E 5	5.6	11.2	22.1	44.4	89.2	178.4	L 5	8.4	16.8	33.5	67.0	138.6
E 6	6.3	12.5	25.0	47.0	100.1	200.9	L 6	9.4	18.8	37.6	75.2	150.4

	FOCAL LENGTH - 135MM	OBJECT DISTANCE - 76.20M	MAGNIFICATION - 0.053314	GROUP G01	FOCAL LENGTH - 135MM	OBJECT DISTANCE - 300.FT.(91.44M)	MAGNIFICATION - 0.01479	GROUP G01	FOCAL LENGTH - 135MM	OBJECT DISTANCE - 400.FT.(121.02M)	MAGNIFICATION - 0.001109	GROUP G01
E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-1
E 1	6.8	17.6	35.2	70.4	140.9	241.7	L 1	10.6	21.1	42.3	84.5	169.1
E 2	9.9	19.0	39.2	74.0	158.1	316.2	L 2	11.9	23.0	47.4	94.9	189.5
E 3	11.1	22.2	44.4	95.7	172.5	344.4	L 3	13.3	26.6	53.3	106.5	213.0
E 4	12.5	24.4	49.4	93.6	199.2	348.4	L 4	14.9	29.9	59.8	119.6	239.1
E 5	14.0	24.0	55.4	111.8	223.6	367.2	L 5	16.8	33.6	67.1	134.2	268.4
E 6	15.7	31.4	62.7	125.5	251.0	512.0	L 6	18.8	37.7	75.3	150.6	301.3

	FOCAL LENGTH - 135MM	OBJECT DISTANCE - 50.0M	MAGNIFICATION - 0.000587	GROUP G01	FOCAL LENGTH - 135MM	OBJECT DISTANCE - 750.FT.(228.60M)	MAGNIFICATION - 0.000591	GROUP G01	FOCAL LENGTH - 135MM	OBJECT DISTANCE - 1000.FT.(304.80M)	MAGNIFICATION - 0.000443	GROUP G01
E	-5	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-1
E 1	17.6	35.2	70.5	141.0	262.1	543.9	L 1	26.4	52.9	105.8	211.5	423.1
E 2	19.8	39.0	79.1	158.3	316.5	613.0	L 2	29.7	59.4	118.7	237.5	474.9
E 3	22.2	44.0	98.4	177.6	355.3	710.5	L 3	33.3	66.6	133.0	266.5	533.1
E 4	24.9	59.8	99.7	194.4	378.1	747.5	L 4	37.4	74.8	149.6	299.2	598.9
E 5	28.0	54.0	111.9	221.8	447.6	895.2	L 5	42.0	84.0	167.9	335.8	671.6
E 6	31.6	57.8	125.0	251.2	502.4	999.9	L 6	47.1	94.2	188.5	376.9	753.8

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER)FOR 135MM FOCAL LENGTH LENSES

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER)FOR 135MM FOCAL LENGTH LENSES

IMAGE PLATE RESOLUTION (LINES PER MILLIMETER) FOR 150MM FOCAL LENGTH LENSES

	FOCAL LENGTH - 150MM	OBJECT DISTANCE - 50.FT.(15.24M)	MAGNIFICATION - .00360	-6 GROUP LENGTH - 7.59MM(.298IN.)	FOCAL LENGTH - 150MM	OBJECT DISTANCE - 75.FT.(22.86M)	MAGNIFICATION - .006605	-6 GROUP LENGTH - 5.04MM(.1984IN.)
	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP
E	-6	-5	-4	-3	-2	-1	E	-6
L 1	1.6	3.1	6.3	12.6	25.2	50.3	L 1	3.2
L 2	1.8	3.5	7.1	14.1	28.2	56.5	E 2	3.5
N 3	2.0	4.0	7.4	15.6	31.7	63.4	N 3	4.0
E 4	2.2	4.4	8.9	17.6	35.6	71.1	E 4	4.5
N 5	2.5	5.0	10.0	20.0	39.9	79.5	N 5	5.0
T 6	2.8	5.6	11.2	22.4	44.4	99.6	T 6	5.6

	FOCAL LENGTH - 150MM	OBJECT DISTANCE - 150FT.(45.72M)	MAGNIFICATION - .00292	-6 GROUP LENGTH - 2.51MM(.0989IN.)	FOCAL LENGTH - 150MM	OBJECT DISTANCE - 200FT.(60.96M)	MAGNIFICATION - .002467	-6 GROUP LENGTH - 1.82MM(.0741IN.)
	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP
E	-6	-5	-4	-3	-2	-1	E	-6
L 1	4.7	9.5	19.0	36.0	76.0	151.9	L 1	9.5
L 2	5.3	10.7	21.3	42.6	85.3	170.5	E 2	10.7
N 3	6.0	12.0	23.3	47.5	93.5	181.6	N 3	12.0
E 4	6.7	13.4	26.9	53.7	107.4	214.8	E 4	13.4
N 5	7.5	15.1	30.1	60.3	120.4	241.1	N 5	15.1
T 6	8.5	14.9	33.4	67.7	135.3	270.7	T 6	16.9

	FOCAL LENGTH - 150MM	OBJECT DISTANCE - 400.FT.(121.92M)	MAGNIFICATION - .001232	-6 GROUP LENGTH - .94MM(.0371IN.)	FOCAL LENGTH - 150MM	OBJECT DISTANCE - 500.FT.(152.40M)	MAGNIFICATION - .000985	-6 GROUP LENGTH - .752MM(.0296IN.)
	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP
E	-6	-5	-4	-3	-2	-1	E	-6
L 1	12.7	25.4	50.7	101.5	203.0	405.9	L 1	23.8
L 2	14.2	28.5	57.0	113.9	227.4	455.6	E 2	26.7
N 3	16.0	32.0	63.9	127.9	255.7	511.4	N 3	30.0
E 4	17.9	35.9	71.1	143.5	247.0	574.0	E 4	33.7
N 5	20.1	40.3	80.5	161.1	322.6	644.3	N 5	37.6
T 6	22.6	45.2	90.4	180.4	361.6	723.2	T 6	42.4

	FOCAL LENGTH - 150MM	OBJECT DISTANCE - 1500.FT.(457.20M)	MAGNIFICATION - .000492	-6 GROUP LENGTH - .37MM(.0148IN.)	FOCAL LENGTH - 150MM	OBJECT DISTANCE - 1500.FT.(457.20M)	MAGNIFICATION - .000328	-6 GROUP LENGTH - .250MM(.0099IN.)
	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP
E	-6	-5	-4	-3	-2	-1	E	-6
L 1	31.7	63.5	126.4	253.9	507.4	999.9	L 1	63.5
L 2	35.6	71.2	142.5	285.5	570.1	999.9	E 2	71.3
N 3	40.0	80.8	159.5	319.9	639.7	999.9	N 3	80.0
E 4	44.9	89.8	179.5	359.4	717.7	999.9	E 4	89.8
N 5	50.4	100.5	191.0	380.4	805.6	999.9	N 5	100.8
T 6	56.5	113.1	226.1	452.1	904.3	999.9	T 6	113.1

	FOCAL LENGTH - 150MM	OBJECT DISTANCE - 2000.FT.(609.60M)	MAGNIFICATION - .00026	-6 GROUP LENGTH - .188MM(.0074IN.)	FOCAL LENGTH - 150MM	OBJECT DISTANCE - 2000.FT.(609.60M)	MAGNIFICATION - .00026	-6 GROUP LENGTH - .188MM(.0074IN.)
	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP
E	-6	-5	-4	-3	-2	-1	E	-6
L 1	63.5	127.0	253.9	507.9	999.9	999.9	L 1	63.5
L 2	71.3	142.5	285.5	570.1	999.9	999.9	E 2	71.3
N 3	80.0	160.0	319.9	639.7	999.9	999.9	N 3	80.0
E 4	89.8	179.6	359.1	718.2	999.9	999.9	E 4	89.8
N 5	100.8	201.6	403.1	806.2	999.9	999.9	N 5	100.8
T 6	113.1	226.2	452.5	904.5	999.9	999.9	T 6	113.1

IMAGE PLATE RESOLUTION (LINES PER MILLIMETER) FOR 150MM FOCAL LENGTH LENSES

IMAGE PLANE RESOLUTION LINES PER MILLIMETER FOR 180MM FOCAL LENGTH LENSES

	FOCAL LENGTH	180MM	FOCAL LENGTH	180MM	FOCAL LENGTH	180MM
	OBJECT DISTANCE	15.2MM	OBJECT DISTANCE	75.FT.1	OBJECT DISTANCE	100.FT.1
	MAGNIFICATION	.011452	MAGNIFICATION	.007937	MAGNIFICATION	.006941
	-6 GROUP LENGTH	.012051 (.154.11m.)	-6 GROUP LENGTH	.0055MM (.2384IN.)	-6 GROUP LENGTH	.0533MM (.1755IN.)
E	-6	-5	-4	-3	-2	-1
E	1	1.3	2.0	2.8	3.6	4.4
E	2	1.5	2.0	2.5	3.1	3.7
E	3	1.6	2.3	2.7	3.2	3.8
E	4	1.8	2.7	3.4	4.1	4.8
E	5	2.1	4.2	5.2	6.4	7.4
E	6	2.3	4.7	9.1	11.3	13.5

	FOCAL LENGTH	180MM	FOCAL LENGTH	180MM	FOCAL LENGTH	180MM
	OBJECT DISTANCE	200.FT.1	OBJECT DISTANCE	60.96MM	OBJECT DISTANCE	91.04MM
	MAGNIFICATION	.002962	MAGNIFICATION	.0090IN.	MAGNIFICATION	.001972
	-6 GROUP LENGTH	.2260MM (.0890IN.)	-6 GROUP LENGTH	.0026MM (.0090IN.)	-6 GROUP LENGTH	.0050MM (.00237IN.)
E	-6	-5	-4	-3	-2	-1
E	1	4.0	7.9	15.9	31.6	63.4
E	2	4.4	8.0	17.7	35.5	71.1
E	3	5.0	10.0	19.7	39.7	79.8
E	4	5.6	11.2	21.4	41.4	81.4
E	5	6.3	12.4	23.4	43.4	83.4
E	6	7.0	13.6	25.4	45.4	85.4
E	7	7.6	14.8	27.4	47.4	87.4

	FOCAL LENGTH	180MM	FOCAL LENGTH	180MM	FOCAL LENGTH	180MM
	OBJECT DISTANCE	200.FT.1	OBJECT DISTANCE	60.96MM	OBJECT DISTANCE	91.04MM
	MAGNIFICATION	.002962	MAGNIFICATION	.0090IN.	MAGNIFICATION	.001972
	-6 GROUP LENGTH	.0026MM (.0090IN.)	-6 GROUP LENGTH	.0026MM (.0090IN.)	-6 GROUP LENGTH	.0050MM (.00237IN.)
E	-6	-5	-4	-3	-2	-1
E	1	4.0	7.9	15.9	31.6	63.4
E	2	4.4	8.0	17.7	35.5	71.1
E	3	5.0	10.0	19.7	39.7	79.8
E	4	5.6	11.2	21.4	41.4	81.4
E	5	6.3	12.4	23.4	43.4	83.4
E	6	7.0	13.6	25.4	45.4	85.4
E	7	7.6	14.8	27.4	47.4	87.4

	FOCAL LENGTH	180MM	FOCAL LENGTH	180MM	FOCAL LENGTH	180MM
	OBJECT DISTANCE	1500.FT.1	OBJECT DISTANCE	1500.FT.1	OBJECT DISTANCE	1500.FT.1
	MAGNIFICATION	.000394	MAGNIFICATION	.000394	MAGNIFICATION	.000394
	-6 GROUP LENGTH	.0117IN.	-6 GROUP LENGTH	.0116IN.	-6 GROUP LENGTH	.0116IN.
E	-6	-5	-4	-3	-2	-1
E	1	21.1	42.3	84.5	169.1	338.2
E	2	23.7	47.4	94.9	174.6	374.6
E	3	26.0	51.3	106.5	213.0	426.1
E	4	24.9	54.9	110.6	239.1	476.2
E	5	23.0	47.1	134.2	268.4	538.6
E	6	21.6	41.2	150.6	301.3	602.5
E	7	22.7	45.2	141.4	282.7	565.5

IMAGE PLANE RESOLUTION LINES PER MILLIMETER FOR 180MM FOCAL LENGTH LENSES

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR 200MM FOCAL LENGTH LENSES

	FOCAL LENGTH - 200MM	OBJECT DISTANCE - 75.FT.(22.86M)	MAGNIFICATION - .008826	-6 GROUP LENGTH- 6.734MM(.2651IN.)	GROUP	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1	
GROUPE																			
E	.6	.5	.4	.3	.2	.1	E	.6	.5	.4	.3	E	.6	.5	.4	.3	.2	.1	
L	1	1.2	2.1	4.1	9.4	18.4	L	1	1.0	3.5	7.1	L	1	2.4	4.7	9.5	18.9	37.8	75.7
E	2	1.3	2.6	5.6	11.6	21.1	E	2	2.0	4.0	7.9	E	2	2.7	5.3	10.6	21.2	42.5	85.0
E	3	1.5	3.0	6.6	13.4	23.7	E	2	2.2	4.5	8.9	E	3	3.0	6.0	11.9	23.8	47.7	95.4
E	4	1.5	3.0	6.6	13.4	23.7	E	2	2.2	4.5	8.9	E	4	3.3	6.7	13.4	26.8	53.5	107.1
E	5	1.7	3.3	6.9	14.3	26.4	E	2	2.5	5.0	10.0	E	5	3.8	7.5	15.0	30.0	60.1	120.2
E	6	1.9	3.7	7.5	14.9	29.1	E	2	2.8	5.6	11.2	E	6	4.2	8.4	16.9	33.7	67.4	134.9
T	7	2.1	4.2	8.0	16.7	31.4	T	6	3.2	6.3	12.6	T	6	4.2	8.4	16.9	33.7	67.4	134.9

	FOCAL LENGTH - 200MM	OBJECT DISTANCE - 200.FT.(60.96M)	MAGNIFICATION - .003292	-6 GROUP LENGTH- 2.512MM(.0989IN.)	GROUP	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1	
GROUPE																			
E	.6	.5	.4	.3	.2	.1	E	.6	.5	.4	.3	E	.6	.5	.4	.3	.2	.1	
L	1	1.0	2.1	4.2	9.4	18.4	L	1	1.0	3.5	7.1	L	1	2.1	4.6	9.5	18.9	37.8	75.7
E	2	1.0	2.0	4.0	8.0	16.0	E	2	1.0	3.0	6.0	E	2	1.0	2.0	4.0	8.0	16.0	32.0
E	3	1.2	2.4	4.8	9.6	17.4	E	2	1.2	3.2	6.4	E	3	1.8	3.6	7.2	14.4	28.7	57.4
E	4	1.5	3.0	6.0	12.0	24.0	E	2	1.5	3.5	7.0	E	4	2.1	4.2	8.4	16.8	33.6	67.2
E	5	1.8	3.3	6.6	13.2	26.4	E	2	1.8	3.6	7.2	E	5	2.4	4.8	9.6	18.0	36.0	72.0
E	6	2.0	3.6	7.0	14.0	28.0	E	2	2.0	3.8	7.6	E	6	2.4	4.8	9.6	18.0	36.0	72.0
T	7	2.3	4.0	8.0	16.0	32.0	T	6	3.0	6.0	12.0	T	6	2.4	4.8	9.6	18.0	36.0	72.0

	FOCAL LENGTH - 200MM	OBJECT DISTANCE - 500.FT.(152.40M)	MAGNIFICATION - .001314	-6 GROUP LENGTH- 1.003MM(.0395IN.)	GROUP	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1	
GROUPE																			
E	.6	.5	.4	.3	.2	.1	E	.6	.5	.4	.3	E	.6	.5	.4	.3	.2	.1	
L	1	1.0	2.1	4.2	9.4	18.4	L	1	1.0	3.5	7.1	L	1	1.7	3.5	7.0	14.2	28.5	57.1
E	2	1.0	2.0	4.0	8.0	16.0	E	2	1.0	3.0	6.0	E	2	2.0	4.0	8.0	16.0	32.0	64.0
E	3	1.2	2.4	4.8	9.6	17.4	E	2	1.2	3.2	6.4	E	3	2.2	4.5	9.0	17.9	35.9	71.9
E	4	1.5	3.0	6.0	12.0	24.0	E	2	1.5	3.5	7.0	E	4	2.5	5.0	10.0	20.5	40.5	80.7
E	5	1.8	3.3	6.6	13.2	26.4	E	2	1.8	3.6	7.2	E	5	2.8	5.6	11.3	22.6	45.3	90.6
E	6	2.0	3.6	7.0	14.0	28.0	E	2	2.0	3.8	7.6	E	6	3.0	6.0	12.0	24.0	48.0	96.0
T	7	2.3	4.0	8.0	16.0	32.0	T	6	3.0	6.0	12.0	T	6	3.0	6.0	12.0	24.0	48.0	96.0

	FOCAL LENGTH - 200MM	OBJECT DISTANCE - 1500.FT.(457.20M)	MAGNIFICATION - .000438	-6 GROUP LENGTH- .334MM(.0131IN.)	GROUP	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1	
GROUPE																			
E	.6	.5	.4	.3	.2	.1	E	.6	.5	.4	.3	E	.6	.5	.4	.3	.2	.1	
L	1	1.0	2.1	4.2	9.4	18.4	L	1	1.0	3.5	7.1	L	1	1.7	3.5	7.0	14.2	28.5	57.1
E	2	1.0	2.0	4.0	8.0	16.0	E	2	1.0	3.0	6.0	E	2	2.0	4.0	8.0	16.0	32.0	64.0
E	3	1.2	2.4	4.8	9.6	17.4	E	2	1.2	3.2	6.4	E	3	2.2	4.5	9.0	17.9	35.9	71.9
E	4	1.5	3.0	6.0	12.0	24.0	E	2	1.5	3.5	7.0	E	4	2.5	5.0	10.0	20.5	40.5	80.7
E	5	1.8	3.3	6.6	13.2	26.4	E	2	1.8	3.6	7.2	E	5	2.8	5.6	11.3	22.6	45.3	90.6
E	6	2.0	3.6	7.0	14.0	28.0	E	2	2.0	3.8	7.6	E	6	3.0	6.0	12.0	24.0	48.0	96.0
T	7	2.3	4.0	8.0	16.0	32.0	T	6	3.0	6.0	12.0	T	6	3.0	6.0	12.0	24.0	48.0	96.0

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR 200MM FOCAL LENGTH LENSES

IMAGE PLATE RESOLUTION (LINES PER MILLIMETER) FOR 205MM FOCAL LENGTH LENSES

	FOCAL LENGTH	205MM	FOCAL LENGTH	205MM	FOCAL LENGTH	205MM
	OBJECT DISTANCE	16.7MM	OBJECT DISTANCE	75.0FT (22.86M)	OBJECT DISTANCE	100.0FT (30.48M)
	MAGNIFICATION	16.7X	MAGNIFICATION	0.00949	MAGNIFICATION	0.006771
	-6 GROUP LENGTH	10.0MM (.047IN.)	-6 GROUP LENGTH	6.904MM (.2716IN.)	-6 GROUP LENGTH	5.166MM (.2034IN.)
	GROUP		GROUP		GROUP	
E	-6	-4	-1	-2	-1	-1
L 1	1.1	2.3	6.7	18.3	16.7	1.1
E 2	1.3	2.6	5.3	20.0	16.2	E 2
E 3	1.4	2.9	5.1	23.1	16.2	E 3
E 4	1.5	3.2	5.0	25.4	16.4	E 4
N 5	1.6	3.6	5.0	29.1	16.2	N 5
T 6	2.0	4.1	6.2	32.7	16.3	T 6
E	-6	-5	-3	-1	-1	E
L 1	1.1	2.3	6.7	18.3	16.7	1.1
E 2	1.3	2.6	5.3	20.0	16.2	E 2
E 3	1.4	2.9	5.1	23.1	16.2	E 3
E 4	1.5	3.2	5.0	25.4	16.4	E 4
N 5	1.6	3.6	5.0	29.1	16.2	N 5
T 6	2.0	4.1	6.2	32.7	16.3	T 6

	FOCAL LENGTH	205MM	FOCAL LENGTH	205MM	FOCAL LENGTH	205MM
	OBJECT DISTANCE	75.0FT (22.86M)	MAGNIFICATION	0.003374	OBJECT DISTANCE	300.0FT (91.44M)
	-6 GROUP LENGTH	2.575MM (.1014IN.)	-6 GROUP LENGTH	1.714MM (.0675IN.)	MAGNIFICATION	0.02247
	GROUP		GROUP		GROUP	
E	-6	-5	-3	-1	E	-6
L 1	1.1	2.3	6.7	18.3	16.7	1.1
E 2	1.3	2.6	5.3	20.0	16.2	E 2
E 3	1.4	2.9	5.1	23.1	16.2	E 3
E 4	1.5	3.2	5.0	25.4	16.4	E 4
N 5	1.6	3.6	5.0	29.1	16.2	N 5
T 6	2.0	4.1	6.2	32.7	16.3	T 6
E	-6	-5	-3	-1	E	-6
L 1	1.1	2.3	6.7	18.3	16.7	L 1
E 2	1.3	2.6	5.3	20.0	16.2	E 2
E 3	1.4	2.9	5.1	23.1	16.2	E 3
E 4	1.5	3.2	5.0	25.4	16.4	E 4
N 5	1.6	3.6	5.0	29.1	16.2	N 5
T 6	2.0	4.1	6.2	32.7	16.3	T 6

	FOCAL LENGTH	205MM	FOCAL LENGTH	205MM	FOCAL LENGTH	205MM
	OBJECT DISTANCE	75.0FT (22.86M)	MAGNIFICATION	0.004051	OBJECT DISTANCE	750.0FT (228.60M)
	-6 GROUP LENGTH	1.028MM (.0405IN.)	-6 GROUP LENGTH	1.028MM (.0405IN.)	MAGNIFICATION	0.00895
	GROUP		GROUP		GROUP	
E	-6	-5	-3	-1	E	-6
L 1	1.1	2.3	6.7	18.3	16.7	L 1
E 2	1.3	2.6	5.3	20.0	16.2	E 2
E 3	1.4	2.9	5.1	23.1	16.2	E 3
E 4	1.5	3.2	5.0	25.4	16.4	E 4
N 5	1.6	3.6	5.0	29.1	16.2	N 5
T 6	2.0	4.1	6.2	32.7	16.3	T 6
E	-6	-5	-3	-1	E	-6
L 1	1.1	2.3	6.7	18.3	16.7	L 1
E 2	1.3	2.6	5.3	20.0	16.2	E 2
E 3	1.4	2.9	5.1	23.1	16.2	E 3
E 4	1.5	3.2	5.0	25.4	16.4	E 4
N 5	1.6	3.6	5.0	29.1	16.2	N 5
T 6	2.0	4.1	6.2	32.7	16.3	T 6

	FOCAL LENGTH	205MM	FOCAL LENGTH	205MM	FOCAL LENGTH	205MM
	OBJECT DISTANCE	150.0FT (45.72M)	MAGNIFICATION	0.00449	OBJECT DISTANCE	2000.0FT (609.60M)
	-6 GROUP LENGTH	.514MM (.0205IN.)	-6 GROUP LENGTH	.342MM (.0135IN.)	MAGNIFICATION	.000336
	GROUP		GROUP		GROUP	
E	-6	-5	-3	-1	E	-6
L 1	1.1	2.3	6.7	18.3	16.7	L 1
E 2	1.3	2.6	5.3	20.0	16.2	E 2
E 3	1.4	2.9	5.1	23.1	16.2	E 3
E 4	1.5	3.2	5.0	25.4	16.4	E 4
N 5	1.6	3.6	5.0	29.1	16.2	N 5
T 6	2.0	4.1	6.2	32.7	16.3	T 6
E	-6	-5	-3	-1	E	-6
L 1	1.1	2.3	6.7	18.3	16.7	L 1
E 2	1.3	2.6	5.3	20.0	16.2	E 2
E 3	1.4	2.9	5.1	23.1	16.2	E 3
E 4	1.5	3.2	5.0	25.4	16.4	E 4
N 5	1.6	3.6	5.0	29.1	16.2	N 5
T 6	2.0	4.1	6.2	32.7	16.3	T 6

	FOCAL LENGTH	205MM	FOCAL LENGTH	205MM	FOCAL LENGTH	205MM
	OBJECT DISTANCE	150.0FT (45.72M)	MAGNIFICATION	0.00449	OBJECT DISTANCE	2000.0FT (609.60M)
	-6 GROUP LENGTH	.514MM (.0205IN.)	-6 GROUP LENGTH	.342MM (.0135IN.)	MAGNIFICATION	.000336
	GROUP		GROUP		GROUP	
E	-6	-5	-3	-1	E	-6
L 1	1.1	2.3	6.7	18.3	16.7	L 1
E 2	1.3	2.6	5.3	20.0	16.2	E 2
E 3	1.4	2.9	5.1	23.1	16.2	E 3
E 4	1.5	3.2	5.0	25.4	16.4	E 4
N 5	1.6	3.6	5.0	29.1	16.2	N 5
T 6	2.0	4.1	6.2	32.7	16.3	T 6

IMAGE PLATE RESOLUTION (LINES PER MILLIMETER) FOR 205MM FOCAL LENGTH LENSES

IMAGE PLATE RESOLUTION LINES PER MILLIMETER FOR 210MM FOCAL LENGTH LENSES

FOCAL LENGTH = 210MM		FOCAL LENGTH = 210MM	
OBJECT DISTANCE = 75.FT. (22.86M)		OBJECT DISTANCE = 100 FT. (30.48M)	
MAGNIFICATION = .009272		MAGNIFICATION = .006938	
-6 GROUP LENGTH= 10.661MM (.2705IN.)		-6 GROUP LENGTH= 5.293MM (.2084IN.)	
GROUP	GROUP	GROUP	GROUP
-6	-5	-4	-3
1.1	2.2	4.4	6.6
1.3	2.5	5.0	7.9
1.4	2.8	5.2	8.0
1.6	3.2	6.1	8.2
1.8	3.6	7.1	8.4
2.0	4.0	7.6	8.7
-5	-4	-3	-2
1.1	1.9	3.5	5.4
1.3	2.1	4.0	5.6
1.4	2.3	4.2	5.8
1.6	2.7	4.5	6.1
1.8	3.1	5.0	6.5
2.0	3.5	5.3	6.8
-4	-3	-2	-1
1.1	1.7	3.4	5.0
1.3	1.9	3.6	5.1
1.4	2.1	4.2	5.5
1.6	2.4	4.5	5.8
1.8	2.7	5.4	6.3
2.0	3.0	5.6	6.7
-3	-2	-1	E
1.1	1.7	3.4	E
1.3	1.9	3.6	L 1
1.4	2.1	4.2	E 2
1.6	2.4	4.5	H 3
1.8	2.7	5.4	E 4
2.0	3.0	5.6	N 5
			T 6
-2	-1	E	
1.1	1.7	E	
1.3	1.9	L 1	
1.4	2.1	E 2	
1.6	2.4	H 3	
1.8	2.7	E 4	
2.0	3.0	N 5	
		T 6	
-1			

FOCAL LENGTH	-210MM	FOCAL LENGTH	-210MM
OBJECT DISTANCE	-500.FT.(152.40M)	OBJECT DISTANCE	-750.FT.(228.60M)
MAGNIFICATION	-0.01380	MAGNIFICATION	-0.00919
-6 GROUP LENGTH	1.053MM(.0414IN.)	-6 GROUP LENGTH	.702MM(.0276IN.)
GROUP	GROUP	GROUP	GROUP
-6	-5	-4	-3
-5	-4	-3	-2
-4	-3	-2	-1
-3	-2	-1	E
-2	-1	E	-1
-1	E	-2	-2
1	1.1.1	1.1.1	1.1.1
2	1.0.2	1.1.3	1.2.4
3	1.0.3	1.1.3	1.2.5
4	1.2.3	1.2.3	1.3.5
5	1.1.4	1.1.4	1.1.4
6	1.2.4	1.2.4	1.2.5
7	1.1.5	1.1.5	1.1.5
8	1.2.5	1.2.5	1.2.5
9	1.1.6	1.1.6	1.1.6
10	1.2.6	1.2.6	1.2.6
11	1.1.7	1.1.7	1.1.7
12	1.2.7	1.2.7	1.2.7
13	1.1.8	1.1.8	1.1.8
14	1.2.8	1.2.8	1.2.8
15	1.1.9	1.1.9	1.1.9
16	1.2.9	1.2.9	1.2.9
17	1.1.10	1.1.10	1.1.10
18	1.2.10	1.2.10	1.2.10
19	1.1.11	1.1.11	1.1.11
20	1.2.11	1.2.11	1.2.11
21	1.1.12	1.1.12	1.1.12
22	1.2.12	1.2.12	1.2.12
23	1.1.13	1.1.13	1.1.13
24	1.2.13	1.2.13	1.2.13
25	1.1.14	1.1.14	1.1.14
26	1.2.14	1.2.14	1.2.14
27	1.1.15	1.1.15	1.1.15
28	1.2.15	1.2.15	1.2.15
29	1.1.16	1.1.16	1.1.16
30	1.2.16	1.2.16	1.2.16
31	1.1.17	1.1.17	1.1.17
32	1.2.17	1.2.17	1.2.17
33	1.1.18	1.1.18	1.1.18
34	1.2.18	1.2.18	1.2.18
35	1.1.19	1.1.19	1.1.19
36	1.2.19	1.2.19	1.2.19
37	1.1.20	1.1.20	1.1.20
38	1.2.20	1.2.20	1.2.20
39	1.1.21	1.1.21	1.1.21
40	1.2.21	1.2.21	1.2.21
41	1.1.22	1.1.22	1.1.22
42	1.2.22	1.2.22	1.2.22
43	1.1.23	1.1.23	1.1.23
44	1.2.23	1.2.23	1.2.23
45	1.1.24	1.1.24	1.1.24
46	1.2.24	1.2.24	1.2.24
47	1.1.25	1.1.25	1.1.25
48	1.2.25	1.2.25	1.2.25
49	1.1.26	1.1.26	1.1.26
50	1.2.26	1.2.26	1.2.26
51	1.1.27	1.1.27	1.1.27
52	1.2.27	1.2.27	1.2.27
53	1.1.28	1.1.28	1.1.28
54	1.2.28	1.2.28	1.2.28
55	1.1.29	1.1.29	1.1.29
56	1.2.29	1.2.29	1.2.29
57	1.1.30	1.1.30	1.1.30
58	1.2.30	1.2.30	1.2.30
59	1.1.31	1.1.31	1.1.31
60	1.2.31	1.2.31	1.2.31
61	1.1.32	1.1.32	1.1.32
62	1.2.32	1.2.32	1.2.32
63	1.1.33	1.1.33	1.1.33
64	1.2.33	1.2.33	1.2.33
65	1.1.34	1.1.34	1.1.34
66	1.2.34	1.2.34	1.2.34
67	1.1.35	1.1.35	1.1.35
68	1.2.35	1.2.35	1.2.35
69	1.1.36	1.1.36	1.1.36
70	1.2.36	1.2.36	1.2.36
71	1.1.37	1.1.37	1.1.37
72	1.2.37	1.2.37	1.2.37
73	1.1.38	1.1.38	1.1.38
74	1.2.38	1.2.38	1.2.38
75	1.1.39	1.1.39	1.1.39
76	1.2.39	1.2.39	1.2.39
77	1.1.40	1.1.40	1.1.40
78	1.2.40	1.2.40	1.2.40
79	1.1.41	1.1.41	1.1.41
80	1.2.41	1.2.41	1.2.41
81	1.1.42	1.1.42	1.1.42
82	1.2.42	1.2.42	1.2.42
83	1.1.43	1.1.43	1.1.43
84	1.2.43	1.2.43	1.2.43
85	1.1.44	1.1.44	1.1.44
86	1.2.44	1.2.44	1.2.44
87	1.1.45	1.1.45	1.1.45
88	1.2.45	1.2.45	1.2.45
89	1.1.46	1.1.46	1.1.46
90	1.2.46	1.2.46	1.2.46
91	1.1.47	1.1.47	1.1.47
92	1.2.47	1.2.47	1.2.47
93	1.1.48	1.1.48	1.1.48
94	1.2.48	1.2.48	1.2.48
95	1.1.49	1.1.49	1.1.49
96	1.2.49	1.2.49	1.2.49
97	1.1.50	1.1.50	1.1.50
98	1.2.50	1.2.50	1.2.50
99	1.1.51	1.1.51	1.1.51
100	1.2.51	1.2.51	1.2.51
101	1.1.52	1.1.52	1.1.52
102	1.2.52	1.2.52	1.2.52
103	1.1.53	1.1.53	1.1.53
104	1.2.53	1.2.53	1.2.53
105	1.1.54	1.1.54	1.1.54
106	1.2.54	1.2.54	1.2.54
107	1.1.55	1.1.55	1.1.55
108	1.2.55	1.2.55	1.2.55
109	1.1.56	1.1.56	1.1.56
110	1.2.56	1.2.56	1.2.56
111	1.1.57	1.1.57	1.1.57
112	1.2.57	1.2.57	1.2.57
113	1.1.58	1.1.58	1.1.58
114	1.2.58	1.2.58	1.2.58
115	1.1.59	1.1.59	1.1.59
116	1.2.59	1.2.59	1.2.59
117	1.1.60	1.1.60	1.1.60
118	1.2.60	1.2.60	1.2.60
119	1.1.61	1.1.61	1.1.61
120	1.2.61	1.2.61	1.2.61
121	1.1.62	1.1.62	1.1.62
122	1.2.62	1.2.62	1.2.62
123	1.1.63	1.1.63	1.1.63
124	1.2.63	1.2.63	1.2.63
125	1.1.64	1.1.64	1.1.64
126	1.2.64	1.2.64	1.2.64
127	1.1.65	1.1.65	1.1.65
128	1.2.65	1.2.65	1.2.65
129	1.1.66	1.1.66	1.1.66
130	1.2.66	1.2.66	1.2.66
131	1.1.67	1.1.67	1.1.67
132	1.2.67	1.2.67	1.2.67
133	1.1.68	1.1.68	1.1.68
134	1.2.68	1.2.68	1.2.68
135	1.1.69	1.1.69	1.1.69
136	1.2.69	1.2.69	1.2.69
137	1.1.70	1.1.70	1.1.70
138	1.2.70	1.2.70	1.2.70
139	1.1.71	1.1.71	1.1.71
140	1.2.71	1.2.71	1.2.71
141	1.1.72	1.1.72	1.1.72
142	1.2.72	1.2.72	1.2.72
143	1.1.73	1.1.73	1.1.73
144	1.2.73	1.2.73	1.2.73
145	1.1.74	1.1.74	1.1.74
146	1.2.74	1.2.74	1.2.74
147	1.1.75	1.1.75	1.1.75
148	1.2.75	1.2.75	1.2.75
149	1.1.76	1.1.76	1.1.76
150	1.2.76	1.2.76	1.2.76
151	1.1.77	1.1.77	1.1.77
152	1.2.77	1.2.77	1.2.77
153	1.1.78	1.1.78	1.1.78
154	1.2.78	1.2.78	1.2.78
155	1.1.79	1.1.79	1.1.79
156	1.2.79	1.2.79	1.2.79
157	1.1.80	1.1.80	1.1.80
158	1.2.80	1.2.80	1.2.80
159	1.1.81	1.1.81	1.1.81
160	1.2.81	1.2.81	1.2.81
161	1.1.82	1.1.82	1.1.82
162	1.2.82	1.2.82	1.2.82
163	1.1.83	1.1.83	1.1.83
164	1.2.83	1.2.83	1.2.83
165	1.1.84	1.1.84	1.1.84
166	1.2.84	1.2.84	1.2.84
167	1.1.85	1.1.85	1.1.85
168	1.2.85	1.2.85	1.2.85
169	1.1.86	1.1.86	1.1.86
170	1.2.86	1.2.86	1.2.86
171	1.1.87	1.1.87	1.1.87
172	1.2.87	1.2.87	1.2.87
173	1.1.88	1.1.88	1.1.88
174	1.2.88	1.2.88	1.2.88
175	1.1.89	1.1.89	1.1.89
176	1.2.89	1.2.89	1.2.89
177	1.1.90	1.1.90	1.1.90
178	1.2.90	1.2.90	1.2.90
179	1.1.91	1.1.91	1.1.91
180	1.2.91	1.2.91	1.2.91
181	1.1.92	1.1.92	1.1.92
182	1.2.92	1.2.92	1.2.92
183	1.1.93	1.1.93	1.1.93
184	1.2.93	1.2.93	1.2.93
185	1.1.94	1.1.94	1.1.94
186	1.2.94	1.2.94	1.2.94
187	1.1.95	1.1.95	1.1.95
188	1.2.95	1.2.95	1.2.95
189	1.1.96	1.1.96	1.1.96
190	1.2.96	1.2.96	1.2.96
191	1.1.97	1.1.97	1.1.97
192	1.2.97	1.2.97	1.2.97
193	1.1.98	1.1.98	1.1.98
194	1.2.98	1.2.98	1.2.98
195	1.1.99	1.1.99	1.1.99
196	1.2.99	1.2.99	1.2.99
197	1.1.100	1.1.100	1.1.100
198	1.2.100	1.2.100	1.2.100
199	1.1.101	1.1.101	1.1.101
200	1.2.101	1.2.101	1.2.101
201	1.1.102	1.1.102	1.1.102
202	1.2.102	1.2.102	1.2.102
203	1.1.103	1.1.103	1.1.103
204	1.2.104	1.2.104	1.2.104
205	1.1.105	1.1.105	1.1.105
206	1.2.106	1.2.106	1.2.106
207	1.1.107	1.1.107	1.1.107
208	1.2.108	1.2.108	1.2.108
209	1.1.109	1.1.109	1.1.109
210	1.2.110	1.2.110	1.2.110
211	1.1.111	1.1.111	1.1.111
212	1.2.112	1.2.112	1.2.112
213	1.1.113	1.1.113	1.1.113
214	1.2.114	1.2.114	1.2.114
215	1.1.115	1.1.115	1.1.115
216	1.2.116	1.2.116	1.2.116
217	1.1.117	1.1.117	1.1.117
218	1.2.118	1.2.118	1.2.118
219	1.1.119	1.1.119	1.1.119
220	1.2.120	1.2.120	1.2.120
221	1.1.121	1.1.121	1.1.121
222	1.2.122	1.2.122	1.2.122
223	1.1.123	1.1.123	1.1.123
224	1.2.124	1.2.124	1.2.124
225	1.1.125	1.1.125	1.1.125
226	1.2.126	1.2.126	1.2.126
227	1.1.127	1.1.127	1.1.127
228	1.2.128	1.2.128	1.2.128
229	1.1.129	1.1.129	1.1.129
230	1.2.130	1.2.130	1.2.130
231	1.1.131	1.1.131	1.1.131
232	1.2.132	1.2.132	1.2.132
233	1.1.133	1.1.133	1.1.133
234	1.2.134	1.2.134	1.2.134
235	1.1.135	1.1.135	1.1.135
236	1.2.136	1.2.136	1.2.136
237	1.1.137	1.1.137	1.1.137
238	1.2.138	1.2.138	1.2.138
239	1.1.139	1.1.139	1.1.139
240	1.2.140	1.2.140	1.2.140
241	1.1.141	1.1.141	1.1.141
242	1.2.142	1.2.142	1.2.142
243	1.1.143	1.1.143	1.1.143
244	1.2.144	1.2.144	1.2.144
245	1.1.145	1.1.145	1.1.145
246	1.2.146	1.2.146	1.2.146
247	1.1.147	1.1.147	1.1.147
248	1.2.148	1.2.148	1.2.148
249	1.1.149	1.1.149	1.1.149
250	1.2.150	1.2.150	1.2.150
251	1.1.151	1.1.151	1.1.151
252	1.2.152	1.2.152	1.2.152
253	1.1.153	1.1.153	1.1.153
254	1.2.154	1.2.154	1.2.154
255	1.1.155	1.1.155	1.1.155
256	1.2.156	1.2.156	1.2.156
257	1.1.157	1.1.157	1.1.157
258	1.2.158	1.2.158	1.2.158
259	1.1.159	1.1.159	1.1.159
260	1.2.160	1.2.160	1.2.160

		FOCAL LENGTH = 210MM	FOCAL LENGTH = 210MM	FOCAL LENGTH = 210MM
OBJECT DISTANCE =	INCHES	FT. (300. - 600.)	OBJECT DISTANCE = 2000.FT.(457.20M)	OBJECT DISTANCE = 2000.FT.(609.60M)
MAGNIFICATION =	-	-	MAGNIFICATION = -	MAGNIFICATION = -
-A GROUP LENGTH =	-	-	-A GROUP LENGTH = -	-A GROUP LENGTH = -
GROUP	GROUP	GROUP	GROUP	GROUP
-B	-5	-1	-3	-1
1	22.7	45.3	90. /	181.4
2	25.4	50.4	101.3	362.7
3	28.0	57.1	114.2	407.2
4	32.0	64.1	124.9	403.6
5	36.0	72.0	133.9	447.0
6	40.4	80.8	141.4	500.4
7	45.3	90.7	161.3	553.3
8	50.4	101.3	181.4	609.9
9	57.1	114.3	210.0	666.9
10	64.1	124.9	247.0	733.9
11	72.0	133.9	267.0	800.9
12	80.8	141.4	287.0	866.3
13	89.9	150.0	307.0	933.3
14	99.9	160.0	327.0	999.9
15	99.9	170.0	347.0	999.9
16	99.9	180.0	367.0	999.9
17	99.9	190.0	387.0	999.9
18	99.9	200.0	407.0	999.9
19	99.9	210.0	427.0	999.9
20	99.9	220.0	447.0	999.9
21	99.9	230.0	467.0	999.9
22	99.9	240.0	487.0	999.9
23	99.9	250.0	507.0	999.9
24	99.9	260.0	527.0	999.9
25	99.9	270.0	547.0	999.9
26	99.9	280.0	567.0	999.9
27	99.9	290.0	587.0	999.9
28	99.9	300.0	607.0	999.9
29	99.9	310.0	627.0	999.9
30	99.9	320.0	647.0	999.9
31	99.9	330.0	667.0	999.9
32	99.9	340.0	687.0	999.9
33	99.9	350.0	707.0	999.9
34	99.9	360.0	727.0	999.9
35	99.9	370.0	747.0	999.9
36	99.9	380.0	767.0	999.9
37	99.9	390.0	787.0	999.9
38	99.9	400.0	807.0	999.9
39	99.9	410.0	827.0	999.9
40	99.9	420.0	847.0	999.9
41	99.9	430.0	867.0	999.9
42	99.9	440.0	887.0	999.9
43	99.9	450.0	907.0	999.9
44	99.9	460.0	927.0	999.9
45	99.9	470.0	947.0	999.9
46	99.9	480.0	967.0	999.9
47	99.9	490.0	987.0	999.9
48	99.9	500.0	1007.0	999.9
49	99.9	510.0	1027.0	999.9
50	99.9	520.0	1047.0	999.9
51	99.9	530.0	1067.0	999.9
52	99.9	540.0	1087.0	999.9
53	99.9	550.0	1107.0	999.9
54	99.9	560.0	1127.0	999.9
55	99.9	570.0	1147.0	999.9
56	99.9	580.0	1167.0	999.9
57	99.9	590.0	1187.0	999.9
58	99.9	600.0	1207.0	999.9
59	99.9	610.0	1227.0	999.9
60	99.9	620.0	1247.0	999.9
61	99.9	630.0	1267.0	999.9
62	99.9	640.0	1287.0	999.9
63	99.9	650.0	1307.0	999.9
64	99.9	660.0	1327.0	999.9
65	99.9	670.0	1347.0	999.9
66	99.9	680.0	1367.0	999.9
67	99.9	690.0	1387.0	999.9
68	99.9	700.0	1407.0	999.9
69	99.9	710.0	1427.0	999.9
70	99.9	720.0	1447.0	999.9
71	99.9	730.0	1467.0	999.9
72	99.9	740.0	1487.0	999.9
73	99.9	750.0	1507.0	999.9
74	99.9	760.0	1527.0	999.9
75	99.9	770.0	1547.0	999.9
76	99.9	780.0	1567.0	999.9
77	99.9	790.0	1587.0	999.9
78	99.9	800.0	1607.0	999.9
79	99.9	810.0	1627.0	999.9
80	99.9	820.0	1647.0	999.9
81	99.9	830.0	1667.0	999.9
82	99.9	840.0	1687.0	999.9
83	99.9	850.0	1707.0	999.9
84	99.9	860.0	1727.0	999.9
85	99.9	870.0	1747.0	999.9
86	99.9	880.0	1767.0	999.9
87	99.9	890.0	1787.0	999.9
88	99.9	900.0	1807.0	999.9
89	99.9	910.0	1827.0	999.9
90	99.9	920.0	1847.0	999.9
91	99.9	930.0	1867.0	999.9
92	99.9	940.0	1887.0	999.9
93	99.9	950.0	1907.0	999.9
94	99.9	960.0	1927.0	999.9
95	99.9	970.0	1947.0	999.9
96	99.9	980.0	1967.0	999.9
97	99.9	990.0	1987.0	999.9
98	99.9	1000.0	2007.0	999.9
99	99.9	1010.0	2027.0	999.9
100	99.9	1020.0	2047.0	999.9
101	99.9	1030.0	2067.0	999.9
102	99.9	1040.0	2087.0	999.9
103	99.9	1050.0	2107.0	999.9
104	99.9	1060.0	2127.0	999.9
105	99.9	1070.0	2147.0	999.9
106	99.9	1080.0	2167.0	999.9
107	99.9	1090.0	2187.0	999.9
108	99.9	1100.0	2207.0	999.9
109	99.9	1110.0	2227.0	999.9
110	99.9	1120.0	2247.0	999.9
111	99.9	1130.0	2267.0	999.9
112	99.9	1140.0	2287.0	999.9
113	99.9	1150.0	2307.0	999.9
114	99.9	1160.0	2327.0	999.9
115	99.9	1170.0	2347.0	999.9
116	99.9	1180.0	2367.0	999.9
117	99.9	1190.0	2387.0	999.9
118	99.9	1200.0	2407.0	999.9
119	99.9	1210.0	2427.0	999.9
120	99.9	1220.0	2447.0	999.9
121	99.9	1230.0	2467.0	999.9
122	99.9	1240.0	2487.0	999.9
123	99.9	1250.0	2507.0	999.9
124	99.9	1260.0	2527.0	999.9
125	99.9	1270.0	2547.0	999.9
126	99.9	1280.0	2567.0	999.9
127	99.9	1290.0	2587.0	999.9
128	99.9	1300.0	2607.0	999.9
129	99.9	1310.0	2627.0	999.9
130	99.9	1320.0	2647.0	999.9
131	99.9	1330.0	2667.0	999.9
132	99.9	1340.0	2687.0	999.9
133	99.9	1350.0	2707.0	999.9
134	99.9	1360.0	2727.0	999.9
135	99.9	1370.0	2747.0	999.9
136	99.9	1380.0	2767.0	999.9
137	99.9	1390.0	2787.0	999.9
138	99.9	1400.0	2807.0	999.9
139	99.9	1410.0	2827.0	999.9
140	99.9	1420.0	2847.0	999.9
141	99.9	1430.0	2867.0	999.9
142	99.9	1440.0	2887.0	999.9
143	99.9	1450.0	2907.0	999.9
144	99.9	1460.0	2927.0	999.9
145	99.9	1470.0	2947.0	999.9
146	99.9	1480.0	2967.0	999.9
147	99.9	1490.0	2987.0	999.9
148	99.9	1500.0	3007.0	999.9
149	99.9	1510.0	3027.0	999.9
150	99.9	1520.0	3047.0	999.9
151	99.9	1530.0	3067.0	999.9
152	99.9	1540.0	3087.0	999.9
153	99.9	1550.0	3107.0	999.9
154	99.9	1560.0	3127.0	999.9
155	99.9	1570.0	3147.0	999.9
156	99.9	1580.0	3167.0	999.9
157	99.9	1590.0	3187.0	999.9
158	99.9	1600.0	3207.0	999.9
159	99.9	1610.0	3227.0	999.9
160	99.9	1620.0	3247.0	999.9
161	99.9	1630.0	3267.0	999.9
162	99.9	1640.0	3287.0	999.9
163	99.9	1650.0	3307.0	999.9
164	99.9	1660.0	3327.0	999.9
165	99.9	1670.0	3347.0	999.9
166	99.9	1680.0	3367.0	999.9
167	99.9	1690.0	3387.0	999.9
168	99.9	1700.0	3407.0	999.9
169	99.9	1710.0	3427.0	999.9
170	99.9	1720.0	3447.0	999.9
171	99.9	1730.0	3467.0	999.9
172	99.9	1740.0	3487.0	999.9
173	99.9	1750.0	3507.0	999.9
174	99.9	1760.0	3527.0	999.9
175	99.9	1770.0	3547.0	999.9
176	99.9	1780.0	3567.0	999.9
177	99.9	1790.0	3587.0	999.9
178	99.9	1800.0	3607.0	999.9
179	99.9	1810.0	3627.0	999.9
180	99.9	1820.0	3647.0	999.9
181	99.9	1830.0	3667.0	999.9
182	99.9	1840.0	3687.0	999.9
183	99.9	1850.0	3707.0	999.9
184	99.9	1860.0	3727.0	999.9
185	99.9	1870.0	3747.0	999.9
186	99.9	1880.0	3767.0	999.9
187	99.9	1890.0	3787.0	999.9
188	99.9	1900.0	3807.0	999.9
189	99.9	1910.0	3827.0	999.9
190	99.9	1920.0	3847.0	999.9
191	99.9	1930.0	3867.0	999.9
192	99.9	1940.0	3887.0	999.9
193	99.9	1950.0	3907.0	999.9
194	99.9	1960.0	3927.0	999.9
195	99.9	1970.0	3947.0	999.9
196	99.9	1980.0	3967.0	999.9
197	99.9	1990.0	3987.0	999.9
198	99.9	2000.0	4007.0	999.9

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR 210MM FOCAL LENGTH LENSES

230MM FOCAL LENGTH LENSES

FOCAL LENGTH = 230MM		FOCAL LENGTH = 250MM		FOCAL LENGTH = 300MM	
OBJECT DISTANCE = 1500.FT. (457.20M)		OBJECT DISTANCE = 2000.FT. (609.60M)		OBJECT DISTANCE = 2000.FT. (609.60M)	
MAGNIFICATION = .000503		MAGNIFICATION = .000377		MAGNIFICATION = .000377	
-6 GROUP LENGTH = .574MM (.02271IN.)		-6 GROUP LENGTH = .284MM (.01131IN.)		-6 GROUP LENGTH = .284MM (.01131IN.)	
GROUP	GROUP	GROUP	GROUP	GROUP	GROUP
-6	-5	-4	-3	-2	-1
E	E	E	E	E	E
1	1	1	1	1	1
20.7	41.4	42.4	45.5	54.2	64.2
L 1	L 1	L 1	L 1	L 1	L 1
22.1	46.5	48.2	51.5	57.1	64.2
E 2	E 2	E 2	E 2	E 2	E 2
26.1	52.1	54.1	58.1	64.1	71.1
M 3	M 3	M 3	M 3	M 3	M 3
29.3	54.5	57.7	61.7	68.1	75.1
E 4	E 4	E 4	E 4	E 4	E 4
32.8	58.7	61.4	64.1	69.7	76.4
K 5	K 5	K 5	K 5	K 5	K 5
36.9	73.7	74.7	78.1	82.5	87.1
T 6	T 6	T 6	T 6	T 6	T 6

THE LETTER FOR SECTION 111

FOCAL LENGTH	230MM	230MM	230MM	230MM	230MM
OBJECT DISTANCE	5.0'-11' (15.24m)	75.FT.1	75.FT.1	75.FT.1	75.FT.1
MAGNIFICATION	+010163	+010163	+010163	+010163	+010163
-A GROUP LENGTH-	11.692mm (.4601in.)	7.755mm (.3053in.)	7.755mm (.3053in.)	7.755mm (.3053in.)	7.755mm (.3053in.)
GROUP					
1	.5	-2	-2	-2	-1
2	.5	.5	.5	.5	.5
3	1.0	2.0	4.0	6.0	9.0
4	1.1	2.3	4.6	7.2	11.3
5	1.3	2.6	5.1	8.2	13.8
6	1.4	2.9	5.5	9.0	15.5
7	1.5	3.2	6.0	9.4	15.0
8	1.6	3.4	6.5	9.8	16.0
9	1.7	3.6	7.0	10.2	17.0
10	1.8	3.8	7.5	10.6	17.4
11	1.9	4.0	8.0	11.0	17.8
12	2.0	4.2	8.5	11.4	18.2
13	2.1	4.4	9.0	11.8	18.6
14	2.2	4.6	9.5	12.2	19.0
15	2.3	4.8	10.0	12.6	19.4
16	2.4	5.0	10.5	13.0	19.8
17	2.5	5.2	11.0	13.4	20.2
18	2.6	5.4	11.5	13.8	20.6
19	2.7	5.6	12.0	14.2	21.0
20	2.8	5.8	12.5	14.6	21.4
21	2.9	6.0	13.0	15.0	21.8
22	3.0	6.2	13.5	15.4	22.2
23	3.1	6.4	14.0	15.8	22.6
24	3.2	6.6	14.5	16.2	23.0
25	3.3	6.8	15.0	16.6	23.4
26	3.4	7.0	15.5	17.0	23.8
27	3.5	7.2	16.0	17.4	24.2

	FOCAL LENGTH =	230MM	230MM
	OBJECT DISTANCE =	200. FT. (	60.96M)
	MAGNIFICATION =	+003787	
	-6 GROUP LENGTH =	2.89MM (.1138IN.)	
	GROUP		
E	-6	-5	-4
L	3.1	6.2	12.4
S	3.5	6.4	13.3
C	3.9	7.4	15.1
P	4.4	8.7	17.5
E	4.8	9.4	19.4
A	5.0	9.8	22.7
S	5.5	11.3	
T	6.0		

	FOCAL LENGTH	"	230MM	230MM	"	FOCAL LENGTH	"	230MM	230MM	"	MAGNIFICATION	"	001511	001511	"
	OBJECT DISTANCE	"	500 FT.	(	)	OBJECT DISTANCE	"	500 FT.	(	)	GROUP LENGTH	"	0.054IN.	0.054IN.	"
	MAGNIFICATION	"	1.153MM	(	)	MAGNIFICATION	"	1.153MM	(	)	GROUP LENGTH	"	0.054IN.	0.054IN.	"
	GROUP					GROUP					GROUP				
E	-46	-5	-4	-3	-2	E	-6	-5	-4	-3	E	-6	-5	-4	-3
L	1	8.3	16.5	33.1	66.1	L	1	10.3	20.7	41.4	L	1	165.4	330.8	-1
E	2	9.3	17.1	34.1	68.2	E	2	11.6	23.2	46.4	E	2	185.7	371.3	-2
S	3	10.4	20.7	41.7	83.3	S	3	13.0	26.0	52.1	S	3	208.4	416.8	-3
E	4	11.7	22.4	44.7	86.4	E	4	14.6	29.2	58.5	E	4	233.9	467.8	-4
N	5	13.1	26.2	52.7	105.0	N	5	16.4	32.8	65.6	N	5	262.6	525.1	-5
T	6	14.7	29.4	58.4	117.4	T	6	18.4	36.8	73.7	T	6	294.7	589.4	-6

FOCAL LENGTH	- 230MM	FOCAL LENGTH	- 230MM
OBJECT DISTANCE	- 1500.FT. (457.20M)	MAGNIFICATION	- .000503
GROUP LENGTH	- .284MM (.011IN.)	GROUP	
GROUP			
E	-6	-5	-4
L	20.7	61.4	145.6
L	1	60.5	142.0
E	2	105.3	271.6
E	2	105.3	271.6
E	3	117.0	294.1
E	4	117.0	294.1
E	5	131.4	262.6
E	6	147.4	294.0
L	1	54.7	147.4
L	2	93.7	246.0
E	3	110.6	221.3
E	4	110.6	221.3
E	5	110.6	221.3
E	6	110.6	221.3

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR 250MM FOCAL LENGTH LENSES

FOCAL LENGTH - 250MM		FOCAL LENGTH - 250MM		FOCAL LENGTH - 250MM	
OBJECT DISTANCE - 50.FT. (15.24M)	MAGNIFICATION - 0.0105 (.0244IN.)	OBJECT DISTANCE - 75.FT. (22.86M)	MAGNIFICATION - 0.01105 (.0244IN.)	OBJECT DISTANCE - 100.FT. (30.48M)	MAGNIFICATION - 0.0115 (.0244IN.)
GROUP LENGTH - 0.437MM (.0332IN.)		GROUP LENGTH - 0.437MM (.0332IN.)		GROUP LENGTH - 0.319MM (.0244IN.)	
E -6	-5	-4	-3	-2	-1
E 0	1.4	2.7	5.0	10.0	21.4
E 1	1.1	2.1	4.2	8.2	16.2
E 2	1.2	2.4	4.7	9.4	18.9
E 3	1.3	2.6	5.1	11.5	21.6
E 4	1.5	3.0	5.7	11.9	23.4
E 5	1.7	3.3	6.7	14.4	26.7
E 6	2.0	4.0	7.5	15.0	30.0
E 7	2.1	4.2	7.6	15.2	30.5
E 8	2.2	4.4	7.7	15.4	30.9
E 9	2.4	4.7	8.0	15.9	31.4
E 10	2.6	5.1	8.5	17.5	32.6
E 11	2.8	5.4	9.0	18.0	33.5
E 12	3.0	5.7	9.5	18.5	34.5
E 13	3.2	6.0	10.0	19.0	35.5
E 14	3.4	6.3	10.5	19.5	36.5
E 15	3.6	6.6	11.0	20.0	37.0
E 16	3.8	6.9	11.5	20.5	37.5
E 17	4.0	7.2	12.0	21.0	38.0
E 18	4.2	7.5	12.5	21.5	38.5
E 19	4.4	7.8	13.0	22.0	39.0
E 20	4.6	8.1	13.5	22.5	39.5
E 21	4.8	8.4	14.0	23.0	40.0
E 22	5.0	8.7	14.5	23.5	40.5
E 23	5.2	9.0	15.0	24.0	41.0
E 24	5.4	9.3	15.5	24.5	41.5
E 25	5.6	9.6	16.0	25.0	42.0
E 26	5.8	9.9	16.5	25.5	42.5
E 27	6.0	10.2	17.0	26.0	43.0
E 28	6.2	10.5	17.5	26.5	43.5
E 29	6.4	10.8	18.0	27.0	44.0
E 30	6.6	11.1	18.5	27.5	44.5
E 31	6.8	11.4	19.0	28.0	45.0
E 32	7.0	11.7	19.5	28.5	45.5
E 33	7.2	12.0	20.0	29.0	46.0
E 34	7.4	12.3	20.5	29.5	46.5
E 35	7.6	12.6	21.0	30.0	47.0
E 36	7.8	12.9	21.5	30.5	47.5
E 37	8.0	13.2	22.0	31.0	48.0
E 38	8.2	13.5	22.5	31.5	48.5
E 39	8.4	13.8	23.0	32.0	49.0
E 40	8.6	14.1	23.5	32.5	49.5
E 41	8.8	14.4	24.0	33.0	50.0
E 42	9.0	14.7	24.5	33.5	50.5
E 43	9.2	15.0	25.0	34.0	51.0
E 44	9.4	15.3	25.5	34.5	51.5
E 45	9.6	15.6	26.0	35.0	52.0
E 46	9.8	15.9	26.5	35.5	52.5
E 47	10.0	16.2	27.0	36.0	53.0
E 48	10.2	16.5	27.5	36.5	53.5
E 49	10.4	16.8	28.0	37.0	54.0
E 50	10.6	17.1	28.5	37.5	54.5
E 51	10.8	17.4	29.0	38.0	55.0
E 52	11.0	17.7	29.5	38.5	55.5
E 53	11.2	18.0	30.0	39.0	56.0
E 54	11.4	18.3	30.5	39.5	56.5
E 55	11.6	18.6	31.0	40.0	57.0
E 56	11.8	18.9	31.5	40.5	57.5
E 57	12.0	19.2	32.0	41.0	58.0
E 58	12.2	19.5	32.5	41.5	58.5
E 59	12.4	19.8	33.0	42.0	59.0
E 60	12.6	20.1	33.5	42.5	59.5
E 61	12.8	20.4	34.0	43.0	60.0
E 62	13.0	20.7	34.5	43.5	60.5
E 63	13.2	21.0	35.0	44.0	61.0
E 64	13.4	21.3	35.5	44.5	61.5
E 65	13.6	21.6	36.0	45.0	62.0
E 66	13.8	21.9	36.5	45.5	62.5
E 67	14.0	22.2	37.0	46.0	63.0
E 68	14.2	22.5	37.5	46.5	63.5
E 69	14.4	22.8	38.0	47.0	64.0
E 70	14.6	23.1	38.5	47.5	64.5
E 71	14.8	23.4	39.0	48.0	65.0
E 72	15.0	23.7	39.5	48.5	65.5
E 73	15.2	24.0	40.0	49.0	66.0
E 74	15.4	24.3	40.5	49.5	66.5
E 75	15.6	24.6	41.0	50.0	67.0
E 76	15.8	24.9	41.5	50.5	67.5
E 77	16.0	25.2	42.0	51.0	68.0
E 78	16.2	25.5	42.5	51.5	68.5
E 79	16.4	25.8	43.0	52.0	69.0
E 80	16.6	26.1	43.5	52.5	69.5
E 81	16.8	26.4	44.0	53.0	70.0
E 82	17.0	26.7	44.5	53.5	70.5
E 83	17.2	27.0	45.0	54.0	71.0
E 84	17.4	27.3	45.5	54.5	71.5
E 85	17.6	27.6	46.0	55.0	72.0
E 86	17.8	27.9	46.5	55.5	72.5
E 87	18.0	28.2	47.0	56.0	73.0
E 88	18.2	28.5	47.5	56.5	73.5
E 89	18.4	28.8	48.0	57.0	74.0
E 90	18.6	29.1	48.5	57.5	74.5
E 91	18.8	29.4	49.0	58.0	75.0
E 92	19.0	29.7	49.5	58.5	75.5
E 93	19.2	30.0	50.0	59.0	76.0
E 94	19.4	30.3	50.5	59.5	76.5
E 95	19.6	30.6	51.0	60.0	77.0
E 96	19.8	30.9	51.5	60.5	77.5
E 97	20.0	31.2	52.0	61.0	78.0
E 98	20.2	31.5	52.5	61.5	78.5
E 99	20.4	31.8	53.0	62.0	79.0
E 100	20.6	32.1	53.5	62.5	79.5
E 101	20.8	32.4	54.0	63.0	80.0
E 102	21.0	32.7	54.5	63.5	80.5
E 103	21.2	33.0	55.0	64.0	81.0
E 104	21.4	33.3	55.5	64.5	81.5
E 105	21.6	33.6	56.0	65.0	82.0
E 106	21.8	33.9	56.5	65.5	82.5
E 107	22.0	34.2	57.0	66.0	83.0
E 108	22.2	34.5	57.5	66.5	83.5
E 109	22.4	34.8	58.0	67.0	84.0
E 110	22.6	35.1	58.5	67.5	84.5
E 111	22.8	35.4	59.0	68.0	85.0
E 112	23.0	35.7	59.5	68.5	85.5
E 113	23.2	36.0	60.0	69.0	86.0
E 114	23.4	36.3	60.5	69.5	86.5
E 115	23.6	36.6	61.0	70.0	87.0
E 116	23.8	36.9	61.5	70.5	87.5
E 117	24.0	37.2	62.0	71.0	88.0
E 118	24.2	37.5	62.5	71.5	88.5
E 119	24.4	37.8	63.0	72.0	89.0
E 120	24.6	38.1	63.5	72.5	89.5
E 121	24.8	38.4	64.0	73.0	90.0
E 122	25.0	38.7	64.5	73.5	90.5
E 123	25.2	39.0	65.0	74.0	91.0
E 124	25.4	39.3	65.5	74.5	91.5
E 125	25.6	39.6	66.0	75.0	92.0
E 126	25.8	39.9	66.5	75.5	92.5
E 127	26.0	40.2	67.0	76.0	93.0
E 128	26.2	40.5	67.5	76.5	93.5
E 129	26.4	40.8	68.0	77.0	94.0
E 130	26.6	41.1	68.5	77.5	94.5
E 131	26.8	41.4	69.0	78.0	95.0
E 132	27.0	41.7	69.5	78.5	95.5
E 133	27.2	42.0	70.0	79.0	96.0
E 134	27.4	42.3	70.5	79.5	96.5
E 135	27.6	42.6	71.0	80.0	97.0
E 136	27.8	42.9	71.5	80.5	97.5
E 137	28.0	43.2	72.0	81.0	98.0
E 138	28.2	43.5	72.5	81.5	98.5
E 139	28.4	43.8	73.0	82.0	99.0
E 140	28.6	44.1	73.5	82.5	99.5
E 141	28.8	44.4	74.0	83.0	100.0
E 142	29.0	44.7	74.5	83.5	100.5
E 143	29.2	45.0	75.0	84.0	101.0
E 144	29.4	45.3	75.5	84.5	101.5
E 145	29.6	45.6	76.0	85.0	102.0
E 146	29.8	45.9	76.5	85.5	102.5
E 147	30.0	46.2	77.0	86.0	103.0
E 148	30.2	46.5	77.5	86.5	103.5
E 149	30.4	46.8	78.0	87.0	104.0
E 150	30.6	47.1	78.5	87.5	104.5
E 151	30.8	47.4	79.0	88.0	105.0
E 152	31.0	47.7	79.5	88.5	105.5
E 153	31.2	48.0	80.0	89.0	106.0
E 154	31.4	48.3	80.5	89.5	106.5
E 155	31.6	48.6	81.0	90.0	107.0
E 156	31.8	48.9	81.5	90.5	107.5
E 157	32.0	49.2	82.0	91.0	108.0
E 158	32.2	49.5	82.5	91.5	108.5
E 159	32.4	49.8	83.0	92.0	109.0
E 160	32.6	50.1	83.5	92.5	109.5
E 161	32.8	50.4	84.0	93.0	110.0
E 162	33.0	50.7	84.5	93.5	110.5
E 163	33.2	51.0	85.0	94.0	111.0
E 164	33.4	51.3	85.5	94.5	111.5
E 165	33.6	51.6	86.0	95.0	112.0
E 166	33.8	51.9	86.5	95.5	112.5
E 167	34.0	52.2	87.0	96.0	113.0
E 168	34.2	52.5	87.5	96.5	113.5
E 169	34.4	52.8	88.0	97.0	114.0
E 170	34.6	53.1	88.5	97.5	114.5
E 171	34.8	53.4	89.0	98.0	115.0
E 172	35.0	53.7	89.5	98.5	115.5
E 173	35.2	54.0	90.0	99.0	116.0
E 174	35.4	54.3	90.5	99.5	116.5
E 175	35.6	54.6	91.0	100.0	117.0
E 176	35.8	54.9	91.5	100.5	117.5
E 177	36.0	55.2	92.0	101.0	118.0
E 178	36.2	55.5	92.5	101.5	118.5
E 179	36.4	55.8	93.0	102.0	119.0
E 180	36.6	56.1	93.5	102.5	119.5
E 181	36.8	56.4	94.0	103.0	120.0
E 182	37.0	56.7	94.5	103.5	120.5
E 183	37.2	57.0	95.0	104.0	121.0
E 184	37.4				

IMAGE PLATE RESOLUTION (LINES PER MILLIMETER) FOR 275MM FOCAL LENGTH LENSES

	FOCAL LENGTH -	275MM	FOCAL LENGTH -	275MM
	OBJECT DISTANCE -	75.FT.1	OBJECT DISTANCE -	100.FT.1
	MAGNIFICATION -	0.01216	MAGNIFICATION -	0.009104
	-6 GROUP LENGTH -	0.290MM(.3658IN.)	-6 GROUP LENGTH -	0.2725MM(.2725IN.)
	GROUP		GROUP	
E	-6	-6	-6	-6
E1	-5	-5	-5	-5
E2	1.7	2.0	1.3	1.4
E3	1.9	2.1	1.5	1.6
E4	1.1	6.1	1.1	5.8
E5	1.1	6.1	1.1	5.8
E6	1.2	6.1	1.2	5.9
E7	1.1	6.1	1.1	5.8
E8	1.1	6.1	1.1	5.8
E9	1.1	6.1	1.1	5.8
E10	1.2	6.1	1.2	5.9
E11	1.1	6.1	1.1	5.8
E12	1.1	6.1	1.1	5.8
E13	1.1	6.1	1.1	5.8
E14	1.0	6.1	1.0	5.7
E15	1.1	6.1	1.1	5.8
E16	1.2	6.1	1.2	5.9
E17	1.2	6.1	1.2	5.9
E18	1.2	6.1	1.2	5.9
E19	1.1	6.1	1.1	5.8
E20	1.1	6.1	1.1	5.8
E21	1.1	6.1	1.1	5.8
E22	1.1	6.1	1.1	5.8
E23	1.1	6.1	1.1	5.8
E24	1.1	6.1	1.1	5.8
E25	1.1	6.1	1.1	5.8
E26	1.1	6.1	1.1	5.8
E27	1.1	6.1	1.1	5.8
E28	1.1	6.1	1.1	5.8
E29	1.1	6.1	1.1	5.8
E30	1.1	6.1	1.1	5.8

	FOCAL LENGTH -	275MM	FOCAL LENGTH -	275MM
	OBJECT DISTANCE -	75.FT.1	OBJECT DISTANCE -	100.FT.1
	MAGNIFICATION -	0.004532	MAGNIFICATION -	0.003017
	-6 GROUP LENGTH -	0.458MM(.1161IN.)	-6 GROUP LENGTH -	0.302MM(.0906IN.)
	GROUP		GROUP	
E	-6	-6	-6	-6
E1	-5	-5	-5	-5
E2	1.0	1.1	1.0	1.0
E3	1.0	1.1	1.0	1.0
E4	1.1	1.1	1.1	1.1
E5	1.1	1.1	1.1	1.1
E6	1.1	1.1	1.1	1.1
E7	1.1	1.1	1.1	1.1
E8	1.1	1.1	1.1	1.1
E9	1.1	1.1	1.1	1.1
E10	1.1	1.1	1.1	1.1
E11	1.1	1.1	1.1	1.1
E12	1.1	1.1	1.1	1.1
E13	1.1	1.1	1.1	1.1
E14	1.1	1.1	1.1	1.1
E15	1.1	1.1	1.1	1.1
E16	1.1	1.1	1.1	1.1
E17	1.1	1.1	1.1	1.1
E18	1.1	1.1	1.1	1.1
E19	1.1	1.1	1.1	1.1
E20	1.1	1.1	1.1	1.1
E21	1.1	1.1	1.1	1.1
E22	1.1	1.1	1.1	1.1
E23	1.1	1.1	1.1	1.1
E24	1.1	1.1	1.1	1.1
E25	1.1	1.1	1.1	1.1
E26	1.1	1.1	1.1	1.1
E27	1.1	1.1	1.1	1.1
E28	1.1	1.1	1.1	1.1
E29	1.1	1.1	1.1	1.1
E30	1.1	1.1	1.1	1.1

	FOCAL LENGTH -	275MM	FOCAL LENGTH -	275MM
	OBJECT DISTANCE -	500.FT.1	OBJECT DISTANCE -	750.FT.1
	MAGNIFICATION -	0.001808	MAGNIFICATION -	0.001204
	-6 GROUP LENGTH -	1.379MM(.0543IN.)	-6 GROUP LENGTH -	.919MM(.0362IN.)
	GROUP		GROUP	
E	-6	-6	-6	-6
E1	-5	-5	-5	-5
E2	1.0	1.1	1.0	1.0
E3	1.0	1.1	1.0	1.0
E4	1.1	1.1	1.1	1.1
E5	1.1	1.1	1.1	1.1
E6	1.1	1.1	1.1	1.1
E7	1.1	1.1	1.1	1.1
E8	1.1	1.1	1.1	1.1
E9	1.1	1.1	1.1	1.1
E10	1.1	1.1	1.1	1.1
E11	1.1	1.1	1.1	1.1
E12	1.1	1.1	1.1	1.1
E13	1.1	1.1	1.1	1.1
E14	1.1	1.1	1.1	1.1
E15	1.1	1.1	1.1	1.1
E16	1.1	1.1	1.1	1.1
E17	1.1	1.1	1.1	1.1
E18	1.1	1.1	1.1	1.1
E19	1.1	1.1	1.1	1.1
E20	1.1	1.1	1.1	1.1
E21	1.1	1.1	1.1	1.1
E22	1.1	1.1	1.1	1.1
E23	1.1	1.1	1.1	1.1
E24	1.1	1.1	1.1	1.1
E25	1.1	1.1	1.1	1.1
E26	1.1	1.1	1.1	1.1
E27	1.1	1.1	1.1	1.1
E28	1.1	1.1	1.1	1.1
E29	1.1	1.1	1.1	1.1
E30	1.1	1.1	1.1	1.1

	FOCAL LENGTH -	275MM	FOCAL LENGTH -	275MM
	OBJECT DISTANCE -	1500.FT.1	OBJECT DISTANCE -	2000.FT.1
	MAGNIFICATION -	0.000602	MAGNIFICATION -	0.000452
	-6 GROUP LENGTH -	.659MM(.0181IN.)	-6 GROUP LENGTH -	.364MM(.0136IN.)
	GROUP		GROUP	
E	-6	-6	-6	-6
E1	1.0	1.1	1.0	1.0
E2	1.0	1.1	1.0	1.0
E3	1.0	1.1	1.0	1.0
E4	1.1	1.1	1.1	1.1
E5	1.1	1.1	1.1	1.1
E6	1.1	1.1	1.1	1.1
E7	1.1	1.1	1.1	1.1
E8	1.1	1.1	1.1	1.1
E9	1.1	1.1	1.1	1.1
E10	1.1	1.1	1.1	1.1
E11	1.1	1.1	1.1	1.1
E12	1.1	1.1	1.1	1.1
E13	1.1	1.1	1.1	1.1
E14	1.1	1.1	1.1	1.1
E15	1.1	1.1	1.1	1.1
E16	1.1	1.1	1.1	1.1
E17	1.1	1.1	1.1	1.1
E18	1.1	1.1	1.1	1.1
E19	1.1	1.1	1.1	1.1
E20	1.1	1.1	1.1	1.1
E21	1.1	1.1	1.1	1.1
E22	1.1	1.1	1.1	1.1
E23	1.1	1.1	1.1	1.1
E24	1.1	1.1	1.1	1.1
E25	1.1	1.1	1.1	1.1
E26	1.1	1.1	1.1	1.1
E27	1.1	1.1	1.1	1.1
E28	1.1	1.1	1.1	1.1
E29	1.1	1.1	1.1	1.1
E30	1.1	1.1	1.1	1.1

IMAGE PLATE RESOLUTION (LINES PER MILLIMETER) FOR 275MM FOCAL LENGTH LENSES

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR 300MM FOCAL LENGTH LENSES

FOCAL LENGTH = 300MM									
OBJECT DISTANCE = 100.FT.(30.48M)									
MAGNIFICATION = .009540									
+6 GROUP LENGTH= 7.584MM(.2988IN.)									
E	-6	-5	-4	-3	-2	-1	E	-6	-5
L 1	1.6	3.1	6.3	12.6	25.2	50.3	L 1	2.4	4.7
E 2	1.8	3.5	7.1	14.1	28.2	56.5	E 2	2.7	5.3
N 3	2.0	4.0	7.9	15.8	31.7	63.4	N 3	3.0	6.0
E 4	2.2	4.4	8.9	17.8	35.6	71.1	E 4	3.3	6.7
N 5	2.5	5.0	10.0	20.0	39.9	N 5	3.6	7.5	
T 6	2.8	5.6	11.2	22.4	44.4	N 6	4.2	8.4	

FOCAL LENGTH = 300MM									
OBJECT DISTANCE = 50.FT.(45.72M)									
MAGNIFICATION = .006605									
+6 GROUP LENGTH= 5.040MM(.1984IN.)									
G-Group	-6	-5	-4	-3	-2	-1	E	-6	-5
E	1.6	3.1	6.3	12.6	25.2	50.3	L 1	2.4	4.7
L 1	1.8	3.5	7.1	14.1	28.2	56.5	E 2	2.7	5.3
E 2	2.0	4.0	7.9	15.8	31.7	63.4	N 3	3.0	6.0
N 3	2.2	4.4	8.9	17.8	35.6	71.1	E 4	3.3	6.7
E 4	2.5	5.0	10.0	20.0	39.9	N 5	3.6	7.5	
N 5	2.8	5.6	11.2	22.4	44.4	N 6	4.2	8.4	
T 6	3.1	6.1	12.2	24.4	48.8	T 6	4.6	9.2	

FOCAL LENGTH = 300MM									
OBJECT DISTANCE = 50.FT.(45.72M)									
MAGNIFICATION = .004946									
+6 GROUP LENGTH= 3.773MM(.1486IN.)									
G-Group	-6	-5	-4	-3	-2	-1	E	-6	-5
E	1.6	3.1	6.3	12.6	25.2	50.3	L 1	2.4	4.7
L 1	1.8	3.5	7.1	14.1	28.2	56.5	E 2	2.7	5.3
E 2	2.0	4.0	7.9	15.8	31.7	63.4	N 3	3.0	6.0
N 3	2.2	4.4	8.9	17.8	35.6	71.1	E 4	3.3	6.7
E 4	2.5	5.0	10.0	20.0	39.9	N 5	3.6	7.5	
N 5	2.8	5.6	11.2	22.4	44.4	N 6	4.2	8.4	
T 6	3.1	6.1	12.2	24.4	48.8	T 6	4.6	9.2	

FOCAL LENGTH = 300MM									
OBJECT DISTANCE = 500.FT.(152.40M)									
MAGNIFICATION = .001972									
+6 GROUP LENGTH= 1.505MM(.0592IN.)									
G-Group	-6	-5	-4	-3	-2	-1	E	-6	-5
E	1.6	3.1	6.3	12.6	25.2	50.3	L 1	2.4	4.7
L 1	1.8	3.5	7.1	14.1	28.2	56.5	E 2	2.7	5.3
E 2	2.0	4.0	7.9	15.8	31.7	63.4	N 3	3.0	6.0
N 3	2.2	4.4	8.9	17.8	35.6	71.1	E 4	3.3	6.7
E 4	2.5	5.0	10.0	20.0	39.9	N 5	3.6	7.5	
N 5	2.8	5.6	11.2	22.4	44.4	N 6	4.2	8.4	
T 6	3.1	6.1	12.2	24.4	48.8	T 6	4.6	9.2	

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR 300MM FOCAL LENGTH LENSES

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR 350MM FOCAL LENGTH LENSES

FOCAL LENGTH - 350MM
OBJECT DISTANCE - 160.FT. (30.48M)
MAGNIFICATION - 0.411616 (+ .3484IN.)
-6 GROUP LENGTH - 8.443M (+ .3484IN.)
GROUP - G40Up

E	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	L13	L14	L15	L16	L17	L18	L19	L20	L21	L22	L23	L24	L25	L26	L27	L28	L29	L30	L31	L32	L33	L34	L35	L36	L37	L38	L39	L40																																																						
	.5	.7	.9	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1																																																				
L1	1.0	2.7	5.4	10.8	21.6	45.0	100.0	210.0	420.0	830.0	1600.0	3200.0	6400.0	12800.0	25600.0	51200.0	102400.0	204800.0	409600.0	819200.0	1638400.0	3276800.0	6553600.0	13107200.0	26214400.0	52428800.0	104857600.0	209715200.0	419430400.0	838860800.0	1677721600.0	3355443200.0	6710886400.0	13421772800.0	26843545600.0	53687091200.0	107374182400.0	214748364800.0	429496729600.0	858993459200.0	1717986918400.0	3435973836800.0	6871947673600.0	13743895347200.0	27487788694400.0	54975577388800.0	109951154776000.0	219902309552000.0	439804618504000.0	879609236008000.0	1759218472016000.0	3518436944032000.0	7036873888064000.0	14073747761280000.0	28147495522560000.0	56294991045120000.0	11258998208240000.0	22517996416480000.0	45035992832960000.0	90071995665920000.0	180143991331840000.0	360287982663680000.0	720575965327360000.0	1441159930654800000.0	2882319861309600000.0	5764639722619200000.0	11529279445238000000.0	23058558890476000000.0	46117117780952000000.0	92234225561904000000.0	184468451123808000000.0	368936875247616000000.0	737873750495232000000.0	1475747500984464000000.0	2951495001968928000000.0	5902990003937856000000.0	11805980007875712000000.0	23611960015751424000000.0	47223920031502848000000.0	94447840063005696000000.0	188895680126011392000000.0	377791360252022784000000.0	755582720504045568000000.0	151116544100809136000000.0	302233088201618272000000.0	604466176403236544000000.0	120893235280647308800000.0	241786470561294617600000.0	483572941122589235200000.0	967145882245178470400000.0	1934297764900356940800000.0	3868595529800713881600000.0	7737191059601427763200000.0	15474382119202855526400000.0

FOCAL LENGTH - 350MM
OBJECT DISTANCE - 160.FT. (45.72M)
MAGNIFICATION - 0.007714
-6 GROUP LENGTH - 5.886MM (+ .2317IN.)
GROUP - GR0Up

E	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	L13	L14	L15	L16	L17	L18	L19	L20	L21	L22	L23	L24	L25	L26	L27	L28	L29	L30	L31	L32	L33	L34	L35	L36	L37	L38	L39	L40																																																						
	.5	.7	.9	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1																																																				
L1	1.0	2.7	5.4	10.8	21.6	45.0	100.0	210.0	420.0	830.0	1600.0	3200.0	6400.0	12800.0	25600.0	51200.0	102400.0	204800.0	409600.0	819200.0	1638400.0	3276800.0	6553600.0	13107200.0	26214400.0	52428800.0	104857600.0	209715200.0	419430400.0	838860800.0	1677721600.0	3355443200.0	6710886400.0	13421772800.0	26843545600.0	53687091200.0	107374182400.0	214748364800.0	429496729600.0	858993459200.0	1717986918400.0	3435973836800.0	6871947673600.0	13743895347200.0	27487788694400.0	54975577388800.0	109951154776000.0	219902309552000.0	439804618504000.0	879609236008000.0	1759218472016000.0	3518436944032000.0	7036873888064000.0	14073747761280000.0	28147495522560000.0	56294991045120000.0	11258998208240000.0	22517996416480000.0	45035992832960000.0	90071995665920000.0	180143991331840000.0	360287982663680000.0	720575965327360000.0	1441159930654800000.0	2882319861309600000.0	5764639722619200000.0	11529279445238000000.0	23058558890476000000.0	46117117780952000000.0	92234225561904000000.0	184468451123808000000.0	368936875247616000000.0	737873750495232000000.0	1475747500984464000000.0	2951495001968928000000.0	5902990003937856000000.0	11805980007875712000000.0	23611960015751424000000.0	47223920031502848000000.0	94447840063005696000000.0	188895680126011392000000.0	377791360252022784000000.0	755582720504045568000000.0	151116544100809136000000.0	302233088201618272000000.0	604466176403236544000000.0	120893235280647308800000.0	241786470561294617600000.0	483572941122589235200000.0	967145882245178470400000.0	193429776490035694080000.0	386859552980071388160000.0	773719105960142776320000.0	154743821192028555264000.0

FOCAL LENGTH - 350MM
OBJECT DISTANCE - 160.FT. (45.72M)
MAGNIFICATION - 0.007714
-6 GROUP LENGTH - 5.886MM (+ .2317IN.)
GROUP - GR0Up

E	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	L13	L14	L15	L16	L17	L18	L19	L20	L21	L22	L23	L24	L25	L26	L27	L28	L29	L30	L31	L32	L33	L34	L35	L36	L37	L38	L39	L40																																																						
	.5	.7	.9	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1																																																				
L1	1.0	2.7	5.4	10.8	21.6	45.0	100.0	210.0	420.0	830.0	1600.0	3200.0	6400.0	12800.0	25600.0	51200.0	102400.0	204800.0	409600.0	819200.0	1638400.0	3276800.0	6553600.0	13107200.0	26214400.0	52428800.0	104857600.0	209715200.0	419430400.0	838860800.0	1677721600.0	3355443200.0	6710886400.0	13421772800.0	26843545600.0	53687091200.0	107374182400.0	214748364800.0	429496729600.0	858993459200.0	1717986918400.0	3435973836800.0	6871947673600.0	13743895347200.0	27487788694400.0	54975577388800.0	109951154776000.0	219902309552000.0	439804618504000.0	879609236008000.0	1759218472016000.0	3518436944032000.0	7036873888064000.0	14073747761280000.0	28147495522560000.0	56294991045120000.0	11258998208240000.0	22517996416480000.0	45035992832960000.0	90071995665920000.0	180143991331840000.0	360287982663680000.0	720575965327360000.0	1441159930654800000.0	2882319861309600000.0	5764639722619200000.0	11529279445238000000.0	23058558890476000000.0	46117117780952000000.0	92234225561904000000.0	184468451123808000000.0	368936875247616000000.0	737873750495232000000.0	1475747500984464000000.0	2951495001968928000000.0	5902990003937856000000.0	11805980007875712000000.0	23611960015751424000000.0	47223920031502848000000.0	94447840063005696000000.0	188895680126011392000000.0	377791360252022784000000.0	755582720504045568000000.0	151116544100809136000000.0	302233088201618272000000.0	604466176403236544000000.0	120893235280647308800000.0	241786470561294617600000.0	483572941122589235200000.0	967145882245178470400000.0	193429776490035694080000.0	386859552980071388160000.0	773719105960142776320000.0	154743821192028555264000.0

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR 350MM FOCAL LENGTH LENSES

400MM FOCAL LENGTH LENSES

FOCAL LENGTH		OBJECT DISTANCE		MAGNIFICATION		GROUP LENGTH		GROUP	
mm	in.	mm	in.	mm	in.	mm	in.	mm	in.
400	15.75	400	15.75	1.00	1.00	400	15.75	1.00	1.00
400	15.75	800	31.50	0.50	0.50	800	31.50	0.50	0.50
400	15.75	1200	47.25	0.33	0.33	1200	47.25	0.33	0.33
400	15.75	1600	63.00	0.25	0.25	1600	63.00	0.25	0.25
400	15.75	2000	78.75	0.20	0.20	2000	78.75	0.20	0.20
400	15.75	2400	94.50	0.17	0.17	2400	94.50	0.17	0.17
400	15.75	2800	110.25	0.14	0.14	2800	110.25	0.14	0.14
400	15.75	3200	126.00	0.12	0.12	3200	126.00	0.12	0.12
400	15.75	3600	141.75	0.10	0.10	3600	141.75	0.10	0.10
400	15.75	4000	157.50	0.08	0.08	4000	157.50	0.08	0.08
400	15.75	4400	173.25	0.07	0.07	4400	173.25	0.07	0.07
400	15.75	4800	189.00	0.06	0.06	4800	189.00	0.06	0.06
400	15.75	5200	204.75	0.05	0.05	5200	204.75	0.05	0.05
400	15.75	5600	220.50	0.04	0.04	5600	220.50	0.04	0.04
400	15.75	6000	236.25	0.03	0.03	6000	236.25	0.03	0.03
400	15.75	6400	252.00	0.02	0.02	6400	252.00	0.02	0.02
400	15.75	6800	267.75	0.02	0.02	6800	267.75	0.02	0.02
400	15.75	7200	283.50	0.01	0.01	7200	283.50	0.01	0.01
400	15.75	7600	299.25	0.01	0.01	7600	299.25	0.01	0.01
400	15.75	8000	315.00	0.01	0.01	8000	315.00	0.01	0.01
400	15.75	8400	330.75	0.01	0.01	8400	330.75	0.01	0.01
400	15.75	8800	346.50	0.01	0.01	8800	346.50	0.01	0.01
400	15.75	9200	362.25	0.01	0.01	9200	362.25	0.01	0.01
400	15.75	9600	378.00	0.01	0.01	9600	378.00	0.01	0.01
400	15.75	10000	393.75	0.01	0.01	10000	393.75	0.01	0.01
400	15.75	10400	409.50	0.01	0.01	10400	409.50	0.01	0.01
400	15.75	10800	425.25	0.01	0.01	10800	425.25	0.01	0.01
400	15.75	11200	441.00	0.01	0.01	11200	441.00	0.01	0.01
400	15.75	11600	456.75	0.01	0.01	11600	456.75	0.01	0.01
400	15.75	12000	472.50	0.01	0.01	12000	472.50	0.01	0.01
400	15.75	12400	488.25	0.01	0.01	12400	488.25	0.01	0.01
400	15.75	12800	504.00	0.01	0.01	12800	504.00	0.01	0.01
400	15.75	13200	519.75	0.01	0.01	13200	519.75	0.01	0.01
400	15.75	13600	535.50	0.01	0.01	13600	535.50	0.01	0.01
400	15.75	14000	551.25	0.01	0.01	14000	551.25	0.01	0.01
400	15.75	14400	567.00	0.01	0.01	14400	567.00	0.01	0.01
400	15.75	14800	582.75	0.01	0.01	14800	582.75	0.01	0.01
400	15.75	15200	598.50	0.01	0.01	15200	598.50	0.01	0.01
400	15.75	15600	614.25	0.01	0.01	15600	614.25	0.01	0.01
400	15.75	16000	630.00	0.01	0.01	16000	630.00	0.01	0.01
400	15.75	16400	645.75	0.01	0.01	16400	645.75	0.01	0.01
400	15.75	16800	661.50	0.01	0.01	16800	661.50	0.01	0.01
400	15.75	17200	677.25	0.01	0.01	17200	677.25	0.01	0.01
400	15.75	17600	693.00	0.01	0.01	17600	693.00	0.01	0.01
400	15.75	18000	708.75	0.01	0.01	18000	708.75	0.01	0.01
400	15.75	18400	724.50	0.01	0.01	18400	724.50	0.01	0.01
400	15.75	18800	740.25	0.01	0.01	18800	740.25	0.01	0.01
400	15.75	19200	756.00	0.01	0.01	19200	756.00	0.01	0.01
400	15.75	19600	771.75	0.01	0.01	19600	771.75	0.01	0.01
400	15.75	20000	787.50	0.01	0.01	20000	787.50	0.01	0.01
400	15.75	20400	803.25	0.01	0.01	20400	803.25	0.01	0.01
400	15.75	20800	819.00	0.01	0.01	20800	819.00	0.01	0.01
400	15.75	21200	834.75	0.01	0.01	21200	834.75	0.01	0.01
400	15.75	21600	850.50	0.01	0.01	21600	850.50	0.01	0.01
400	15.75	22000	866.25	0.01	0.01	22000	866.25	0.01	0.01
400	15.75	22400	882.00	0.01	0.01	22400	882.00	0.01	0.01
400	15.75	22800	897.75	0.01	0.01	22800	897.75	0.01	0.01
400	15.75	23200	913.50	0.01	0.01	23200	913.50	0.01	0.01
400	15.75	23600	929.25	0.01	0.01	23600	929.25	0.01	0.01
400	15.75	24000	945.00	0.01	0.01	24000	945.00	0.01	0.01
400	15.75	24400	960.75	0.01	0.01	24400	960.75	0.01	0.01
400	15.75	24800	976.50	0.01	0.01	24800	976.50	0.01	0.01
400	15.75	25200	992.25	0.01	0.01	25200	992.25	0.01	0.01
400	15.75	25600	1008.00	0.01	0.01	25600	1008.00	0.01	0.01
400	15.75	26000	1023.75	0.01	0.01	26000	1023.75	0.01	0.01
400	15.75	26400	1039.50	0.01	0.01	26400	1039.50	0.01	0.01
400	15.75	26800	1055.25	0.01	0.01	26800	1055.25	0.01	0.01
400	15.75	27200	1071.00	0.01	0.01	27200	1071.00	0.01	0.01
400	15.75	27600	1086.75	0.01	0.01	27600	1086.75	0.01	0.01
400	15.75	28000	1102.50	0.01	0.01	28000	1102.50	0.01	0.01
400	15.75	28400	1118.25	0.01	0.01	28400	1118.25	0.01	0.01
400	15.75	28800	1134.00	0.01	0.01	28800	1134.00	0.01	0.01
400	15.75	29200	1149.75	0.01	0.01	29200	1149.75	0.01	0.01
400	15.75	29600	1165.50	0.01	0.01	29600	1165.50	0.01	0.01
400	15.75	30000	1181.25	0.01	0.01	30000	1181.25	0.01	0.01
400	15.75	30400	1197.00	0.01	0.01	30400	1197.00	0.01	0.01
400	15.75	30800	1212.75	0.01	0.01	30800	1212.75	0.01	0.01
400	15.75	31200	1228.50	0.01	0.01	31200	1228.50	0.01	0.01
400	15.75	31600	1244.25	0.01	0.01	31600	1244.25	0.01	0.01
400	15.75	32000	1260.00	0.01	0.01	32000	1260.00	0.01	0.01
400	15.75	32400	1275.75	0.01	0.01	32400	1275.75	0.01	0.01
400	15.75	32800	1291.50	0.01	0.01	32800	1291.50	0.01	0.01
400	15.75	33200	1307.25	0.01	0.01	33200	1307.25	0.01	0.01
400	15.75	33600	1323.00	0.01	0.01	33600	1323.00	0.01	0.01
400	15.75	34000	1338.75	0.01	0.01	34000	1338.75	0.01	0.01
400	15.75	34400	1354.50	0.01	0.01	34400	1354.50	0.01	0.01
400	15.75	34800	1370.25	0.01	0.01	34800	1370.25	0.01	0.01
400	15.75	35200	1386.00	0.01	0.01	35200	1386.00	0.01	0.01
400	15.75	35600	1401.75	0.01	0.01	35600	1401.75	0.01	0.01
400	15.75	36000	1417.50	0.01	0.01	36000	1417.50	0.01	0.01
400	15.75	36400	1433.25	0.01	0.01	36400	1433.25	0.01	0.01
400	15.75	36800	1449.00	0.01	0.01	36800	1449.00	0.01	0.01
400	15.75	37200	1464.75	0.01	0.01	37200	1464.75	0.01	0.01
400	15.75	37600	1480.50	0.01	0.01	37600	1480.50	0.01	0.01
400	15.75	38000	1496.25	0.01	0.01	38000	1496.25	0.01	0.01
400	15.75	38400	1512.00	0.01	0.01	38400	1512.00	0.01	0.01
400	15.75	38800	1527.75	0.01	0.01	38800	1527.75	0.01	0.01
400	15.75	39200	1543.50	0.01	0.01	39200	1543.50	0.01	0.01
400	15.75	39600	1559.25	0.01	0.01	39600	1559.25	0.01	0.01
400	15.75	40000	1575.00	0.01	0.01	40000	1575.00	0.01	0.01

FOCAL LENGTH	400MM	400MM	400MM	400MM	400MM	400MM	400MM	400MM	400MM
OBJECT DISTANCE	1000.FT. (	304.80M)	1000.FT. (	304.80M)	1000.FT. (	304.80M)	1000.FT. (	304.80M)	1000.FT. (
MAGNIFICATION	-	-	-	-	-	-	-	-	-
GROUP LENGTH	-	-	-	-	-	-	-	-	-
GROUP	-	-	-	-	-	-	-	-	-
E	-6	-5	-4	-3	-2	-1	E	-6	-5
E	-5	-4	-3	-2	-1	E	-5	-4	-3
E	-4	-3	-2	-1	E	-4	-3	-2	-1
E	-3	-2	-1	E	-3	-2	E	-3	-2
E	-2	-1	E	-2	-1	E	-2	-1	E
E	-1	E	E	E	E	E	E	E	E
E	1	2	3	4	5	6	7	8	9
E	2	3	4	5	6	7	8	9	10
E	3	4	5	6	7	8	9	10	11
E	4	5	6	7	8	9	10	11	12
E	5	6	7	8	9	10	11	12	13
E	6	7	8	9	10	11	12	13	14
E	7	8	9	10	11	12	13	14	15
E	8	9	10	11	12	13	14	15	16
E	9	10	11	12	13	14	15	16	17
E	10	11	12	13	14	15	16	17	18
E	11	12	13	14	15	16	17	18	19
E	12	13	14	15	16	17	18	19	20
E	13	14	15	16	17	18	19	20	21
E	14	15	16	17	18	19	20	21	22
E	15	16	17	18	19	20	21	22	23
E	16	17	18	19	20	21	22	23	24
E	17	18	19	20	21	22	23	24	25
E	18	19	20	21	22	23	24	25	26
E	19	20	21	22	23	24	25	26	27
E	20	21	22	23	24	25	26	27	28
E	21	22	23	24	25	26	27	28	29
E	22	23	24	25	26	27	28	29	30
E	23	24	25	26	27	28	29	30	31
E	24	25	26	27	28	29	30	31	32
E	25	26	27	28	29	30	31	32	33
E	26	27	28	29	30	31	32	33	34
E	27	28	29	30	31	32	33	34	35
E	28	29	30	31	32	33	34	35	36
E	29	30	31	32	33	34	35	36	37
E	30	31	32	33	34	35	36	37	38
E	31	32	33	34	35	36	37	38	39
E	32	33	34	35	36	37	38	39	40
E	33	34	35	36	37	38	39	40	41
E	34	35	36	37	38	39	40	41	42
E	35	36	37	38	39	40	41	42	43
E	36	37	38	39	40	41	42	43	44
E	37	38	39	40	41	42	43	44	45
E	38	39	40	41	42	43	44	45	46
E	39	40	41	42	43	44	45	46	47
E	40	41	42	43	44	45	46	47	48
E	41	42	43	44	45	46	47	48	49
E	42	43	44	45	46	47	48	49	50
E	43	44	45	46	47	48	49	50	51
E	44	45	46	47	48	49	50	51	52
E	45	46	47	48	49	50	51	52	53
E	46	47	48	49	50	51	52	53	54
E	47	48	49	50	51	52	53	54	55
E	48	49	50	51	52	53	54	55	56
E	49	50	51	52	53	54	55	56	57
E	50	51	52	53	54	55	56	57	58
E	51	52	53	54	55	56	57	58	59
E	52	53	54	55	56	57	58	59	60
E	53	54	55	56	57	58	59	60	61
E	54	55	56	57	58	59	60	61	62
E	55	56	57	58	59	60	61	62	63
E	56	57	58	59	60	61	62	63	64
E	57	58	59	60	61	62	63	64	65
E	58	59	60	61	62	63	64	65	66
E	59	60	61	62	63	64	65	66	67
E	60	61	62	63	64	65	66	67	68
E	61	62	63	64	65	66	67	68	69
E	62	63	64	65	66	67	68	69	70
E	63	64	65	66	67	68	69	70	71
E	64	65	66	67	68	69	70	71	72
E	65	66	67	68	69	70	71	72	73
E	66	67	68	69	70	71	72	73	74
E	67	68	69	70	71	72	73	74	75
E	68	69	70	71	72	73	74	75	76
E	69	70	71	72	73	74	75	76	77
E	70	71	72	73	74	75	76	77	78
E	71	72	73	74	75	76	77	78	79
E	72	73	74	75	76	77	78	79	80
E	73	74	75	76	77	78	79	80	81
E	74	75	76	77	78	79	80	81	82
E	75	76	77	78	79	80	81	82	83
E	76	77	78	79	80	81	82	83	84
E	77	78	79	80	81	82	83	84	85
E	78	79	80	81	82	83	84	85	86
E	79	80	81	82	83	84	85	86	87
E	80	81	82	83	84	85	86	87	88
E	81	82	83	84	85	86	87	88	89
E	82	83	84	85	86	87	88	89	90
E	83	84	85	86	87	88	89	90	91
E	84	85	86	87	88	89	90	91	92
E	85	86	87	88	89	90	91	92	93
E	86	87	88	89	90	91	92	93	94
E	87	88	89	90	91	92	93	94	95
E	88	89	90	91	92	93	94	95	96
E	89	90	91	92	93	94	95	96	97
E	90	91	92	93	94	95	96	97	98
E	91	92	93	94	95	96	97	98	99
E	92	93	94	95	96	97	98	99	100
E	93	94	95	96	97	98	99	100	101
E	94	95	96	97	98	99	100	101	102
E	95	96	97	98	99	100	101	102	103
E	96	97	98	99	100	101	102	103	104
E	97	98	99	100	101	102	103	104	105
E	98	99	100	101	102	103	104	105	106
E	99	100	101	102	103	104	105	106	107
E	100	101	102	103	104	105	106	107	108
E	101	102	103	104	105	106	107	108	109
E	102	103	104	105	106	107	108	109	110
E	103	104	105	106	107	108	109	110	111
E	104	105	106	107	108	109	110	111	112
E	105	106	107	108	109	110	111	112	113
E	106	107	108	109	110	111	112	113	114
E	107	108	109	110	111	112	113	114	115
E	108	109	110	111	112	113	114	115	116
E	109	110	111	112	113	114	115	116	117
E	110	111	112	113	114	115	116	117	118
E	111	112	113	114	115	116	117	118	119
E	112	113	114	115	116	117	118	119	120
E	113	114	115	116	117	118	119	120	121
E	114	115	116	117	118	119	120	121	122
E	115	116	117	118	119	120	121	122	123
E	116	117	118	119	120	121	122	123	124
E	117	118	119	120	121	122	123	124	125
E	118	119	120	121	122	123	124	125	126
E	119	120	121	122	123	124	125	126	127
E	120	121	122	123	124	125	126	127	128
E	121	122	123	124	125	126	127	128	129
E	122	123	124	125	126	127	128	129	130
E	123	124	125	126	127	128	129	130	131
E	124	125	126	127	128	129	130	131	132
E	125	126	127	128	129	130	131	132	133
E	126	127	128	129	130	131	132	133	134
E	127	128	129	130	131	132	133	134	135
E	128	129	130	131	132	133	134	135	136
E	129	130	131	132	133	134	135	136	137
E	130	131	132	133	134	135	136	137	138
E	131	132	133	134	135	136	137	138	139
E	132	133	134	135	136	137	138	139	140
E	133	134	135	136	137	138	139	140	141
E	134	135	136	137	138	139	140	141	142
E	135	136	137	138	139	140	141	142	143
E	136	137	138	139	140	141	142	143	144
E	137	138	139	140	141	142	143	144	145
E	138	139	140	141	142	143	144	145	146
E	139	140	141	142	143	144	145	146	147
E	140	141	142	143	144	145	146	147	148
E	141	142	143	144	145	146	147	148	149
E	142	143	144	145	146	147	148	149	150
E	143	144	145	146	147	148	149	150	151
E	144	145	146	147	148	149	150	151	152
E	145	146	147	148	149	150	151	152	153
E	146	147	148	149	150	151	152	153	154
E	147	148	149	150	151	152	153	154	155
E	148	149	150	151	152	153	154	155	156
E	149	150	151	152					

IMAGE RESOLUTION (LINES PER MILLIMETER) FOR 400 MM FOCAL LENGTH LENSES

IMAGE PLANE RESOLUTION LINES PER MILLIMETER FOR 500MM FOCAL LENGTH LENSES

	FOCAL LENGTH	500MM	FOCAL LENGTH	500MM	FOCAL LENGTH	500MM
	OBJECT DISTANCE	(100.FT.)	OBJECT DISTANCE	(150.FT.)	OBJECT DISTANCE	(200.FT.)
	MAGNIFICATION	(0.0151FT.)	MAGNIFICATION	(0.01057)	MAGNIFICATION	(0.008270)
	-6 GROUP LENGTH	(12.75IN.)	-6 GROUP LENGTH	(8.437MM(.3321IN.))	-6 GROUP LENGTH	(6.310MM(.2484IN.))
	GROUP		GROUP		GROUP	
E	-6	.4	.6	.5	.6	.6
L 1	.9	1.9	3.7	2.1	1.4	1.9
L 2	1.1	2.1	4.4	2.2	1.6	2.1
L 3	1.2	2.6	4.7	3.3	2.0	2.4
L 4	1.3	2.6	5.3	4.6	2.6	2.8
L 5	1.5	3.0	5.9	4.9	2.9	3.0
L 6	1.7	3.3	6.7	5.4	3.5	3.4
E	-6	.4	.6	.5	.6	.6
L 1	.9	1.9	3.7	2.1	1.4	1.9
L 2	1.1	2.1	4.4	2.2	1.6	2.1
L 3	1.2	2.6	4.7	3.3	2.0	2.4
L 4	1.3	2.6	5.3	4.6	2.6	2.8
L 5	1.5	3.0	5.9	4.9	2.9	3.0
L 6	1.7	3.3	6.7	5.4	3.5	3.4

	FOCAL LENGTH	500MM	FOCAL LENGTH	500MM	FOCAL LENGTH	500MM
	OBJECT DISTANCE	(400.FT.)	OBJECT DISTANCE	(45.72M)	OBJECT DISTANCE	(60.96M)
	MAGNIFICATION	(0.0144FT.)	MAGNIFICATION	(0.0374MM(.3321IN.))	MAGNIFICATION	(0.03292MM(.0989IN.))
	-6 GROUP LENGTH	(105.1IN.0)	-6 GROUP LENGTH	(31.237IN.0)	-6 GROUP LENGTH	(9.891IN.0)
	GROUP		GROUP		GROUP	
E	-6	.4	.6	.5	.6	.6
L 1	.9	1.9	3.7	2.1	1.4	1.9
L 2	1.1	2.1	4.4	2.2	1.6	2.1
L 3	1.2	2.6	4.7	3.3	2.0	2.4
L 4	1.3	2.6	5.3	4.6	2.6	2.8
L 5	1.5	3.0	5.9	4.9	2.9	3.0
L 6	1.7	3.3	6.7	5.4	3.5	3.4
E	-6	.4	.6	.5	.6	.6
L 1	.9	1.9	3.7	2.1	1.4	1.9
L 2	1.1	2.1	4.4	2.2	1.6	2.1
L 3	1.2	2.6	4.7	3.3	2.0	2.4
L 4	1.3	2.6	5.3	4.6	2.6	2.8
L 5	1.5	3.0	5.9	4.9	2.9	3.0
L 6	1.7	3.3	6.7	5.4	3.5	3.4

	FOCAL LENGTH	500MM	FOCAL LENGTH	500MM	FOCAL LENGTH	500MM
	OBJECT DISTANCE	(400.FT.)	OBJECT DISTANCE	(45.72M)	OBJECT DISTANCE	(50.70M)
	MAGNIFICATION	(0.0144FT.)	MAGNIFICATION	(0.041118MM(.1237IN.))	MAGNIFICATION	(0.03292MM(.0989IN.))
	-6 GROUP LENGTH	(105.1IN.0)	-6 GROUP LENGTH	(31.237IN.0)	-6 GROUP LENGTH	(9.891IN.0)
	GROUP		GROUP		GROUP	
E	-6	.4	.6	.5	.6	.6
L 1	.9	1.9	3.7	2.1	1.4	1.9
L 2	1.1	2.1	4.4	2.2	1.6	2.1
L 3	1.2	2.6	4.7	3.3	2.0	2.4
L 4	1.3	2.6	5.3	4.6	2.6	2.8
L 5	1.5	3.0	5.9	4.9	2.9	3.0
L 6	1.7	3.3	6.7	5.4	3.5	3.4
E	-6	.4	.6	.5	.6	.6
L 1	.9	1.9	3.7	2.1	1.4	1.9
L 2	1.1	2.1	4.4	2.2	1.6	2.1
L 3	1.2	2.6	4.7	3.3	2.0	2.4
L 4	1.3	2.6	5.3	4.6	2.6	2.8
L 5	1.5	3.0	5.9	4.9	2.9	3.0
L 6	1.7	3.3	6.7	5.4	3.5	3.4

	FOCAL LENGTH	500MM	FOCAL LENGTH	500MM	FOCAL LENGTH	500MM
	OBJECT DISTANCE	(400.FT.)	OBJECT DISTANCE	(45.72M)	OBJECT DISTANCE	(50.70M)
	MAGNIFICATION	(0.0144FT.)	MAGNIFICATION	(0.04941IN.0)	MAGNIFICATION	(0.03291IN.0)
	-6 GROUP LENGTH	(105.1IN.0)	-6 GROUP LENGTH	(31.236MM(.09494IN.0))	-6 GROUP LENGTH	(9.891IN.0)
	GROUP		GROUP		GROUP	
E	-6	.4	.6	.5	.6	.6
L 1	.9	1.9	3.7	2.1	1.4	1.9
L 2	1.1	2.1	4.4	2.2	1.6	2.1
L 3	1.2	2.6	4.7	3.3	2.0	2.4
L 4	1.3	2.6	5.3	4.6	2.6	2.8
L 5	1.5	3.0	5.9	4.9	2.9	3.0
L 6	1.7	3.3	6.7	5.4	3.5	3.4
E	-6	.4	.6	.5	.6	.6
L 1	.9	1.9	3.7	2.1	1.4	1.9
L 2	1.1	2.1	4.4	2.2	1.6	2.1
L 3	1.2	2.6	4.7	3.3	2.0	2.4
L 4	1.3	2.6	5.3	4.6	2.6	2.8
L 5	1.5	3.0	5.9	4.9	2.9	3.0
L 6	1.7	3.3	6.7	5.4	3.5	3.4

	FOCAL LENGTH	500MM	FOCAL LENGTH	500MM	FOCAL LENGTH	500MM
	OBJECT DISTANCE	(400.FT.)	OBJECT DISTANCE	(45.72M)	OBJECT DISTANCE	(50.70M)
	MAGNIFICATION	(0.0144FT.)	MAGNIFICATION	(0.0547MM(.164IN.))	MAGNIFICATION	(0.03291IN.0)
	-6 GROUP LENGTH	(105.1IN.0)	-6 GROUP LENGTH	(31.236MM(.0547MM(.164IN.0)))	-6 GROUP LENGTH	(9.891IN.0)
	GROUP		GROUP		GROUP	
E	-6	.4	.6	.5	.6	.6
L 1	.9	1.9	3.7	2.1	1.4	1.9
L 2	1.1	2.1	4.4	2.2	1.6	2.1
L 3	1.2	2.6	4.7	3.3	2.0	2.4
L 4	1.3	2.6	5.3	4.6	2.6	2.8
L 5	1.5	3.0	5.9	4.9	2.9	3.0
L 6	1.7	3.3	6.7	5.4	3.5	3.4
E	-6	.4	.6	.5	.6	.6
L 1	.9	1.9	3.7	2.1	1.4	1.9
L 2	1.1	2.1	4.4	2.2	1.6	2.1
L 3	1.2	2.6	4.7	3.3	2.0	2.4
L 4	1.3	2.6	5.3	4.6	2.6	2.8
L 5	1.5	3.0	5.9	4.9	2.9	3.0
L 6	1.7	3.3	6.7	5.4	3.5	3.4

IMAGE PLANE RESOLUTION LINES PER MILLIMETER FOR 500MM FOCAL LENGTH LENSES

IMAGE PLATE RESOLUTION (LINES PER MILLIMETER) FOR 600MM FOCAL LENGTH LENSES

	FOCAL LENGTH - 400MM	OBJECT DISTANCE - 110.7FT. (30.0MM)	MAGNIFICATION - +0.26660	-6 GROUP LENGTH - 15.321IN. (+0.031IN.)	GROUP	FOCAL LENGTH - 600MM	OBJECT DISTANCE - 150.0FT. (45.72IN.)	MAGNIFICATION - +0.13298	-6 GROUP LENGTH - 10.146MM (+0.3995IN.)	GROUP	FOCAL LENGTH - 600MM	OBJECT DISTANCE - 200.0FT. (60.96IN.)	MAGNIFICATION - +0.09946	-6 GROUP LENGTH - 7.584MM (+0.2986IN.)	GROUP						
E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1	
L	1	1.6	3.1	6.2	12.5	26.9	L	1	1.2	2.3	4.7	9.4	18.8	L	1	1.6	3.1	6.3	12.6	25.2	56.3
E	2	1.7	3.2	7.0	14.0	28.0	E	2	1.3	2.6	5.3	10.6	21.1	E	2	1.8	3.5	7.1	14.1	28.2	56.3
E	3	1.0	2.0	3.2	7.8	15.7	E	3	1.5	3.0	5.9	11.8	23.7	E	3	2.0	4.0	7.9	15.8	31.7	63.6
E	4	1.1	2.2	4.4	8.8	17.6	E	4	1.7	3.3	6.6	13.3	26.6	E	4	2.2	4.4	8.9	17.8	35.6	71.1
N	5	1.2	2.5	6.4	9.9	19.9	N	5	1.9	3.7	7.5	14.9	29.8	N	5	2.5	5.0	10.0	20.0	39.9	79.8
T	6	1.4	2.6	5.5	11.1	22.2	T	6	2.1	4.2	8.4	16.7	33.5	T	6	5.6	11.2	22.4	44.8	89.6	89.6

	FOCAL LENGTH - 600MM	OBJECT DISTANCE - 400.0FT. (121.92IN.)	MAGNIFICATION - +0.04946	-6 GROUP LENGTH - 3.173MM (+0.4861IN.)	GROUP	FOCAL LENGTH - 600MM	OBJECT DISTANCE - 400.0FT. (121.92IN.)	MAGNIFICATION - +0.04946	-6 GROUP LENGTH - 3.016MM (+1.187IN.)	GROUP	FOCAL LENGTH - 600MM	OBJECT DISTANCE - 500.0FT. (152.40IN.)	MAGNIFICATION - +0.03953	-6 GROUP LENGTH - 3.016MM (+1.187IN.)	GROUP						
E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1	
L	1	2.4	4.7	9.5	18.9	37.4	L	1	2.2	4.3	12.6	25.3	50.5	L	1	4.0	7.9	15.6	31.6	63.3	126.5
E	2	2.7	5.3	10.6	21.2	42.5	E	2	3.5	7.1	14.2	28.4	56.7	E	2	4.4	8.9	17.7	35.5	71.0	142.0
E	3	3.0	6.0	11.4	23.8	47.7	E	3	4.0	8.0	15.9	31.8	63.7	E	3	5.0	10.0	19.9	39.8	79.7	159.4
E	4	3.3	6.7	13.4	26.8	53.5	E	4	4.5	8.9	17.9	35.7	71.5	E	4	5.6	11.2	22.4	44.7	89.4	178.9
H	5	3.5	7.5	15.1	30.0	63.1	H	5	5.0	10.0	20.1	40.1	80.2	H	5	6.3	12.6	25.0	50.2	100.4	200.8
T	6	4.2	8.4	16.4	33.7	67.4	T	6	6.6	11.3	22.5	45.0	90.1	T	6	7.0	14.1	28.2	56.3	112.7	225.4

	FOCAL LENGTH - 600MM	OBJECT DISTANCE - 1000.0FT. (304.80IN.)	MAGNIFICATION - +0.01972	-6 GROUP LENGTH - 1.505MM (+0.592IN.)	GROUP	FOCAL LENGTH - 600MM	OBJECT DISTANCE - 1000.0FT. (304.80IN.)	MAGNIFICATION - +0.01972	-6 GROUP LENGTH - 1.501MM (+0.592IN.)	GROUP	FOCAL LENGTH - 600MM	OBJECT DISTANCE - 1500.0FT. (457.20IN.)	MAGNIFICATION - +0.01314	-6 GROUP LENGTH - 1.003MM (+0.395IN.)	GROUP						
E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1	
L	1	5.9	11.9	23.8	47.5	95.0	L	1	7.9	15.8	31.7	63.4	126.8	L	1	11.9	23.8	47.6	95.1	190.3	380.5
E	2	6.7	13.3	26.7	53.3	106.0	E	2	8.9	17.8	34.2	71.1	142.3	E	2	13.3	26.7	53.4	106.6	213.6	427.1
E	3	7.5	15.0	29.4	59.4	119.7	E	3	10.0	20.0	39.9	79.8	159.7	E	3	15.0	30.0	59.9	119.9	239.7	479.4
E	4	8.4	16.0	33.4	67.2	138.4	E	4	11.2	22.4	44.8	89.6	179.3	E	4	16.8	33.6	67.3	134.5	269.1	538.1
N	5	9.6	14.9	37.7	75.4	150.4	N	5	12.6	25.2	50.3	100.6	201.2	N	5	16.9	37.8	75.5	151.0	302.0	604.0
T	6	11.2	42.3	84.6	159.3	318.5	T	6	14.1	29.2	54.5	112.9	225.8	T	6	21.2	42.4	84.7	169.5	339.0	678.0

	FOCAL LENGTH - 600MM	OBJECT DISTANCE - 3000.0FT. (914.40IN.)	MAGNIFICATION - +0.001972	-6 GROUP LENGTH - 0.501MM (+0.197IN.)	GROUP	FOCAL LENGTH - 600MM	OBJECT DISTANCE - 3000.0FT. (914.40IN.)	MAGNIFICATION - +0.001972	-6 GROUP LENGTH - 0.501MM (+0.197IN.)	GROUP	FOCAL LENGTH - 600MM	OBJECT DISTANCE - 4000.0FT. (1219.20IN.)	MAGNIFICATION - +0.00492	-6 GROUP LENGTH - 0.376MM (+0.148IN.)	GROUP						
E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1	
L	1	15.9	31.7	63.6	125.4	273.1	L	1	23.8	47.6	95.2	190.4	380.8	L	1	31.7	63.5	126.9	253.9	507.8	999.9
E	2	17.4	35.6	71.2	142.4	286.9	E	2	24.7	53.4	106.8	213.7	427.0	E	2	35.6	71.2	142.5	285.0	569.9	999.9
E	3	20.0	40.0	79.3	159.0	319.7	E	3	31.0	64.0	119.9	239.9	479.4	E	3	40.0	80.0	159.9	319.9	539.7	999.9
E	4	22.4	46.9	89.7	179.4	358.9	E	4	33.7	67.3	134.6	269.2	538.6	E	4	44.9	89.8	179.5	359.0	718.1	999.9
N	5	25.2	50.6	100.7	201.4	402.6	N	5	37.8	75.6	151.1	322.2	604.4	N	5	50.0	100.8	201.5	403.0	806.0	999.9
T	6	26.3	56.3	113.0	226.1	452.1	T	6	42.4	84.8	159.6	339.0	678.4	T	6	56.5	113.1	226.2	452.4	904.7	999.9

IMAGE PLATE RESOLUTION (LINES PER MILLIMETER) FOR 600MM FOCAL LENGTH LENSES

IMAGE PLATE RESOLUTION (LINES PER MILLIMETER) FOR 710MM FOCAL LENGTH LENSES

FOCAL LENGTH	710MM	FOCAL LENGTH	710MM
OBJECT DISTANCE	4000.FT.(11219.20M)	OBJECT DISTANCE	5000.FT.(1524.00M)
MAGNIFICATION	-0.005083	MAGNIFICATION	-0.00466
-6 GROUP LENGTH	.045MM(.0175IN.)	-6 GROUP LENGTH	.035MM(.0140IN.)
GROUP		GROUP	
-3	-3	-3	-3
-2	-2	-2	-2
-1	-1	-1	-1
0	0	0	0
1	20.1	20.1	20.1
2	22.6	22.6	22.6
3	25.3	25.3	25.3
4	28.4	28.4	28.4
5	31.9	31.9	31.9
6	35.6	35.6	35.6

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR 800MM FOCAL LENGTH LENSES

FOCAL LENGTH = 800MM					
OBJECT DISTANCE = 2000 FT. (60.96M)					
MAGNIFICATION = .013298 (.0351IN.)					
-6 GROUP LENGTH=10.146MM (.3995IN.)					
GROUP	-5	-4	-3	-2	-1
E	-6	-5	-4	-3	-2
L 1	.9	1.8	3.5	7.0	14.1
L 2	1.0	2.0	3.9	7.9	15.4
L 3	1.1	2.2	4.4	8.7	17.7
L 4	1.2	2.5	5.9	14.9	35.4
N 5	1.4	2.9	6.6	11.1	22.3
T 4	1.6	3.1	6.3	12.5	25.8

FOCAL LENGTH = 800MM					
OBJECT DISTANCE = 500 FT. (152.40M)					
MAGNIFICATION = .005277 (.01585IN.)					
-6 GROUP LENGTH=4.026MM (.1585IN.)					
GROUP	-5	-4	-3	-2	-1
E	-6	-5	-4	-3	-2
L 1	2.4	4.7	9.1	14.9	37.4
L 2	2.7	5.3	10.5	21.2	42.1
L 3	3.0	6.0	11.4	23.6	45.0
L 4	3.3	6.7	12.7	45.6	97.7
N 5	3.7	7.4	13.6	53.6	139.7
T 4	4.2	8.4	14.7	35.5	87.1

FOCAL LENGTH = 800MM					
OBJECT DISTANCE = 1500 FT. (457.20M)					
MAGNIFICATION = .001753 (.005271IN.)					
-6 GROUP LENGTH=1.337MM (.05271IN.)					
GROUP	-5	-4	-3	-2	-1
E	-6	-5	-4	-3	-2
L 1	1.9	3.7	7.4	14.9	37.4
L 2	2.3	4.2	8.1	16.7	42.1
L 3	2.7	5.0	9.8	19.7	45.6
L 4	3.1	5.7	10.5	22.4	53.6
N 5	3.5	6.4	11.3	24.2	56.4
T 4	4.0	7.0	12.0	26.0	59.4

FOCAL LENGTH = 800MM					
OBJECT DISTANCE = 2000 FT. (609.60M)					
MAGNIFICATION = .003514 (.01585IN.)					
-6 GROUP LENGTH=2.680MM (.01585IN.)					
GROUP	-5	-4	-3	-2	-1
E	-6	-5	-4	-3	-2
L 1	1.7	3.4	6.7	13.4	37.4
L 2	2.0	4.1	8.0	17.0	42.1
L 3	2.5	4.9	9.8	19.7	45.6
L 4	2.9	5.6	11.7	23.6	53.6
N 5	3.3	6.4	12.4	25.2	56.4
T 4	3.7	7.1	13.0	27.0	59.4

FOCAL LENGTH = 800MM					
OBJECT DISTANCE = 3000 FT. (914.40M)					
MAGNIFICATION = .008826 (.02851IN.)					
-6 GROUP LENGTH=6.734MM (.20581IN.)					
GROUP	-5	-4	-3	-2	-1
E	-6	-5	-4	-3	-2
L 1	1.7	3.4	6.7	13.4	37.4
L 2	2.0	4.1	8.0	17.0	42.1
L 3	2.5	4.9	9.8	19.7	45.6
L 4	2.9	5.6	11.7	23.6	53.6
N 5	3.3	6.4	12.4	25.2	56.4
T 4	3.7	7.1	13.0	27.0	59.4

FOCAL LENGTH = 800MM					
OBJECT DISTANCE = 750 FT. (228.60M)					
MAGNIFICATION = .003512 (.01585IN.)					
-6 GROUP LENGTH=2.680MM (.01585IN.)					
GROUP	-5	-4	-3	-2	-1
E	-6	-5	-4	-3	-2
L 1	1.7	3.4	6.7	13.4	37.4
L 2	2.0	4.1	8.0	17.0	42.1
L 3	2.5	4.9	9.8	19.7	45.6
L 4	2.9	5.6	11.7	23.6	53.6
N 5	3.3	6.4	12.4	25.2	56.4
T 4	3.7	7.1	13.0	27.0	59.4

FOCAL LENGTH = 800MM					
OBJECT DISTANCE = 2000 FT. (609.60M)					
MAGNIFICATION = .00114 (.003514IN.)					
-6 GROUP LENGTH=1.003MM (.003514IN.)					
GROUP	-5	-4	-3	-2	-1
E	-6	-5	-4	-3	-2
L 1	1.7	3.4	6.7	13.4	37.4
L 2	2.0	4.1	8.0	17.0	42.1
L 3	2.5	4.9	9.8	19.7	45.6
L 4	2.9	5.6	11.7	23.6	53.6
N 5	3.3	6.4	12.4	25.2	56.4
T 4	3.7	7.1	13.0	27.0	59.4

FOCAL LENGTH = 800MM					
OBJECT DISTANCE = 5000 FT. (1524.00M)					
MAGNIFICATION = .00114 (.003514IN.)					
-6 GROUP LENGTH=.401MM (.01585IN.)					
GROUP	-5	-4	-3	-2	-1
E	-6	-5	-4	-3	-2
L 1	1.7	3.4	6.7	13.4	37.4
L 2	2.0	4.1	8.0	17.0	42.1
L 3	2.5	4.9	9.8	19.7	45.6
L 4	2.9	5.6	11.7	23.6	53.6
N 5	3.3	6.4	12.4	25.2	56.4
T 4	3.7	7.1	13.0	27.0	59.4

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER)FOR 800MM FOCAL LENGTH LENSES

IMAGE PLATE RESOLUTION (LINES PER MILLIMETER) FOR 914MM FOCAL LENGTH LENSES

FOCAL LENGTH	914MM	914MM	914MM	914MM	
OBJECT DISTANCE	1400.FT. (45.72M)	OBJECT DISTANCE	200.FT. (60.96M)	OBJECT DISTANCE	300.FT. (91.44M)
MAGNIFICATION	.0200000	MAGNIFICATION	.0152222	MAGNIFICATION	.0100977
-6 GROUP LENGTH	.4601141	-6 GROUP LENGTH	.4452116	-6 GROUP LENGTH	.4033116
GROUP		GROUP		GROUP	
E	-6	-5	-4	-3	-2
L	1	1.5	3.1	12.0	47.0
E	2	1.7	3.1	13.0	47.5
E	3	1.9	3.1	15.0	50.0
E	4	1.0	1.9	7.7	15.0
E	5	1.1	2.2	4.4	17.0
E	6	1.2	2.4	4.4	19.0
E	7	1.4	2.7	5.7	21.0
L	1	1.6	3.1	16.0	53.0
E	2	1.7	3.1	17.0	54.0
E	3	1.9	3.1	19.0	56.0
E	4	1.0	1.9	7.7	19.5
E	5	1.1	2.2	4.4	21.5
E	6	1.2	2.4	4.4	23.5
E	7	1.4	2.7	5.7	25.5

FOCAL LENGTH	914MM	914MM	914MM	914MM	
OBJECT DISTANCE	500.FT. (152.40M)	OBJECT DISTANCE	500.FT. (152.40M)	OBJECT DISTANCE	750.FT. (228.60M)
MAGNIFICATION	.006034	MAGNIFICATION	.006034	MAGNIFICATION	.004014
-6 GROUP LENGTH	.4604MM (.1812IN.)	-6 GROUP LENGTH	.4604MM (.1812IN.)	-6 GROUP LENGTH	.12061IN.)
GROUP		GROUP		GROUP	
E	-6	-5	-4	-3	-2
L	1	1.5	3.1	12.0	47.0
E	2	1.7	3.1	13.0	47.5
E	3	1.9	3.1	15.0	50.0
E	4	1.0	1.9	7.7	15.0
E	5	1.1	2.2	4.4	17.0
E	6	1.2	2.4	4.4	19.0
E	7	1.4	2.7	5.7	21.0
L	1	1.6	3.1	16.0	53.0
E	2	1.7	3.1	17.0	54.0
E	3	1.9	3.1	19.0	56.0
E	4	1.0	1.9	7.7	19.5
E	5	1.1	2.2	4.4	21.5
E	6	1.2	2.4	4.4	23.5
E	7	1.4	2.7	5.7	25.5

FOCAL LENGTH	914MM	914MM	914MM	914MM	
OBJECT DISTANCE	1500.FT. (457.20M)	OBJECT DISTANCE	1500.FT. (457.20M)	OBJECT DISTANCE	2000.FT. (609.60M)
MAGNIFICATION	.002003	MAGNIFICATION	.002003	MAGNIFICATION	.001502
-6 GROUP LENGTH	.4602MM (.0901IN.)	-6 GROUP LENGTH	.4602MM (.0901IN.)	-6 GROUP LENGTH	.04511IN.)
GROUP		GROUP		GROUP	
E	-6	-5	-4	-3	-2
L	1	1.5	3.1	12.0	47.0
E	2	1.7	3.1	13.0	47.5
E	3	1.9	3.1	15.0	50.0
E	4	1.0	1.9	7.7	15.0
E	5	1.1	2.2	4.4	17.0
E	6	1.2	2.4	4.4	19.0
E	7	1.4	2.7	5.7	21.0
L	1	1.6	3.1	16.0	53.0
E	2	1.7	3.1	17.0	54.0
E	3	1.9	3.1	19.0	56.0
E	4	1.0	1.9	7.7	19.5
E	5	1.1	2.2	4.4	21.5
E	6	1.2	2.4	4.4	23.5
E	7	1.4	2.7	5.7	25.5

FOCAL LENGTH	914MM	914MM	914MM	914MM	
OBJECT DISTANCE	4000.FT. (11219.20M)	OBJECT DISTANCE	4000.FT. (11219.20M)	OBJECT DISTANCE	5000.FT. (15244.00M)
MAGNIFICATION	.000750	MAGNIFICATION	.000750	MAGNIFICATION	.000600
-6 GROUP LENGTH	.5372MM (.12025IN.)	-6 GROUP LENGTH	.5372MM (.12025IN.)	-6 GROUP LENGTH	.0458MM (.0108IN.)
GROUP		GROUP		GROUP	
E	-6	-5	-4	-3	-2
L	1	1.5	3.1	12.0	47.0
E	2	1.7	3.1	13.0	47.5
E	3	1.9	3.1	15.0	50.0
E	4	1.0	1.9	7.7	15.0
E	5	1.1	2.2	4.4	17.0
E	6	1.2	2.4	4.4	19.0
E	7	1.4	2.7	5.7	21.0
L	1	1.6	3.1	16.0	53.0
E	2	1.7	3.1	17.0	54.0
E	3	1.9	3.1	19.0	56.0
E	4	1.0	1.9	7.7	19.5
E	5	1.1	2.2	4.4	21.5
E	6	1.2	2.4	4.4	23.5
E	7	1.4	2.7	5.7	25.5

IMAGE PLATE RESOLUTION (LINES PER MILLIMETER) FOR 914MM FOCAL LENGTH LENSES

TABLE I. OPTICAL RESOLUTION (LINES PER MILLIMETER) FOR 1000 MM FOCAL LENGTH

FOCAL LENGTH = 1000MM		FOCAL LENGTH = 1000MM		FOCAL LENGTH = 1000MM	
OBJECT DISTANCE = 300.FT.(60.96M)	MAGNIFICATION = 0.11057	OBJECT DISTANCE = 300.FT.(60.96M)	MAGNIFICATION = 0.437MM(0.3321IN.)	OBJECT DISTANCE = 300.FT.(60.96M)	MAGNIFICATION = 0.91441
-6 GROUP LENGTH=17.462MM(.6711IN.)	GROUP	-6 GROUP LENGTH=17.462MM(.6711IN.)	GROUP	-6 GROUP LENGTH=17.462MM(.6711IN.)	GROUP
1.0	7.5	-3	-2	-1	E
1.1	1.4	2.0	5.0	11.0	E 1
1.2	1.6	3.1	6.3	12.5	E 2
1.3	1.2	3.5	7.0	14.1	E 3
1.4	1.0	4.0	7.4	14.2	E 4
1.5	0.9	4.6	7.9	14.3	E 5
1.6	1.0	5.0	8.0	14.4	E 6
1.7	1.1	5.4	8.4	14.5	E 7
1.8	1.2	5.8	8.8	14.6	E 8
1.9	1.3	6.2	9.2	14.7	E 9
2.0	1.4	6.6	9.6	14.8	E 10
2.1	1.5	7.0	10.0	14.9	E 11
2.2	1.6	7.4	10.4	15.0	E 12
2.3	1.7	7.8	10.8	15.1	E 13
2.4	1.8	8.2	11.2	15.2	E 14
2.5	1.9	8.6	11.6	15.3	E 15
2.6	2.0	9.0	12.0	15.4	E 16
2.7	2.1	9.4	12.4	15.5	E 17
2.8	2.2	9.8	12.8	15.6	E 18
2.9	2.3	10.2	13.2	15.7	E 19
3.0	2.4	10.6	13.6	15.8	E 20
3.1	2.5	11.0	14.0	15.9	E 21
3.2	2.6	11.4	14.4	16.0	E 22
3.3	2.7	11.8	14.8	16.1	E 23
3.4	2.8	12.2	15.2	16.2	E 24
3.5	2.9	12.6	15.6	16.3	E 25
3.6	3.0	13.0	16.0	16.4	E 26
3.7	3.1	13.4	16.4	16.5	E 27
3.8	3.2	13.8	16.8	16.6	E 28
3.9	3.3	14.2	17.2	16.7	E 29
4.0	3.4	14.6	17.6	16.8	E 30
4.1	3.5	15.0	18.0	16.9	E 31
4.2	3.6	15.4	18.4	17.0	E 32
4.3	3.7	15.8	18.8	17.1	E 33
4.4	3.8	16.2	19.2	17.2	E 34
4.5	3.9	16.6	19.6	17.3	E 35
4.6	4.0	17.0	20.0	17.4	E 36
4.7	4.1	17.4	20.4	17.5	E 37
4.8	4.2	17.8	20.8	17.6	E 38
4.9	4.3	18.2	21.2	17.7	E 39
5.0	4.4	18.6	21.6	17.8	E 40
5.1	4.5	19.0	22.0	17.9	E 41
5.2	4.6	19.4	22.4	18.0	E 42
5.3	4.7	19.8	22.8	18.1	E 43
5.4	4.8	20.2	23.2	18.2	E 44
5.5	4.9	20.6	23.6	18.3	E 45
5.6	5.0	21.0	24.0	18.4	E 46
5.7	5.1	21.4	24.4	18.5	E 47
5.8	5.2	21.8	24.8	18.6	E 48
5.9	5.3	22.2	25.2	18.7	E 49
6.0	5.4	22.6	25.6	18.8	E 50
6.1	5.5	23.0	26.0	18.9	E 51
6.2	5.6	23.4	26.4	19.0	E 52
6.3	5.7	23.8	26.8	19.1	E 53
6.4	5.8	24.2	27.2	19.2	E 54
6.5	5.9	24.6	27.6	19.3	E 55
6.6	6.0	25.0	28.0	19.4	E 56
6.7	6.1	25.4	28.4	19.5	E 57
6.8	6.2	25.8	28.8	19.6	E 58
6.9	6.3	26.2	29.2	19.7	E 59
7.0	6.4	26.6	29.6	19.8	E 60
7.1	6.5	27.0	30.0	19.9	E 61
7.2	6.6	27.4	30.4	20.0	E 62
7.3	6.7	27.8	30.8	20.1	E 63
7.4	6.8	28.2	31.2	20.2	E 64
7.5	6.9	28.6	31.6	20.3	E 65
7.6	7.0	29.0	32.0	20.4	E 66
7.7	7.1	29.4	32.4	20.5	E 67
7.8	7.2	29.8	32.8	20.6	E 68
7.9	7.3	30.2	33.2	20.7	E 69
8.0	7.4	30.6	33.6	20.8	E 70
8.1	7.5	31.0	34.0	20.9	E 71
8.2	7.6	31.4	34.4	21.0	E 72
8.3	7.7	31.8	34.8	21.1	E 73
8.4	7.8	32.2	35.2	21.2	E 74
8.5	7.9	32.6	35.6	21.3	E 75
8.6	8.0	33.0	36.0	21.4	E 76
8.7	8.1	33.4	36.4	21.5	E 77
8.8	8.2	33.8	36.8	21.6	E 78
8.9	8.3	34.2	37.2	21.7	E 79
9.0	8.4	34.6	37.6	21.8	E 80
9.1	8.5	35.0	38.0	21.9	E 81
9.2	8.6	35.4	38.4	22.0	E 82
9.3	8.7	35.8	38.8	22.1	E 83
9.4	8.8	36.2	39.2	22.2	E 84
9.5	8.9	36.6	39.6	22.3	E 85
9.6	9.0	37.0	40.0	22.4	E 86
9.7	9.1	37.4	40.4	22.5	E 87
9.8	9.2	37.8	40.8	22.6	E 88
9.9	9.3	38.2	41.2	22.7	E 89
10.0	9.4	38.6	41.6	22.8	E 90
10.1	9.5	39.0	42.0	22.9	E 91
10.2	9.6	39.4	42.4	23.0	E 92
10.3	9.7	39.8	42.8	23.1	E 93
10.4	9.8	40.2	43.2	23.2	E 94
10.5	9.9	40.6	43.6	23.3	E 95
10.6	10.0	41.0	44.0	23.4	E 96
10.7	10.1	41.4	44.4	23.5	E 97
10.8	10.2	41.8	44.8	23.6	E 98
10.9	10.3	42.2	45.2	23.7	E 99
11.0	10.4	42.6	45.6	23.8	E 100

FOCAL LENGTH = 1000MM		FOCAL LENGTH = 500MM	
OBJECT DISTANCE = 4000.FT. (1219.20M)		OBJECT DISTANCE = 5000.FT. (1524.00M)	
MAGNIFICATION = .000657		MAGNIFICATION = .000657	
-6 GROUP LENGTH = .01971IN.)		-6 GROUP LENGTH = .01971IN.)	
GROUP	GROUP	GROUP	GROUP
-6	-5	-4	-3
-5	-4	-3	-2
-4	-3	-2	-1
-3	-2	-1	E
-2	-1	E	L 1
-1	E	L 1	23.6
E	L 1	23.6	95.2
L 1	23.6	95.2	190.4
23.6	95.2	190.4	380.7
95.2	190.4	380.7	761.5
190.4	380.7	761.5	-1
380.7	761.5	-1	26.7
761.5	-1	26.7	53.4
-1	26.7	53.4	106.8
26.7	53.4	106.8	213.7
53.4	106.8	213.7	427.4
106.8	213.7	427.4	654.8
213.7	427.4	654.8	-1
427.4	654.8	-1	50.0
654.8	-1	50.0	109.9
-1	50.0	109.9	239.9
50.0	109.9	239.9	479.7
109.9	239.9	479.7	939.4
239.9	479.7	939.4	-1
479.7	939.4	-1	30.0
939.4	-1	30.0	60.0
-1	30.0	60.0	134.6
30.0	60.0	134.6	269.2
60.0	134.6	269.2	536.5
134.6	269.2	536.5	999.9
269.2	536.5	999.9	-1
536.5	999.9	-1	33.7
999.9	-1	33.7	67.3
-1	33.7	67.3	134.6
33.7	67.3	134.6	269.2
67.3	134.6	269.2	536.5
134.6	269.2	536.5	999.9
269.2	536.5	999.9	-1
536.5	999.9	-1	37.8
999.9	-1	37.8	75.6
-1	37.8	75.6	151.1
37.8	75.6	151.1	302.2
75.6	151.1	302.2	604.4
151.1	302.2	604.4	999.9
302.2	604.4	999.9	-1
604.4	999.9	-1	84.8
999.9	-1	84.8	169.6
-1	84.8	169.6	339.2
84.8	169.6	339.2	676.4
169.6	339.2	676.4	-1
339.2	676.4	-1	37.8
676.4	37.8	37.8	271.3
37.8	271.3	271.3	-1
271.3	-1	-1	1.0
-1	1.0	1.0	1.0

THE DECISION LIMIT FOR 1000MM FOCAL LENGTH LENSES

IMAGE PLANE MESOLUTION LINES PER MILLIMETER FOR 1060MM FOCAL LENGTH LENSES

	FOCAL LENGTH = 1060MM	OBJECT DISTANCE = 200 FT. (60.96M)	MAGNIFICATION = .017696	-6 GROUP LENGTH = 13.502MM (.5316IN.)	GROUP	FOCAL LENGTH = 1060MM	OBJECT DISTANCE = 300 FT. (91.44M)	MAGNIFICATION = .011728	-6 GROUP LENGTH = 8.049MM (.3523IN.)	GROUP
E -6	-5	-4	-3	-2	-1	E -6	-5	-4	-3	-2
E -1	.7	1.3	2.1	3.1	4.1	E -1	.6	.8	.5	.7
E -2	.7	1.2	2.0	3.0	4.0	E -2	.5	.6	.3	.5
E -3	.8	1.7	2.6	3.6	4.6	E -3	.7	.4	.6	.7
E -4	.9	1.4	2.7	3.5	4.4	E -4	.9	.6	.7	.8
E -5	1.0	2.1	4.1	5.1	6.1	E -5	1.0	1.0	1.0	1.0
E -6	1.2	2.3	6.7	9.6	12.6	E -6	1.2	1.2	1.2	1.2

	FOCAL LENGTH = 1060MM	OBJECT DISTANCE = 500 FT. (152.40M)	MAGNIFICATION = .007004	-6 GROUP LENGTH = 5.344MM (.2106IN.)	GROUP	FOCAL LENGTH = 1060MM	OBJECT DISTANCE = 750 FT. (228.60M)	MAGNIFICATION = .004659	-6 GROUP LENGTH = 3.554MM (.1399IN.)	GROUP
E -6	-5	-4	-3	-2	-1	E -6	-5	-4	-3	-2
E -1	1.0	3.0	7.1	14.3	28.4	E -1	3.4	6.7	13.4	26.8
E -2	2.0	6.0	16.0	32.1	64.0	E -2	3.8	7.5	15.1	30.1
E -3	2.2	6.5	9.5	35.4	71.8	E -3	4.2	8.5	16.9	33.8
E -4	2.5	5.0	16.1	20.7	40.6	E -4	4.7	9.5	19.0	37.9
E -5	5.7	15.3	22.6	45.2	90.5	E -5	5.3	10.6	21.3	42.6
E -6	3.2	9.3	12.7	23.0	46.0	E -6	6.0	12.0	23.9	47.8

	FOCAL LENGTH = 1060MM	OBJECT DISTANCE = 1500.FT. (457.20M)	MAGNIFICATION = .002324	-6 GROUP LENGTH = 1.773MM (.0698IN.)	GROUP	FOCAL LENGTH = 1060MM	OBJECT DISTANCE = 2000.FT. (609.60M)	MAGNIFICATION = .001742	-6 GROUP LENGTH = 1.329MM (.0523IN.)	GROUP
E -6	-5	-4	-3	-2	-1	E -6	-5	-4	-3	-2
E -1	1.0	4.0	17.4	25.6	71.4	E -1	6.7	13.4	26.9	53.8
E -2	5.0	10.1	20.1	40.7	80.4	E -2	7.5	15.1	30.1	60.2
E -3	5.6	11.3	22.4	45.1	90.3	E -3	6.5	13.2	26.6	57.6
E -4	4.3	12.7	25.1	50.2	101.3	E -4	6.0	12.7	25.4	50.7
E -5	7.1	14.2	28.4	56.9	113.7	E -5	6.5	13.0	27.8	57.0
E -6	8.0	17.0	33.0	50.1	101.6	E -6	7.0	13.9	27.7	57.9

	FOCAL LENGTH = 1060MM	OBJECT DISTANCE = 4000.FT. (1219.20M)	MAGNIFICATION = .000870	-6 GROUP LENGTH = .664MM (.0261IN.)	GROUP	FOCAL LENGTH = 1060MM	OBJECT DISTANCE = 5000.FT. (1524.00M)	MAGNIFICATION = .000696	-6 GROUP LENGTH = .531MM (.0209IN.)	GROUP
E -6	-5	-4	-3	-2	-1	E -6	-5	-4	-3	-2
E -1	11.3	26.9	63.9	107.7	215.4	E -1	10.0	17.9	35.9	71.8
E -2	15.1	33.2	60.4	125.6	241.8	E -2	10.1	20.1	40.1	61.1
E -3	17.0	33.9	67.4	132.7	271.4	E -3	11.3	22.6	45.2	86.4
E -4	10.0	22.1	76.7	152.3	304.9	E -4	10.6	20.1	40.4	63.7
E -5	21.4	62.7	85.4	171.0	341.4	E -5	35.6	63.7	124.5	254.0
E -6	24.0	44.0	46.4	191.9	383.4	E -6	40.0	60.0	160.0	320.0

	FOCAL LENGTH = 1060MM	OBJECT DISTANCE = 6000.FT. (4572.00M)	MAGNIFICATION = .000570	-6 GROUP LENGTH = .664MM (.0261IN.)	GROUP	FOCAL LENGTH = 1060MM	OBJECT DISTANCE = 8000.FT. (15240.00M)	MAGNIFICATION = .000370	-6 GROUP LENGTH = .531MM (.0209IN.)	GROUP
E -6	-5	-4	-3	-2	-1	E -6	-5	-4	-3	-2
E -1	12.3	27.0	64.0	108.0	210.8	E -1	22.4	44.9	89.8	179.6
E -2	16.1	34.2	60.4	125.6	241.8	E -2	25.2	50.4	100.8	201.6
E -3	17.0	33.9	67.4	132.7	271.4	E -3	28.7	56.6	113.1	226.3
E -4	10.0	22.1	76.7	152.3	304.9	E -4	31.7	63.7	124.5	254.0
E -5	21.4	62.7	85.4	171.0	341.4	E -5	35.6	71.3	142.5	287.0
E -6	24.0	44.0	46.4	191.9	383.4	E -6	40.0	60.0	160.0	320.0

IMAGE PLANE MESOLUTION LINES PER MILLIMETER FOR 1060MM FOCAL LENGTH LENSES

IMAGE PLANE RESOLUTION LINES PER MILLIMETER FOR 120MM FOCAL LENGTH LENSES

FOCAL LENGTH	1200MM	1200MM	1200MM	1200MM	1200MM
OBJECT DISTANCE	200.FT.(	60.96M)	200.FT.(	60.96M)	200.FT.(
MAGNIFICATION	*0.02080	*0.02080	*0.02080	*0.02080	*0.02080
-6 GROUP LENGTH=15.321MM (.6032IN.)					
GROUP	GROUP	GROUP	GROUP	GROUP	GROUP
-6	-5	-4	-3	-2	-1
.5	.6	.7	.8	.9	.1
1.2	2.1	3.0	4.0	5.0	6.1
1.9	2.9	3.9	4.9	5.9	6.9
2.4	3.4	4.0	4.6	5.3	6.4
2.5	3.5	4.0	4.4	5.0	6.4
2.6	3.6	4.1	4.5	5.1	6.5
2.7	3.7	4.2	4.7	5.3	6.6
2.8	3.8	4.3	4.8	5.4	6.8
2.9	3.9	4.4	4.9	5.5	7.0
3.0	4.0	4.5	5.0	5.6	7.1
3.1	4.1	4.6	5.1	5.7	7.2
3.2	4.2	4.7	5.2	5.8	7.3
3.3	4.3	4.8	5.3	5.9	7.4
3.4	4.4	4.9	5.4	6.0	7.5
3.5	4.5	5.0	5.5	6.1	7.6
3.6	4.6	5.1	5.6	6.2	7.7
3.7	4.7	5.2	5.7	6.3	7.8
3.8	4.8	5.3	5.8	6.4	7.9
3.9	4.9	5.4	5.9	6.5	8.0
4.0	5.0	5.5	6.0	6.6	8.1
4.1	5.1	5.6	6.1	6.7	8.2
4.2	5.2	5.7	6.2	6.8	8.3
4.3	5.3	5.8	6.3	6.9	8.4
4.4	5.4	5.9	6.4	7.0	8.5
4.5	5.5	6.0	6.5	7.1	8.6
4.6	5.6	6.1	6.6	7.2	8.7
4.7	5.7	6.2	6.7	7.3	8.8
4.8	5.8	6.3	6.8	7.4	8.9
4.9	5.9	6.4	6.9	7.5	9.0
5.0	6.0	6.5	7.0	7.6	9.1
5.1	6.1	6.6	7.1	7.7	9.2
5.2	6.2	6.7	7.2	7.8	9.3
5.3	6.3	6.8	7.3	7.9	9.4
5.4	6.4	6.9	7.4	8.0	9.5
5.5	6.5	7.0	7.5	8.1	9.6
5.6	6.6	7.1	7.6	8.2	9.7
5.7	6.7	7.2	7.7	8.3	9.8
5.8	6.8	7.3	7.8	8.4	9.9
5.9	6.9	7.4	7.9	8.5	10.0
6.0	7.0	7.5	8.0	8.6	10.1

FOCAL LENGTH	-	1200MM	-	1200MM	-	1200MM	-	1200MM	-	1200MM	-
OBJECT DISTANCE	-	750.FT.	(	228.60M)	-	750.FT.	(	228.60M)	-	750.FT.	(
MAGNIFICATION	-	+005277	-	+005277	-	+005277	-	+005277	-	+005277	-
-6 GROUP LENGTH	-	+0.026MM	(	+0.026MM	)	+0.026MM	(	+0.026MM	)	+0.026MM	(
GROUP	-	1.000	-	1.000	-	1.000	-	1.000	-	1.000	-
FOCAL LENGTH	-	1200MM	-	1200MM	-	1200MM	-	1200MM	-	1200MM	-
OBJECT DISTANCE	-	500.FT. (	152.40M)	-	500.FT. (	152.40M)	-	500.FT. (	152.40M)	500.FT. ((
MAGNIFICATION	-	+0.07937	-	+0.07937	-	+0.07937	-	+0.07937	-	+0.07937	-
-6 GROUP LENGTH	-	+0.056MM	(	+0.056MM	)	+0.056MM	(	+0.056MM	)	+0.056MM	(
GROUP	-	1.000	-	1.000	-	1.000	-	1.000	-	1.000	-
FOCAL LENGTH	-	1200MM	-	1200MM	-	1200MM	-	1200MM	-	1200MM	-
OBJECT DISTANCE	-	300.FT. (	91.44M)	-	300.FT. (	91.44M)	-	300.FT. (	91.44M)	300.FT. ((
MAGNIFICATION	-	+0.15846	-	+0.15846	-	+0.15846	-	+0.15846	-	+0.15846	-
-6 GROUP LENGTH	-	+0.095MM	(	+0.095MM	)	+0.095MM	(	+0.095MM	)	+0.095MM	(
GROUP	-	1.000	-	1.000	-	1.000	-	1.000	-	1.000	-
FOCAL LENGTH	-	1200MM	-	1200MM	-	1200MM	-	1200MM	-	1200MM	-
OBJECT DISTANCE	-	200.FT. (	60.96M)	-	200.FT. (	60.96M)	-	200.FT. (	60.96M)	200.FT. ((
MAGNIFICATION	-	+0.29544	-	+0.29544	-	+0.29544	-	+0.29544	-	+0.29544	-
-6 GROUP LENGTH	-	+0.045MM	(	+0.045MM	)	+0.045MM	(	+0.045MM	)	+0.045MM	(
GROUP	-	1.000	-	1.000	-	1.000	-	1.000	-	1.000	-
FOCAL LENGTH	-	1200MM	-	1200MM	-	1200MM	-	1200MM	-	1200MM	-
OBJECT DISTANCE	-	100.FT. (	30.48M)	-	100.FT. (	30.48M)	-	100.FT. (	30.48M)	100.FT. ((
MAGNIFICATION	-	+0.49544	-	+0.49544	-	+0.49544	-	+0.49544	-	+0.49544	-
-6 GROUP LENGTH	-	+0.011MM	(	+0.011MM	)	+0.011MM	(	+0.011MM	)	+0.011MM	(
GROUP	-	1.000	-	1.000	-	1.000	-	1.000	-	1.000	-

IMAGE ONE RESOLUTION (LINES PER MILLIMETER) FOR 1200MH FOCAL LENGTH LENSES

IMAGE PLATE RESOLUTION (LINES PER MILLIMETER) FOR 1400MM FOCAL LENGTH LENSES

FOCAL LENGTH = 1400MM							
OBJECT DISTANCE = 300.FT.(91.44M)							
MAGNIFICATION = 0.15549							
-6 GROUP LENGTH = 1.864MM(.4671IN.)							
GROUP							
E	-5	-4	-3	-2	-1	E	-6
E-1	-7	-6	-5	-4	-3	E-1	-5
E-2	-7	-6	-5	-4	-3	E-2	-4
E-3	-6	-5	-4	-3	-2	E-3	-3
E-4	-7	-6	-5	-4	-3	E-4	-2
E-5	-6	-5	-4	-3	-2	E-5	-1
E-6	-7	-6	-5	-4	-3	E-6	0
E-7	-6	-5	-4	-3	-2	E-7	-1
E-8	-7	-6	-5	-4	-3	E-8	-2
E-9	-6	-5	-4	-3	-2	E-9	-3
E-10	-7	-6	-5	-4	-3	E-10	-4
E-11	-6	-5	-4	-3	-2	E-11	-5
E-12	-7	-6	-5	-4	-3	E-12	-6
E-13	-6	-5	-4	-3	-2	E-13	-7
E-14	-7	-6	-5	-4	-3	E-14	-8
E-15	-6	-5	-4	-3	-2	E-15	-9
E-16	-7	-6	-5	-4	-3	E-16	-10
E-17	-6	-5	-4	-3	-2	E-17	-11
E-18	-7	-6	-5	-4	-3	E-18	-12
E-19	-6	-5	-4	-3	-2	E-19	-13
E-20	-7	-6	-5	-4	-3	E-20	-14
E-21	-6	-5	-4	-3	-2	E-21	-15
E-22	-7	-6	-5	-4	-3	E-22	-16
E-23	-6	-5	-4	-3	-2	E-23	-17
E-24	-7	-6	-5	-4	-3	E-24	-18
E-25	-6	-5	-4	-3	-2	E-25	-19
E-26	-7	-6	-5	-4	-3	E-26	-20
E-27	-6	-5	-4	-3	-2	E-27	-21
E-28	-7	-6	-5	-4	-3	E-28	-22
E-29	-6	-5	-4	-3	-2	E-29	-23
E-30	-7	-6	-5	-4	-3	E-30	-24
E-31	-6	-5	-4	-3	-2	E-31	-25
E-32	-7	-6	-5	-4	-3	E-32	-26
E-33	-6	-5	-4	-3	-2	E-33	-27
E-34	-7	-6	-5	-4	-3	E-34	-28
E-35	-6	-5	-4	-3	-2	E-35	-29
E-36	-7	-6	-5	-4	-3	E-36	-30
E-37	-6	-5	-4	-3	-2	E-37	-31
E-38	-7	-6	-5	-4	-3	E-38	-32
E-39	-6	-5	-4	-3	-2	E-39	-33
E-40	-7	-6	-5	-4	-3	E-40	-34
E-41	-6	-5	-4	-3	-2	E-41	-35
E-42	-7	-6	-5	-4	-3	E-42	-36
E-43	-6	-5	-4	-3	-2	E-43	-37
E-44	-7	-6	-5	-4	-3	E-44	-38
E-45	-6	-5	-4	-3	-2	E-45	-39
E-46	-7	-6	-5	-4	-3	E-46	-40
E-47	-6	-5	-4	-3	-2	E-47	-41
E-48	-7	-6	-5	-4	-3	E-48	-42
E-49	-6	-5	-4	-3	-2	E-49	-43
E-50	-7	-6	-5	-4	-3	E-50	-44
E-51	-6	-5	-4	-3	-2	E-51	-45
E-52	-7	-6	-5	-4	-3	E-52	-46
E-53	-6	-5	-4	-3	-2	E-53	-47
E-54	-7	-6	-5	-4	-3	E-54	-48
E-55	-6	-5	-4	-3	-2	E-55	-49
E-56	-7	-6	-5	-4	-3	E-56	-50
E-57	-6	-5	-4	-3	-2	E-57	-51
E-58	-7	-6	-5	-4	-3	E-58	-52
E-59	-6	-5	-4	-3	-2	E-59	-53
E-60	-7	-6	-5	-4	-3	E-60	-54
E-61	-6	-5	-4	-3	-2	E-61	-55
E-62	-7	-6	-5	-4	-3	E-62	-56
E-63	-6	-5	-4	-3	-2	E-63	-57
E-64	-7	-6	-5	-4	-3	E-64	-58
E-65	-6	-5	-4	-3	-2	E-65	-59
E-66	-7	-6	-5	-4	-3	E-66	-60
E-67	-6	-5	-4	-3	-2	E-67	-61
E-68	-7	-6	-5	-4	-3	E-68	-62
E-69	-6	-5	-4	-3	-2	E-69	-63
E-70	-7	-6	-5	-4	-3	E-70	-64
E-71	-6	-5	-4	-3	-2	E-71	-65
E-72	-7	-6	-5	-4	-3	E-72	-66
E-73	-6	-5	-4	-3	-2	E-73	-67
E-74	-7	-6	-5	-4	-3	E-74	-68
E-75	-6	-5	-4	-3	-2	E-75	-69
E-76	-7	-6	-5	-4	-3	E-76	-70
E-77	-6	-5	-4	-3	-2	E-77	-71
E-78	-7	-6	-5	-4	-3	E-78	-72
E-79	-6	-5	-4	-3	-2	E-79	-73
E-80	-7	-6	-5	-4	-3	E-80	-74
E-81	-6	-5	-4	-3	-2	E-81	-75
E-82	-7	-6	-5	-4	-3	E-82	-76
E-83	-6	-5	-4	-3	-2	E-83	-77
E-84	-7	-6	-5	-4	-3	E-84	-78
E-85	-6	-5	-4	-3	-2	E-85	-79
E-86	-7	-6	-5	-4	-3	E-86	-80
E-87	-6	-5	-4	-3	-2	E-87	-81
E-88	-7	-6	-5	-4	-3	E-88	-82
E-89	-6	-5	-4	-3	-2	E-89	-83
E-90	-7	-6	-5	-4	-3	E-90	-84
E-91	-6	-5	-4	-3	-2	E-91	-85
E-92	-7	-6	-5	-4	-3	E-92	-86
E-93	-6	-5	-4	-3	-2	E-93	-87
E-94	-7	-6	-5	-4	-3	E-94	-88
E-95	-6	-5	-4	-3	-2	E-95	-89
E-96	-7	-6	-5	-4	-3	E-96	-90
E-97	-6	-5	-4	-3	-2	E-97	-91
E-98	-7	-6	-5	-4	-3	E-98	-92
E-99	-6	-5	-4	-3	-2	E-99	-93
E-100	-7	-6	-5	-4	-3	E-100	-94

FOCAL LENGTH = 1400MM							
OBJECT DISTANCE = 750.FT.(228.60M)							
MAGNIFICATION = 0.06162							
-6 GROUP LENGTH = 4.702MM(.1651IN.)							
GROUP							
E	-5	-4	-3	-2	-1	E	-6
E-1	-7	-6	-5	-4	-3	E-1	-5
E-2	-7	-6	-5	-4	-3	E-2	-4
E-3	-6	-5	-4	-3	-2	E-3	-3
E-4	-7	-6	-5	-4	-3	E-4	-2
E-5	-6	-5	-4	-3	-2	E-5	-1
E-6	-7	-6	-5	-4	-3	E-6	0
E-7	-6	-5	-4	-3	-2	E-7	-1
E-8	-7	-6	-5	-4	-3	E-8	-2
E-9	-6	-5	-4	-3	-2	E-9	-3
E-10	-7	-6	-5	-4	-3	E-10	-4
E-11	-6	-5	-4	-3	-2	E-11	-5
E-12	-7	-6	-5	-4	-3	E-12	-6
E-13	-6	-5	-4	-3	-2	E-13	-7
E-14	-7	-6	-5	-4	-3	E-14	-8
E-15	-6	-5	-4	-3	-2	E-15	-9
E-16	-7	-6	-5	-4	-3	E-16	-10
E-17	-6	-5	-4	-3	-2	E-17	-11
E-18	-7	-6	-5	-4	-3	E-18	-12
E-19	-6	-5	-4	-3	-2	E-19	-13
E-20	-7	-6	-5	-4	-3	E-20	-14
E-21	-6	-5	-4	-3	-2	E-21	-15
E-22	-7	-6	-5	-4	-3	E-22	-16
E-23	-6	-5	-4	-3	-2	E-23	-17
E-24	-7	-6	-5	-4	-3	E-24	-18
E-25	-6	-5	-4	-3	-2	E-25	-19
E-26	-7	-6	-5	-4	-3	E-26	-20
E-27	-6	-5	-4	-3	-2	E-27	-21
E-28	-7	-6	-5	-4	-3	E-28	-22
E-29	-6	-5	-4	-3	-2	E-29	-23
E-30	-7	-6	-5	-4	-3	E-30	-24
E-31	-6	-5	-4	-3	-2	E-31	-25
E-32	-7	-6	-5	-4	-3	E-32	-26
E-33	-6	-5	-4	-3	-2	E-33	-27
E-34	-7	-6	-5	-4	-3	E-34	-28
E-35	-6	-5	-4	-3	-2	E-35	-29
E-36	-7	-6	-5	-4	-3	E-36	-30
E-37	-6	-5	-4	-3	-2	E-37	-31
E-38	-7	-6	-5	-4	-3	E-38	-32
E-39	-6	-5	-4	-3	-2	E-39	-33
E-40	-7	-6	-5	-4	-3	E-40	-34
E-41	-6	-5	-4	-3	-2	E-41	-35
E-42	-7	-6	-5	-4	-3	E-42	-36
E-43	-6	-5	-4	-3	-2	E-43	-37
E-44	-7	-6	-5	-4	-3	E-44	-38
E-45	-6	-5	-4	-3	-2	E-45	-39
E-46	-7	-6	-5	-4	-3	E-46	-40
E-47	-6	-5	-4	-3	-2	E-47	-41
E-48	-7	-6	-5	-4	-3	E-48	-42
E-49	-6	-5	-4	-3	-2	E-49	-43
E-50	-7	-6	-5	-4	-3	E-50	-44
E-51	-6	-5	-4	-3	-2	E-51	-45
E-52	-7	-6	-5	-4	-3	E-52	-46
E-53	-6	-5	-4	-3	-2	E-53	-47
E-54	-7	-6	-5	-4	-3	E-54	-48
E-55	-6	-5	-4	-3	-2	E-55	-49
E-56	-7	-6	-5	-4	-3	E-56	-50
E-57	-6	-5	-4	-3	-2	E-57	-51
E-58	-7	-6	-5	-4	-3	E-58	-52
E-59	-6	-5	-4	-3	-2	E-59	-53
E-60	-7	-6	-5	-4	-3	E-60	-54

FOCAL LENGTH = 1400MM							
OBJECT DISTANCE = 1000.FT.(304.80M)							
MAGNIFICATION = 0.06164							
-6 GROUP LENGTH = 3.521MM(.1386IN.)							
GROUP							
E	-5	-4	-3	-2	-1	E	-6
E-1	-7	-6	-5	-4	-3	E-1	-5
E-2	-7	-6	-5	-4	-3	E-2	-4
E-3	-6	-5	-4	-3	-2	E-3	-3
E-4	-7						

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR 1600MM FOCAL LENGTH LENSES

FOCAL LENGTH = 1600MM										
OBJECT DISTANCE = 600.FT. (60.0MM)										
MAGNIFICATION = .013248 (.0013248)										
-6 GROUP LENGTH=.506MM(.000506IN.)										
GROUP	-6	-5	-4	-3	-2	-1	E	-6	-5	-4
L-1	.6	.5	.4	.3	.2	.1	L-1	.6	.5	.4
L-2	.7	.6	.5	.4	.3	.2	L-2	.7	.6	.5
L-3	.7	.6	.5	.4	.3	.2	L-3	.7	.6	.5
L-4	.7	.6	.5	.4	.3	.2	L-4	.7	.6	.5
L-5	.8	.7	.6	.5	.4	.3	L-5	.8	.7	.6
L-6	.9	.8	.7	.6	.5	.4	L-6	.9	.8	.7
L-7	.7	.6	.5	.4	.3	.2	L-7	.7	.6	.5
L-8	.6	.5	.4	.3	.2	.1	L-8	.6	.5	.4
L-9	.5	.4	.3	.2	.1		L-9	.5	.4	.3
L-10	.4	.3	.2	.1			L-10	.4	.3	.2

FOCAL LENGTH = 1600MM										
OBJECT DISTANCE = 300.FT. (91.4MM)										
MAGNIFICATION = .017809 (.0017809)										
-6 GROUP LENGTH=.589MM(.00589IN.)										
GROUP	-6	-5	-4	-3	-2	-1	E	-6	-5	-4
L-1	.6	.5	.4	.3	.2	.1	L-1	.6	.5	.4
L-2	.7	.6	.5	.4	.3	.2	L-2	.7	.6	.5
L-3	.7	.6	.5	.4	.3	.2	L-3	.7	.6	.5
L-4	.7	.6	.5	.4	.3	.2	L-4	.7	.6	.5
L-5	.8	.7	.6	.5	.4	.3	L-5	.8	.7	.6
L-6	.9	.8	.7	.6	.5	.4	L-6	.9	.8	.7
L-7	.7	.6	.5	.4	.3	.2	L-7	.7	.6	.5
L-8	.6	.5	.4	.3	.2	.1	L-8	.6	.5	.4
L-9	.5	.4	.3	.2	.1		L-9	.5	.4	.3
L-10	.4	.3	.2	.1			L-10	.4	.3	.2

FOCAL LENGTH = 1600MM										
OBJECT DISTANCE = 400.FT. (121.9MM)										
MAGNIFICATION = .021051 (.0021051)										
-6 GROUP LENGTH=.595MM(.00595IN.)										
GROUP	-6	-5	-4	-3	-2	-1	E	-6	-5	-4
L-1	.6	.5	.4	.3	.2	.1	L-1	.6	.5	.4
L-2	.7	.6	.5	.4	.3	.2	L-2	.7	.6	.5
L-3	.7	.6	.5	.4	.3	.2	L-3	.7	.6	.5
L-4	.7	.6	.5	.4	.3	.2	L-4	.7	.6	.5
L-5	.8	.7	.6	.5	.4	.3	L-5	.8	.7	.6
L-6	.9	.8	.7	.6	.5	.4	L-6	.9	.8	.7
L-7	.7	.6	.5	.4	.3	.2	L-7	.7	.6	.5
L-8	.6	.5	.4	.3	.2	.1	L-8	.6	.5	.4
L-9	.5	.4	.3	.2	.1		L-9	.5	.4	.3
L-10	.4	.3	.2	.1			L-10	.4	.3	.2

FOCAL LENGTH = 1600MM										
OBJECT DISTANCE = 500.FT. (152.4MM)										
MAGNIFICATION = .02632 (.002632)										
-6 GROUP LENGTH=.506MM(.000506IN.)										
GROUP	-6	-5	-4	-3	-2	-1	E	-6	-5	-4
L-1	.6	.5	.4	.3	.2	.1	L-1	.6	.5	.4
L-2	.7	.6	.5	.4	.3	.2	L-2	.7	.6	.5
L-3	.7	.6	.5	.4	.3	.2	L-3	.7	.6	.5
L-4	.7	.6	.5	.4	.3	.2	L-4	.7	.6	.5
L-5	.8	.7	.6	.5	.4	.3	L-5	.8	.7	.6
L-6	.9	.8	.7	.6	.5	.4	L-6	.9	.8	.7
L-7	.7	.6	.5	.4	.3	.2	L-7	.7	.6	.5
L-8	.6	.5	.4	.3	.2	.1	L-8	.6	.5	.4
L-9	.5	.4	.3	.2	.1		L-9	.5	.4	.3
L-10	.4	.3	.2	.1			L-10	.4	.3	.2

FOCAL LENGTH = 1600MM										
OBJECT DISTANCE = 700.FT. (213.4MM)										
MAGNIFICATION = .03271 (.003271)										
-6 GROUP LENGTH=.516MM(.00516IN.)										
GROUP	-6	-5	-4	-3	-2	-1	E	-6	-5	-4
L-1	.6	.5	.4	.3	.2	.1	L-1	.6	.5	.4
L-2	.7	.6	.5	.4	.3	.2	L-2	.7	.6	.5
L-3	.7	.6	.5	.4	.3	.2	L-3	.7	.6	.5
L-4	.7	.6	.5	.4	.3	.2	L-4	.7	.6	.5
L-5	.8	.7	.6	.5	.4	.3	L-5	.8	.7	.6
L-6	.9	.8	.7	.6	.5	.4	L-6	.9	.8	.7
L-7	.7	.6	.5	.4	.3	.2	L-7	.7	.6	.5
L-8	.6	.5	.4	.3	.2	.1	L-8	.6	.5	.4
L-9	.5	.4	.3	.2	.1		L-9	.5	.4	.3
L-10	.4	.3	.2	.1			L-10	.4	.3	.2

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR 1600MM FOCAL LENGTH LENSES

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER) FOR 2000MM FOCAL LENGTH LENSES

FOCAL LENGTH = 2000MM				
OBJECT DISTANCE = 600.FT. (121.92M)				
MAGNIFICATION = +0.6670				
+6 GROUP LENGTH=12.725MM(+ .5010IN.)				
GROUP	1	2	3	
E	-5	-4	-3	-2
E-1	1.0	2.1	3.2	4.3
E-2	1.1	2.3	3.5	4.7
E-3	1.6	4.1	14.1	47.2
E-4	1.0	4.1	15.4	47.2
E-5	1.0	4.6	11.6	47.2
E-6	1.1	4.6	17.7	47.5
E-7	1.2	5.0	14.4	47.6
E-8	1.2	5.5	14.8	47.6

FOCAL LENGTH = 2000MM				
OBJECT DISTANCE = 1000.FT. (304.80M)				
MAGNIFICATION = +0.6665				
+6 GROUP LENGTH= 5.040MM(+ .1984IN.)				
GROUP	1	2	3	
E	-5	-4	-3	-2
E-1	1.0	7.1	16.2	48.1
E-2	1.0	7.4	17.6	49.0
E-3	1.0	7.4	35.7	49.4
E-4	1.0	7.4	40.1	49.4
E-5	1.0	7.5	49.3	49.5
E-6	1.0	7.5	50.5	49.5
E-7	1.2	7.4	50.5	49.6
E-8	1.2	7.4	51.0	49.6

FOCAL LENGTH = 2000MM				
OBJECT DISTANCE = 500.FT. (152.40M)				
MAGNIFICATION = +0.6664				
+6 GROUP LENGTH= 3.352MM(+ .1320IN.)				
GROUP	1	2	3	
E	-5	-4	-3	-2
E-1	1.0	2.1	3.2	4.3
E-2	1.1	2.3	3.5	4.7
E-3	1.6	4.1	14.1	47.2
E-4	1.0	4.1	15.4	47.2
E-5	1.0	4.6	11.6	47.2
E-6	1.1	4.6	17.7	47.5
E-7	1.2	5.0	14.4	47.6
E-8	1.2	5.5	14.8	47.6

FOCAL LENGTH = 2000MM				
OBJECT DISTANCE = 400.FT. (121.92M)				
MAGNIFICATION = +0.6663				
+6 GROUP LENGTH= 1.254MM(+ .0494IN.)				
GROUP	1	2	3	
E	-5	-4	-3	-2
E-1	1.0	7.1	16.2	48.1
E-2	1.0	7.4	21.2	49.0
E-3	1.0	7.4	23.6	49.4
E-4	1.0	7.4	26.8	49.4
E-5	1.0	7.5	30.0	49.5
E-6	1.0	7.5	30.0	49.5
E-7	1.2	7.4	33.7	49.6
E-8	1.2	7.4	34.9	49.6

IMAGE PLATE RESOLUTION (LINES PER MILLIMETER) FOR 2000MM FOCAL LENGTH LENSES

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SECTION (C)

TABULATION OF CAMERA SYSTEM MAGNIFICATIONS
AND RESULTANT IMAGE SIZES

CLASSIFICATION	GROUP LENGTH	
	IN	INCH
.0000139	.157	.00420
.0000143	.110	.00432
.0000147	.113	.00445
.0000152	.116	.00458
.0000156	.120	.00471
.0000161	.123	.00485
.0000165	.127	.00499
.0000170	.131	.00514
.0000175	.134	.00529
.0000181	.138	.00544
.0000185	.142	.00560
.0000189	.147	.00577
.0000193	.151	.00594
.0000197	.155	.00611
.0000201	.159	.00628
.0000205	.164	.00645
.0000209	.169	.00662
.0000213	.174	.00680
.0000217	.178	.00698
.0000221	.185	.00716
.0000225	.190	.00734
.0000229	.196	.00752
.0000233	.201	.00770
.0000237	.207	.00788
.0000241	.213	.00806
.0000245	.220	.00824
.0000249	.226	.00842
.0000253	.233	.00860
.0000257	.239	.00878
.0000261	.246	.00896
.0000265	.254	.00914
.0000269	.261	.00932
.0000273	.269	.00950
.0000277	.277	.00968
.0000281	.285	.01021
.0000285	.293	.01154
.0000289	.302	.01187
.0000293	.310	.01222
.0000297	.320	.01258
.0000301	.329	.01295
.0000305	.339	.01333
.0000309	.348	.01372
.0000313	.359	.01412
.0000317	.369	.01453
.0000321	.377	.01490
.0000325	.386	.01528
.0000329	.391	.01566
.0000333	.403	.01605
.0000337	.414	.01643
.0000341	.427	.01679
.0000345	.439	.01726
.0000349	.452	.01774
.0000353	.465	.01821
.0000357	.476	.01862
.0000361	.483	.01900
.0000365	.507	.01997
.0000369	.522	.02053

IDENTIFICATION	GROUP	LENGTH
.0006702	1-CM	
.0006722	.537	.02116
.0006743	.553	.02178
.0006765	.569	.02241
.0006787	.586	.02307
.0006811	.603	.02375
.0006834	.621	.02444
.0006856	.639	.02516
.0006878	.656	.02580
.0006900	.677	.02646
.0006922	.697	.02714
.001021	.702	.03170
.001051	.605	.03263
.001082	.629	
.001114	.653	.03358
.001146	.726	.02467
.001180	.766	.02992
.001214	.782	.03080
.001250	.920	.03462
.001287	.951	.03770
.001324	.986	.03880
.001363	1.014	.03994
.001403	1.064	.04111
.001444	1.075	.04231
.001487	1.106	.04355
.001520	1.139	.04483
.001555	1.172	.04616
.001621	1.204	.04750
.001669	1.262	.04889
.001717	1.278	.05032
.001768	1.316	.05179
.001820	1.354	.05311
.001873	1.394	.05447
.001928	1.435	.05586
.001984	1.477	.05814
.002042	1.520	.05984
.002102	1.564	.06159
.002164	1.610	.06340
.002227	1.656	.06526
.002293	1.706	.06717
.002360	1.756	.06914
.002726	1.808	.07116
.002806	1.860	.07425
.002868	1.915	.07539
.002923	1.971	.07760
.002989	2.029	.07988
.003150	2.088	.08222
.003242	2.150	.08463
.003337	2.213	.08711
.003435	2.277	.08966
.003535	2.344	.09229
.003631	2.413	.09499
.003737	2.483	.09777
.003835	2.556	.10064
		.10359

MANUFACTURER	ITEM	DESCRIPTION	INCH
	.003518	2.766	.19862
	.003619	2.788	.19975
	.003704	2.859	.19295
	.002556	2.953	.16277
	.003686	3.040	.19968
	.004065	3.129	.20319
	.004204	3.221	.20260
	.004328	3.315	.13051
	.004454	3.412	.13434
	.004585	3.512	.13827
	.004714	3.415	.14232
	.004858	3.721	.16469
	.005000	3.930	.16079
	.005137	3.942	.15521
	.005297	4.058	.15975
	.005453	4.179	.16443
	.005612	4.269	.16925
	.005777	4.425	.17421
	.005944	4.555	.17932
	.006120	4.674	.18457
	.006300	4.825	.18398
	.006484	4.987	.19353
	.006674	5.112	.20128
	.006860	5.262	.20717
	.007071	5.416	.21325
	.007278	5.575	.21946
	.007492	5.739	.22593
	.007711	5.907	.23255
	.007937	6.080	.23936
	.008170	6.258	.24637
	.008409	6.441	.25359
	.008653	6.630	.26102
	.008904	6.826	.26867
	.009170	7.026	.27655
	.009439	7.230	.28465
	.009715	7.442	.29299
	.010000	7.660	.30157
	.010283	7.884	.31061
	.010555	8.115	.31951
	.010805	8.353	.32837
	.011225	8.598	.33851
	.011584	8.850	.34643
	.011962	9.109	.35663
	.012341	9.376	.36914
	.012599	9.651	.37946
	.012868	9.936	.39109
	.013248	10.225	.40255
	.013640	10.526	.41435
	.014042	10.833	.42649
	.014457	11.150	.43899
	.014863	11.477	.45185
	.015222	11.813	.46509
	.015674	12.159	.47872
	.016139	12.516	.49275
	.016618	12.863	.50719
	.017131	13.260	.52265

MAGNIFICATION	GROUP	LENGTH
	KN	INCH
*017616	12.649	*53735
*018340	14.049	*55309
*018877	14.460	*56920
*019431	14.884	*58593
*020000	15.320	*60315
*020586	15.769	*62082
*021169	16.231	*63901
*021810	16.707	*65774
*022449	17.196	*67701
*023107	17.760	*69685
*023734	18.219	*71727
*024481	18.753	*73829
*025198	19.302	*75992
*025937	19.868	*78219
*026697	20.450	*80511
*027479	21.049	*82870
*028284	21.666	*85298
*029113	22.301	*87798
*029966	22.954	*90370
*030844	23.627	*93016
*031748	24.319	*95744
*032678	25.032	*98550
*033636	25.765	1.01437
*034621	26.520	1.04410

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SECTION (D)

RESOLVING POWER DATA TABLES
FOR SPECIFIC CAMERA MAGNIFICATIONS

IMAGE PLATE RESOLUTION (LINES PER MILLIMETER)

MAGNIFICATION = .000139		MAGNIFICATION = .000143		MAGNIFICATION = .000147	
.107MM (.0042IN.)		.110MM (.0043IN.)		.113MM (.0044IN.)	
-6 GROUP LENGTH- GROUP		-6 GROUP LENGTH- GROUP		-6 GROUP LENGTH- GROUP	
E -6	-5	-4	-3	-2	-1
L 1 112.2	224.5	449.0	898.0	999.9	999.9
E 2 126.0	252.0	504.0	999.9	999.9	999.9
M 3 141.4	282.8	565.7	999.9	999.9	999.9
E 4 158.7	317.5	635.1	999.9	999.9	999.9
N 5 178.2	356.4	712.7	999.9	999.9	999.9
T 6 200.0	400.0	800.0	999.9	999.9	999.9

MAGNIFICATION = .000152		MAGNIFICATION = .000156		MAGNIFICATION = .000161	
.116MM (.0046IN.)		.120MM (.0047IN.)		.123MM (.0048IN.)	
-6 GROUP LENGTH- GROUP		-6 GROUP LENGTH- GROUP		-6 GROUP LENGTH- GROUP	
E -6	-5	-4	-3	-2	-1
L 1 102.9	215.9	411.7	823.4	999.9	999.9
E 2 115.5	231.1	462.7	924.3	999.9	999.9
M 3 129.7	259.4	518.7	999.9	999.9	999.9
E 4 145.6	291.1	582.3	999.9	999.9	999.9
N 5 163.4	326.8	653.6	999.9	999.9	999.9
T 6 183.4	366.8	733.6	999.9	999.9	999.9

MAGNIFICATION = .000166		MAGNIFICATION = .000170		MAGNIFICATION = .000175	
.127MM (.0050IN.)		.131MM (.0051IN.)		.134MM (.0053IN.)	
-6 GROUP LENGTH- GROUP		-6 GROUP LENGTH- GROUP		-6 GROUP LENGTH- GROUP	
E -6	-5	-4	-3	-2	-1
L 1 94.4	188.8	377.5	755.1	999.9	999.9
E 2 105.9	211.9	423.8	847.6	999.9	999.9
M 3 118.9	237.8	475.7	951.4	999.9	999.9
E 4 133.5	267.0	533.9	999.9	999.9	999.9
N 5 149.8	299.7	599.3	999.9	999.9	999.9
T 6 168.2	336.4	672.7	999.9	999.9	999.9

MAGNIFICATION = .000181		MAGNIFICATION = .000186		MAGNIFICATION = .000191	
.138MM (.0054IN.)		.142MM (.0056IN.)		.147MM (.0058IN.)	
-6 GROUP LENGTH- GROUP		-6 GROUP LENGTH- GROUP		-6 GROUP LENGTH- GROUP	
E -6	-5	-4	-3	-2	-1
L 1 86.6	173.1	346.2	692.4	999.9	999.9
E 2 97.2	184.3	388.6	777.3	999.9	999.9
M 3 109.0	216.1	436.2	872.4	999.9	999.9
E 4 122.4	244.8	489.6	979.2	999.9	999.9
N 5 137.4	274.8	549.6	999.9	999.9	999.9
T 6 154.2	308.4	616.9	999.9	999.9	999.9

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER)

MAGNIFICATION = .000197		MAGNIFICATION = .000203		MAGNIFICATION = .000209	
-6 GROUP LENGTH= .151MM(.0054IN.)		-6 GROUP LENGTH= .155MM(.0061IN.)		-6 GROUP LENGTH= .160MM(.0063IN.)	
E	-6 GROUP	E	-6 GROUP	E	-6 GROUP
E	-6 -5 -4 -3 -2 -1	E	-6 -5 -4 -3 -2 -1	E	-6 -5 -4 -3 -2 -1
L 1	79.4 317.5 635.0 999.9 999.9 L 1	E 1	77.1 154.2 308.4 616.9 999.9 999.9	L 1	74.9 149.8 299.7 599.3 999.9 999.9
E 2	89.1 176.2 356.4 712.7 999.9 999.9 E 2	E 2	86.3 173.1 346.2 692.5 999.9 999.9	E 2	84.1 168.2 336.4 672.7 999.9 999.9
H 3	100.0 200.0 430.0 800.0 999.9 999.9 H 3	97.2 194.3 388.6 777.0 999.9 999.9	H 3	94.4 188.5 377.6 755.1 999.9 999.9	
E 4	112.2 224.5 449.1 858.0 999.9 999.9 E 4	109.0 216.1 436.2 872.4 999.9 999.9	E 4	105.9 211.9 423.8 847.6 999.9 999.9	
N 5	126.0 252.0 509.1 999.9 999.9 N 5	122.4 244.8 489.5 979.2 999.9 999.9	N 5	118.9 237.8 475.7 951.4 999.9 999.9	
T 6	141.4 292.8 565.7 999.9 999.9 T 6	137.4 274.8 549.6 999.9 999.9 999.9	T 6	133.5 267.0 533.9 999.9 999.9 999.9	

MAGNIFICATION = .000215		MAGNIFICATION = .000221		MAGNIFICATION = .000227	
-6 GROUP LENGTH= .164MM(.00651IN.)		-6 GROUP LENGTH= .169MM(.0067IN.)		-6 GROUP LENGTH= .174MM(.0069IN.)	
E	-6 GROUP	E	-6 GROUP	E	-6 GROUP
E	-6 -5 -4 -3 -2 -1	E	-6 -5 -4 -3 -2 -1	E	-6 -5 -4 -3 -2 -1
L 1	72.0 291.1 582.3 999.9 999.9 L 1	E 1	70.7 141.4 282.8 565.7 999.9 999.9	L 1	68.7 137.4 274.8 549.6 999.9 999.9
E 2	81.7 163.4 326.8 653.6 999.9 999.9 E 2	79.4 158.7 317.5 635.0 999.9 999.9	E 2	77.1 154.2 308.5 616.9 999.9 999.9	
H 3	91.7 143.4 366.4 733.6 999.9 999.9 H 3	89.1 178.2 356.4 712.7 999.9 999.9	H 3	86.6 173.1 346.2 692.4 999.9 999.9	
E 4	102.9 205.9 411.7 823.4 999.9 999.9 E 4	100.0 200.0 400.0 800.0 999.9 999.9	E 4	97.2 194.3 388.6 777.2 999.9 999.9	
N 5	115.5 231.1 462.1 924.3 999.9 999.9 N 5	112.2 224.5 449.0 898.0 999.9 999.9	N 5	109.1 218.0 436.2 812.4 999.9 999.9	
T 6	129.7 259.4 518.7 999.9 999.9 T 6	126.0 252.0 504.0 999.9 999.9 999.9	T 6	122.4 244.8 489.6 979.2 999.9 999.9	

MAGNIFICATION = .000234		MAGNIFICATION = .000241		MAGNIFICATION = .000248	
-6 GROUP LENGTH= .175MM(.0071IN.)		-6 GROUP LENGTH= .185MM(.0073IN.)		-6 GROUP LENGTH= .190MM(.0075IN.)	
E	-6 GROUP	E	-6 GROUP	E	-6 GROUP
E	-6 -5 -4 -3 -2 -1	E	-6 -5 -4 -3 -2 -1	E	-6 -5 -4 -3 -2 -1
L 1	66.7 267.0 533.9 999.9 999.9 L 1	E 1	64.8 129.7 259.4 516.7 999.9 999.9	L 1	63.0 126.0 252.0 504.0 999.9 999.9
E 2	74.9 149.8 299.7 599.3 999.9 999.9 E 2	72.8 145.6 291.1 582.3 999.9 999.9	E 2	70.7 141.4 282.9 565.7 999.9 999.9	
H 3	84.1 168.2 336.4 672.7 999.9 999.9 H 3	81.7 163.4 326.8 653.6 999.9 999.9	H 3	79.4 158.7 317.5 635.0 999.9 999.9	
E 4	94.4 188.6 377.6 755.1 999.9 999.9 E 4	91.7 183.4 366.8 733.6 999.9 999.9	E 4	89.1 178.2 356.4 712.7 999.9 999.9	
N 5	105.9 211.9 423.0 847.6 999.9 999.9 N 5	102.9 205.9 411.7 823.4 999.9 999.9	N 5	100.0 200.0 400.0 800.0 999.9 999.9	
T 6	118.9 237.8 475.7 951.4 999.9 999.9 T 6	115.5 231.1 462.1 924.3 999.9 999.9	T 6	112.2 224.5 449.0 899.0 999.0 999.0	

MAGNIFICATION = .000255		MAGNIFICATION = .000263		MAGNIFICATION = .000270	
-6 GROUP LENGTH= .196MM(.0077IN.)		-6 GROUP LENGTH= .201MM(.0079IN.)		-6 GROUP LENGTH= .207MM(.0082IN.)	
E	-6 GROUP	E	-6 GROUP	E	-6 GROUP
E	-6 -5 -4 -3 -2 -1	E	-6 -5 -4 -3 -2 -1	E	-6 -5 -4 -3 -2 -1
L 1	61.2 122.4 244.8 489.6 979.2 999.9 L 1	E 1	59.5 118.9 237.6 475.7 951.4 999.9	L 1	57.8 115.5 231.1 462.1 924.1 999.9
E 2	68.7 137.4 274.8 549.6 999.9 999.9 E 2	66.7 133.5 267.0 534.0 999.9 999.9	E 2	64.8 129.7 259.4 565.7 999.9 999.9	
H 3	77.1 154.2 308.4 616.9 999.9 999.9 H 3	74.9 149.8 299.7 599.3 999.9 999.9	H 3	72.8 145.6 291.1 582.3 999.9 999.9	
E 4	86.6 173.1 346.2 692.4 999.9 999.9 E 4	84.1 168.2 336.4 672.7 999.9 999.9	E 4	81.7 163.4 326.8 653.6 999.9 999.9	
N 5	97.2 194.3 388.6 777.2 999.9 999.9 N 5	94.4 188.8 377.5 755.1 999.9 999.9	N 5	91.7 183.4 366.8 733.6 999.9 999.9	
T 6	109.1 219.1 436.2 872.4 999.9 999.9 T 6	105.9 211.9 423.0 847.6 999.9 999.9	T 6	102.9 205.9 411.7 823.4 999.9 999.9	

IMAGE OF THE RESOLUTION (LINES PER MILLIMETER)

MAGNIFICATION -		MAGNIFICATION -		MAGNIFICATION -	
.000304		.000312		.000322	
.233MM (.00921IN.)		.239MM (.00941IN.)		.245MM (.00971IN.)	
# GROUP LENGTH -	GROUP	# GROUP LENGTH -	GROUP	# GROUP LENGTH -	GROUP
.6	.5	.4	.3	.5	.4
E 1	31.5 102.9 205.9 411.7 823.4 999.9	E 2	56.1 112.3 224.5 449.0 898.0 999.9	E 3	54.5 109.1 218.1 436.2 872.4 999.9
E 2	37.8 115.3 231.1 462.2 924.3 999.9	E 3	63.0 126.0 252.0 504.0 999.9 999.9	E 4	61.2 122.4 244.8 489.6 999.9 999.9
E 3	44.8 129.7 250.4 518.7 999.9 999.9	E 4	70.7 121.4 282.0 565.6 999.9 999.9	E 5	68.7 137.4 274.8 549.6 999.9 999.9
E 4	52.8 145.6 291.1 582.3 999.9 999.9	N 5	79.4 158.7 317.5 635.0 999.9 999.9	N 5	77.1 154.2 308.4 616.4 999.9 999.9
E 5	61.7 163.4 326.6 653.4 999.9 999.9	N 6	86.1 178.2 356.4 712.7 999.9 999.9	T 6	86.6 173.1 346.2 692.4 999.9 999.9

MAGNIFICATION = .000331		MAGNIFICATION = .000341		MAGNIFICATION = .000351	
.254MM (.0100IN.)		.261MM (.0103IN.)		.269MM (.0106IN.)	
-6 GROUP LENGTH- GROUP		-6 GROUP LENGTH- GROUP		-6 GROUP LENGTH- GROUP	
E	-6	-5	-3	-2	-1
L 1	.97.2	.94.4	.188.8	.177.5	.155.1
L 2	.53.0	.105.9	.211.9	.423.8	.867.5
L 3	.99.5	.118.5	.237.8	.415.7	.951.4
L 4	.66.7	.133.5	.267.0	.523.9	.998.9
N 5	.74.9	.149.8	.299.7	.599.3	.999.9
T 6	.64.1	.168.2	.336.4	.672.7	.999.9
L 1	.97.2	.94.4	.188.8	.177.5	.155.1
L 2	.53.0	.105.9	.211.9	.423.8	.867.5
L 3	.99.5	.118.5	.237.8	.415.7	.951.4
L 4	.66.7	.133.5	.267.0	.523.9	.998.9
N 5	.74.9	.149.8	.299.7	.599.3	.999.9
T 6	.64.1	.168.2	.336.4	.672.7	.999.9
E	-6	-5	-4	-3	-2
L 1	.95.9	.91.7	.163.4	.366.8	.733.6
L 2	.51.5	.102.9	.205.9	.411.7	.822.5
L 3	.97.8	.151.5	.231.0	.462.1	.924.5
L 4	.64.0	.129.7	.250.4	.516.7	.959.9
N 5	.72.8	.145.6	.291.1	.582.3	.999.9
T 6	.61.7	.163.4	.326.8	.653.6	.999.9
E	-6	-5	-4	-3	-2
L 1	.94.5	.89.1	.170.0	.390.0	.790.0
L 2	.50.0	.100.0	.200.0	.400.0	.800.0
L 3	.96.1	.112.2	.224.5	.449.0	.878.0
L 4	.63.0	.126.0	.252.0	.504.0	.999.9
N 5	.70.7	.141.4	.282.8	.565.7	.999.9
T 6	.69.4	.158.7	.317.5	.635.0	.999.9

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER)

MAGNIFICATION = .000394		MAGNIFICATION = .000405		MAGNIFICATION = .000417	
-6 GROUP LENGTH= .302MM(.0119IN.)		-6 GROUP LENGTH= .310MM(.0122IN.)		-6 GROUP LENGTH= .320MM(.0126IN.)	
-6	-5	-4	-3	-2	-1
E	79.1	158.7	317.5	635.0	999.9
L	66.3	132.2	258.4	516.7	999.9
C	86.0	100.0	200.0	400.0	999.9
K	66.1	112.2	224.5	449.0	999.9
N	43.0	126.0	252.0	504.0	999.9
T	76.7	141.4	282.4	565.7	999.9

MAGNIFICATION = .000429		MAGNIFICATION = .000442		MAGNIFICATION = .000455	
-6 GROUP LENGTH= .329MM(.0129IN.)		-6 GROUP LENGTH= .339MM(.0133IN.)		-6 GROUP LENGTH= .348MM(.0137IN.)	
-6	-5	-4	-3	-2	-1
E	72.0	145.6	291.1	582.3	999.9
L	61.7	133.4	226.8	453.6	999.9
C	45.4	91.7	183.4	366.8	999.9
K	51.5	102.9	205.9	411.7	999.9
N	57.8	115.5	231.5	462.1	999.9
T	64.8	129.7	259.4	518.7	999.9

MAGNIFICATION = .000468		MAGNIFICATION = .000482		MAGNIFICATION = .000496	
-6 GROUP LENGTH= .359MM(.0141IN.)		-6 GROUP LENGTH= .366MM(.0145IN.)		-6 GROUP LENGTH= .380MM(.0150IN.)	
-6	-5	-4	-3	-2	-1
E	66.7	123.5	267.0	533.9	999.9
L	57.8	116.8	239.5	479.3	999.9
C	42.0	84.1	168.2	336.4	999.9
K	47.2	94.4	188.6	377.5	999.9
N	52.0	105.9	211.9	423.8	999.9
T	60.5	116.9	227.6	455.7	999.9

MAGNIFICATION = .000511		MAGNIFICATION = .000526		MAGNIFICATION = .000541	
-6 GROUP LENGTH= .391MM(.0154IN.)		-6 GROUP LENGTH= .403MM(.0158IN.)		-6 GROUP LENGTH= .414MM(.0163IN.)	
-6	-5	-4	-3	-2	-1
E	41.2	122.4	244.0	489.4	999.9
L	34.4	69.7	137.4	274.8	999.9
C	28.4	77.1	154.2	308.4	999.9
K	43.3	86.6	173.1	346.7	999.9
N	48.4	97.2	194.3	383.6	999.9
T	56.5	119.1	218.1	438.2	999.9

MAGNIFICATION = .000551		MAGNIFICATION = .000566		MAGNIFICATION = .000581	
-6 GROUP LENGTH= .423MM(.0167IN.)		-6 GROUP LENGTH= .435MM(.0171IN.)		-6 GROUP LENGTH= .447MM(.0175IN.)	
-6	-5	-4	-3	-2	-1
E	29.7	59.5	118.9	237.8	999.9
L	22.4	46.7	93.5	267.0	999.9
C	37.5	74.9	149.8	299.7	999.9
K	42.0	84.2	168.2	336.4	999.9
N	47.2	94.4	188.6	377.5	999.9
T	53.3	105.9	211.9	423.8	999.9

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER)

MAGNIFICATION	-000590	MAGNIFICATION	-000573	MAGNIFICATION	-000560
-6 GROUP LENGTH	.427MM(.0165IN.)	-6 GROUP LENGTH	.439MM(.0173IN.)	-6 GROUP LENGTH	.452MM(.0178IN.)
E -5	56.1 112.2 224.5 449.0 868.0	E -5	54.5 109.1 218.1 436.2 872.4	E -5	63.0 105.9 211.9 423.8 867.6
E -4	56.1 112.2 224.5 449.0 868.0	E -4	57.3 122.4 244.8 489.6 979.3	E -4	59.5 118.9 237.8 475.7 951.6
E -3	53.0 128.0 252.0 504.0 956.0	E -3	50.4 137.4 274.8 549.6 999.9	E -3	66.7 133.5 267.0 533.9 999.9
E -2	51.5 128.0 252.0 504.0 956.0	E -2	51.1 156.2 308.4 616.9 999.9	E -2	74.9 149.8 299.7 599.3 999.9
E -1	50.7 141.4 282.8 565.7 976.7	E -1	50.6 173.1 346.2 692.4 999.9	E -1	42.0 84.1 166.2 336.4 999.9
T 0	49.4 158.7 317.5 635.0 999.9	T 0	48.3 173.1 346.2 692.4 999.9	T 0	47.2 94.4 166.8 377.6 999.9
T 1	48.5 178.2 358.4 712.7 999.9	T 1	48.3 173.1 346.2 692.4 999.9	T 1	48.3 173.1 346.2 692.4 999.9
T 2	48.6 180.0 400.0 860.0 999.9	T 2	48.3 173.1 346.2 692.4 999.9	T 2	48.3 173.1 346.2 692.4 999.9
T 3					

MAGNIFICATION	-000643	MAGNIFICATION	-000625	MAGNIFICATION	-000643
-6 GROUP LENGTH	.493MM(.0194IN.)	-6 GROUP LENGTH	.479MM(.0188IN.)	-6 GROUP LENGTH	.493MM(.0194IN.)
E -5	51.5 102.4 203.0 411.7 823.4	E -5	50.0 100.0 200.0 400.0 800.0	E -5	48.6 97.2 194.3 388.6 777.2
E -4	51.5 102.4 203.0 411.7 823.4	E -4	56.1 112.3 224.5 449.0 956.0	E -4	54.5 109.1 218.1 436.2 872.4
E -3	51.5 115.5 231.1 432.2 924.2	E -3	51.5 122.0 246.0 504.0 999.9	E -3	51.2 122.4 244.8 549.6 999.9
E -2	51.5 115.5 231.1 432.2 924.2	E -2	51.5 141.4 282.8 565.7 999.9	E -2	51.7 137.4 274.8 549.6 999.9
E -1	50.7 128.0 252.0 518.7 915.9	E -1	50.7 141.4 282.8 565.7 999.9	E -1	50.7 137.4 274.8 549.6 999.9
T 0	50.7 128.0 252.0 518.7 915.9	T 0	50.7 141.4 282.8 565.7 999.9	T 0	50.7 137.4 274.8 549.6 999.9
T 1	50.7 128.0 252.0 518.7 915.9	T 1	50.7 141.4 282.8 565.7 999.9	T 1	50.7 137.4 274.8 549.6 999.9
T 2	50.7 128.0 252.0 518.7 915.9	T 2	50.7 141.4 282.8 565.7 999.9	T 2	50.7 137.4 274.8 549.6 999.9
T 3					

MAGNIFICATION	-000702	MAGNIFICATION	-000676	MAGNIFICATION	-000702
-6 GROUP LENGTH	.537MM(.0212IN.)	-6 GROUP LENGTH	.522MM(.0206IN.)	-6 GROUP LENGTH	.537MM(.0212IN.)
E -5	51.5 102.4 203.0 411.7 823.4	E -5	50.0 100.0 200.0 400.0 800.0	E -5	44.5 89.1 178.2 356.4 712.7
E -4	51.5 102.4 203.0 411.7 823.4	E -4	56.1 112.3 224.5 449.0 956.0	E -4	50.0 100.0 200.0 400.0 800.0
E -3	51.5 115.5 231.1 432.2 924.2	E -3	51.5 122.0 246.0 504.0 999.9	E -3	56.1 112.2 224.5 449.0 956.0
E -2	51.5 115.5 231.1 432.2 924.2	E -2	51.5 141.4 282.8 565.7 999.9	E -2	56.1 126.0 252.0 504.0 956.0
E -1	50.7 128.0 252.0 518.7 915.9	E -1	50.7 141.4 282.8 565.7 999.9	E -1	53.1 63.0 126.0 252.0 504.0
T 0	50.7 128.0 252.0 518.7 915.9	T 0	50.7 141.4 282.8 565.7 999.9	T 0	50.7 137.4 274.8 549.6 999.9
T 1	50.7 128.0 252.0 518.7 915.9	T 1	50.7 141.4 282.8 565.7 999.9	T 1	50.7 137.4 274.8 549.6 999.9
T 2	50.7 128.0 252.0 518.7 915.9	T 2	50.7 141.4 282.8 565.7 999.9	T 2	50.7 137.4 274.8 549.6 999.9
T 3					

MAGNIFICATION	-000722	MAGNIFICATION	-000743	MAGNIFICATION	-000722
-6 GROUP LENGTH	.569MM(.0224IN.)	-6 GROUP LENGTH	.569MM(.0224IN.)	-6 GROUP LENGTH	.569MM(.0224IN.)
E -5	51.5 102.4 203.0 411.7 823.4	E -5	50.0 100.0 200.0 400.0 800.0	E -5	40.8 81.7 163.4 326.6 653.6
E -4	51.5 102.4 203.0 411.7 823.4	E -4	56.1 112.3 224.5 449.0 956.0	E -4	45.9 91.7 183.4 366.8 733.6
E -3	51.5 115.5 231.1 432.2 924.2	E -3	51.5 122.0 246.0 504.0 999.9	E -3	51.5 102.9 205.6 411.7 823.4
E -2	51.5 115.5 231.1 432.2 924.2	E -2	51.5 141.4 282.8 565.7 999.9	E -2	51.5 122.2 224.5 449.0 956.0
E -1	50.7 128.0 252.0 518.7 915.9	E -1	50.7 141.4 282.8 565.7 999.9	E -1	56.1 126.0 252.0 504.0 956.0
T 0	50.7 128.0 252.0 518.7 915.9	T 0	50.7 141.4 282.8 565.7 999.9	T 0	53.1 63.0 126.0 252.0 504.0
T 1	50.7 128.0 252.0 518.7 915.9	T 1	50.7 141.4 282.8 565.7 999.9	T 1	50.7 137.4 274.8 549.6 999.9
T 2	50.7 128.0 252.0 518.7 915.9	T 2	50.7 141.4 282.8 565.7 999.9	T 2	50.7 137.4 274.8 549.6 999.9
T 3					

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER)

MAGNIFICATION = .000787 -6 GROUP LENGTHS GROUP												MAGNIFICATION = .000834 -6 GROUP LENGTHS GROUP												MAGNIFICATION = .000892 -6 GROUP LENGTHS GROUP						
.603MM (.0237IN.)			.605MM (.0244IN.)			.621MM (.0249IN.)			.639MM (.0262IN.)			.677MM (.0287IN.)			.699MM (.0299IN.)			.738MM (.0317IN.)			.805MM (.0326IN.)			.879MM (.0347IN.)			.01053MM (.0382IN.)			
.1	.2	.3	.4	.5	.6	.7	.8	.9	.1	.2	.3	.4	.5	.6	.7	.8	.9	.1	.2	.3	.4	.5	.6	.7	.8	.9	.1	.2	.3	
10.0	20.7	31.4	42.1	52.8	63.5	74.2	84.9	95.6	106.3	117.0	127.7	138.4	149.1	159.8	170.5	181.2	191.9	202.6	213.3	224.0	234.7	245.4	256.1	266.8	277.5	288.2	298.9	309.6		
11.0	22.3	33.0	43.7	53.4	63.1	73.8	83.5	93.2	102.9	112.6	122.3	132.0	142.7	152.4	162.1	171.8	181.5	191.2	201.9	211.6	221.3	231.0	241.7	251.4	261.1	271.8	281.5	291.2	301.9	
12.0	23.0	33.6	43.3	53.0	62.7	72.4	82.1	91.8	101.5	111.2	120.9	130.6	140.3	150.0	159.7	169.4	179.1	188.8	198.5	208.2	217.9	227.6	237.3	247.0	256.7	266.4	276.1	285.8	295.5	
13.0	23.1	33.9	43.6	53.3	62.9	72.6	82.3	92.0	101.7	111.4	121.1	130.8	140.5	149.2	158.9	168.6	178.3	188.0	197.7	207.4	217.1	226.8	236.5	246.2	255.9	265.6	275.3	285.0	294.7	
14.0	23.5	34.3	43.9	53.7	63.1	72.8	82.6	92.3	102.0	111.7	121.4	131.1	140.8	149.5	159.2	168.9	178.6	188.3	198.0	207.7	217.4	227.1	236.8	246.5	256.2	265.9	275.6	285.3	295.0	
15.0	24.0	34.7	44.3	54.0	63.4	73.1	82.9	92.6	102.3	112.0	121.7	131.4	141.1	150.8	159.5	169.2	178.9	188.6	198.3	208.0	217.7	227.4	237.1	246.8	256.5	266.2	275.9	285.6	295.3	
16.0	24.4	35.1	44.7	54.4	63.7	73.4	83.2	92.9	102.6	112.3	122.0	131.7	141.4	151.1	160.8	169.5	179.2	188.9	198.6	208.3	218.0	227.7	237.4	247.1	256.8	266.5	276.2	285.9	295.6	
17.0	24.8	35.5	45.1	54.8	64.0	73.8	83.6	93.3	103.0	112.7	122.4	132.1	141.8	151.5	161.2	170.9	180.6	190.3	200.0	219.7	229.4	239.1	248.8	258.5	268.2	277.9	287.6	297.3		
18.0	25.2	35.9	45.5	55.2	64.3	74.2	84.0	93.7	103.4	113.1	122.8	132.5	142.2	151.9	161.6	171.3	181.0	190.7	200.4	210.1	219.8	229.5	239.2	248.9	258.6	268.3	278.0	287.7	297.4	
19.0	25.6	36.3	45.9	55.6	64.6	74.6	84.4	94.1	103.8	113.5	123.2	132.9	142.6	152.3	162.0	171.7	181.4	191.1	200.8	210.5	219.2	228.9	238.6	248.3	258.0	268.7	278.4	288.1		
20.0	26.0	36.7	46.3	56.0	64.9	75.0	84.8	94.5	104.2	113.9	123.6	133.3	143.0	152.7	162.4	172.1	181.8	191.5	201.2	210.9	219.6	229.3	239.0	248.7	258.4	268.1	278.8	288.5		
21.0	26.4	37.1	46.7	56.4	65.2	75.4	85.2	94.9	104.6	114.3	124.0	133.7	143.4	153.1	162.8	172.5	182.2	191.9	201.6	211.3	221.0	230.7	240.4	250.1	260.8	270.5	280.2	290.9		
22.0	26.8	37.5	47.1	56.8	65.5	75.8	85.6	95.3	105.0	114.7	124.4	134.1	143.8	153.5	163.2	172.9	182.6	192.3	202.0	211.7	221.4	231.1	240.8	250.5	260.2	270.9	280.6	291.3		
23.0	27.2	37.9	47.5	57.2	65.8	76.2	86.0	95.7	105.4	115.1	124.8	134.5	144.2	153.9	163.6	173.3	183.0	192.7	202.4	212.1	221.8	231.5	241.2	250.9	260.6	270.3	281.0	290.7		
24.0	27.6	38.3	47.9	57.6	66.1	76.6	86.4	96.1	105.8	115.5	125.2	134.9	144.6	154.3	164.0	173.7	183.4	193.1	202.8	212.5	222.2	231.9	241.6	251.3	261.0	270.7	280.4	290.1		
25.0	28.0	38.7	48.3	58.0	66.4	77.0	86.8	96.5	106.2	115.9	125.6	135.3	145.0	154.7	164.4	174.1	183.8	193.5	203.2	212.9	222.6	232.3	242.0	251.7	261.4	271.1	280.8	290.5		
26.0	28.4	39.1	48.7	58.4	66.7	77.4	87.2	97.0	106.7	116.4	126.1	135.8	145.5	155.2	164.9	174.6	184.3	194.0	203.7	213.4	223.1	232.8	242.5	252.2	261.9	271.6	281.3	291.0		
27.0	28.8	39.5	49.1	58.8	67.0	77.8	87.6	97.4	107.1	116.8	126.5	136.2	145.9	155.6	165.3	175.0	184.7	194.4	204.1	213.8	223.5	233.2	242.9	252.6	262.3	272.0	281.7	291.4		
28.0	29.2	39.9	49.5	59.2	67.3	78.2	88.0	97.8	107.5	117.2	126.9	136.6	146.3	156.0	165.7	175.4	185.1	194.8	204.5	214.2	223.9	233.6	243.3	253.0	262.7	272.4	282.1	291.8		
29.0	29.6	40.3	49.9	59.6	67.6	78.6	88.4	98.2	107.9	117.6	127.3	137.0	146.7	156.4	166.1	175.8	185.5	195.2	204.9	214.6	224.3	234.0	243.7	253.4	263.1	272.8	282.5	292.2		
30.0	30.0	40.7	50.3	59.9	67.9	79.0	88.8	98.6	108.3	118.0	127.7	137.4	147.1	156.8	166.5	176.2	185.9	195.6	205.3	215.0	224.7	234.4	244.1	253.8	263.5	273.2	282.9	292.6		
31.0	30.4	41.1	50.7	60.2	68.2	79.4	89.2	99.0	108.7	118.4	128.1	137.8	147.5	157.2	166.9	176.6	186.3	196.0	205.7	215.4	225.1	234.8	244.5	254.2	263.9	273.6	283.3	293.0		
32.0	30.8	41.5	51.1	60.5	68.5	79.8	89.6	99.4	109.1	118.8	128.5	138.2	147.9	157.6	167.3	177.0	186.7	196.4	206.1	215.8	225.5	235.2	244.9	254.6	264.3	274.0	283.7	293.4		
33.0	31.2	41.9	51.5	60.8	68.8	80.2	90.0	99.8	109.5	119.2	128.9	138.6	148.3	158.0	167.7	177.4	187.1	196.8	206.5	216.2	225.9	235.6	245.3	255.0	264.7	274.4	284.1	293.8		
34.0	31.6	42.3	51.9	61.1	69.1	80.6	90.4	99.2	109.9	119.6	129.3	139.0	148.7	158.4	168.1	177.8	187.5	197.2	206.9	216.6	226.3	236.0	245.7	255.4	265.1	274.8	284.5	294.2		
35.0	32.0	42.7	52.3	61.4	69.4	81.0	90.8	99.6	110.1	119.8	129.5	139.2	148.9	158.6	168.3	178.0	187.7	197.4	207.1	216.8	226.5	236.2	245.9	255.6	265.3	275.0	284.7	294.4		
36.0	32.4	43.1	52.7	61.7	69.7	81.4	91.2	99.0	110.4	119.1	129.8	139.5	149.2	158.9	168.6	178.3	188.0	197.7	207.4	217.1	226.8	236.5	246.2	256.9	266.6	276.3	285.9	295.6		
37.0	32.8	43.5	53.1	62.0	69.9	81.8	91.6	99.4	110.7	119.4	130.1	139.8	149.5	159.2	168.9	178.6	188.3	197.0	206.7	216.4	226.1	235.8	245.5	255.2	265.1	274.8	284.5	294.2		
38.0	33.2	43.9	53.5	62.3	69.9	82.2	92.0	99.8	111.0	119.7	130.4	139.9	149.6	159.3	169.0	178.7	188.4	197.1	206.8	216.5	226.2	235.9	245.6	255.3	265.2	274.9	284.6	294.3		
39.0	33.6	44.3	53.9	62.6	69.9	82.6	92.4	99.2	111.3	119.9	130.6	139.9	149.7	159.4	169.1	178.8	188.5	197.2	206.9	216.6	226.3	236.0	245.7	255.4	265.3	275.0	284.7	294.4		
40.0	34.0	44.7	54.3	62.9	69.9	83.0	92.8	99.6	111.6	119.9	130.6	139.9	149.8	159.5	169.2	178.9	188.6	197.3	207.0	216.7	226.4	236.1	246.0	255.7	265.6	275.3	284.8	294.5		
41.0	34.4	45.1	54.7	63.2	69.9	83.4	93.2	99.0	111.9	119.9	130.6	139.9	149.9	159.6	169.3	179.0	188.7	197.4	206.9	216.6	226.3	236.0	246.1	255.8	265.7	275.4	284.9	294.6		
42.0	34.8	45.5	55.1	63.5	69.9	83.8	93.6	99.4	112.2	119.9	130.6	139.9	149.9	159.6	169.3	179.0	188.7	197.5	206.9	216.6	226.3	236.0	246.2	255.9	265.8	275.5	285.0	294.7		
43.0	35.2	45.9	55.5	63.8	69.9	84.2	94.0	99.8	112.5	119.9	130.6	139.9	149.9	159.6	169.3	179.0	188.7	197.6	206.9	216.6	226.3	236.0	246.3	255.9	265.8	275.6	285.1	294.8		
44.0	35.6	46.3	55.9																											

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER)

MAGNIFICATION - 001114		MAGNIFICATION - 001166		MAGNIFICATION - 001180	
-6 GROUP LENGTH - .0333MM(.0346IN.)		-6 GROUP LENGTH - .0368MM(.0361IN.)		-6 GROUP LENGTH - .0364MM(.0356IN.)	
GROUP	LINE/INCH	GROUP	LINE/INCH	GROUP	LINE/INCH
-6	44	-6	45	-6	46
-5	55	-5	56	-5	57
-4	66.1	-4	67.2	-4	68.3
-3	77.1	-3	78.2	-3	79.3
-2	88.1	-2	89.2	-2	90.3
-1	99.1	0	100.1	0	101.0
0	111.1	1	112.1	1	113.1
1	122.1	2	123.2	2	124.2
2	133.2	3	134.3	3	135.3
3	144.3	4	145.4	4	146.4
4	155.4	5	156.5	5	157.5
5	166.5	6	167.6	6	168.6
6	177.6	7	178.7	7	179.7
7	188.7	8	189.8	8	190.8
8	199.8	9	200.9	9	201.9
9	210.9	10	211.10	10	211.10
10	221.10	11	222.11	11	223.11
11	232.11	12	233.12	12	234.12
12	243.12	13	244.13	13	245.13
13	254.13	14	255.14	14	256.14
14	265.14	15	266.15	15	267.15
15	276.15	16	277.16	16	278.16
16	287.16	17	288.17	17	289.17
17	298.17	18	308.18	18	309.18
18	309.18	19	319.19	19	320.19
19	320.19	20	330.20	20	331.20
20	331.20	21	341.21	21	342.21
21	351.21	22	361.22	22	362.22
22	371.22	23	381.23	23	382.23
23	391.23	24	401.24	24	402.24
24	411.24	25	421.25	25	422.25
25	431.25	26	441.26	26	442.26
26	451.26	27	461.27	27	462.27
27	471.27	28	481.28	28	482.28
28	491.28	29	501.29	29	502.29
29	511.29	30	521.30	30	522.30
30	531.30	31	541.31	31	542.31
31	551.31	32	561.32	32	562.32
32	571.32	33	581.33	33	582.33
33	591.33	34	601.34	34	602.34
34	611.34	35	621.35	35	622.35
35	631.35	36	641.36	36	642.36
36	651.36	37	661.37	37	662.37
37	671.37	38	681.38	38	682.38
38	691.38	39	701.39	39	702.39
39	711.39	40	721.40	40	722.40
40	731.40	41	741.41	41	742.41
41	751.41	42	761.42	42	762.42
42	771.42	43	781.43	43	782.43
43	791.43	44	801.44	44	802.44
44	811.44	45	821.45	45	822.45
45	831.45	46	841.46	46	842.46
46	851.46	47	861.47	47	862.47
47	871.47	48	881.48	48	882.48
48	891.48	49	901.49	49	902.49
49	911.49	50	921.50	50	922.50
50	931.50	51	941.51	51	942.51
51	951.51	52	961.52	52	962.52
52	971.52	53	981.53	53	982.53
53	991.53	54	1001.54	54	1002.54
54	1011.54	55	1021.55	55	1022.55
55	1031.55	56	1041.56	56	1042.56
56	1051.56	57	1061.57	57	1062.57
57	1071.57	58	1081.58	58	1082.58
58	1091.58	59	1101.59	59	1102.59
59	1111.59	60	1121.60	60	1122.60
60	1131.60	61	1141.61	61	1142.61
61	1151.61	62	1161.62	62	1162.62
62	1171.62	63	1181.63	63	1182.63
63	1191.63	64	1201.64	64	1202.64
64	1211.64	65	1221.65	65	1222.65
65	1231.65	66	1241.66	66	1242.66
66	1251.66	67	1261.67	67	1262.67
67	1271.67	68	1281.68	68	1282.68
68	1291.68	69	1301.69	69	1302.69
69	1311.69	70	1321.70	70	1322.70
70	1331.70	71	1341.71	71	1342.71
71	1351.71	72	1361.72	72	1362.72
72	1371.72	73	1381.73	73	1382.73
73	1391.73	74	1401.74	74	1402.74
74	1411.74	75	1421.75	75	1422.75
75	1431.75	76	1441.76	76	1442.76
76	1451.76	77	1461.77	77	1462.77
77	1471.77	78	1481.78	78	1482.78
78	1491.78	79	1501.79	79	1502.79
79	1511.79	80	1521.80	80	1522.80
80	1531.80	81	1541.81	81	1542.81
81	1551.81	82	1561.82	82	1562.82
82	1571.82	83	1581.83	83	1582.83
83	1591.83	84	1601.84	84	1602.84
84	1611.84	85	1621.85	85	1622.85
85	1631.85	86	1641.86	86	1642.86
86	1651.86	87	1661.87	87	1662.87
87	1671.87	88	1681.88	88	1682.88
88	1691.88	89	1701.89	89	1702.89
89	1711.89	90	1721.90	90	1722.90
90	1731.90	91	1741.91	91	1742.91
91	1751.91	92	1761.92	92	1762.92
92	1771.92	93	1781.93	93	1782.93
93	1791.93	94	1801.94	94	1802.94
94	1811.94	95	1821.95	95	1822.95
95	1831.95	96	1841.96	96	1842.96
96	1851.96	97	1861.97	97	1862.97
97	1871.97	98	1881.98	98	1882.98
98	1891.98	99	1901.99	99	1902.99
99	1911.99	100	1921.100	100	1922.100

અનુભૂતિક વિજ્ઞાન પરીક્ષા માટે આપેલ રિપોર્ટ

MAGNIFICATIONS = 0.01575
= 0.03150751 = 0.04751561
= 0.063016075
= 0.084521561
= 0.106027075
= 0.127533561
= 0.149040075
= 0.170546561

MAGNIFICATION - .001669									
MAGNIFICATION - .027891 (1.0593 IN.)									
-6 GROUP LENGTH - 1.27891 (1.0593 IN.)									
GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP
-5	-4	-3	-2	-1	C	-6	-5	-4	-3
19.3	28.1	37.1	45.2	53.4	62	10.5	18.7	27.5	36.3
19.3	28.1	37.1	45.2	53.4	62	10.5	18.7	27.5	36.3
10.6	19.4	28.1	36.8	45.2	53.4	11.8	20.5	29.2	37.5
10.6	19.4	28.1	36.8	45.2	53.4	11.8	20.5	29.2	37.5
12.1	20.8	29.4	38.2	46.9	55.1	13.2	21.9	30.6	39.3
12.1	20.8	29.4	38.2	46.9	55.1	13.2	21.9	30.6	39.3
15.3	20.1	24.7	29.4	34.1	38.8	14.9	20.7	26.5	32.3
15.3	20.1	24.7	29.4	34.1	38.8	14.9	20.7	26.5	32.3
17.2	24.1	30.7	37.4	43.1	48.8	16.7	23.4	29.7	35.5

CLASSIFICATION - 001717
- GROUP LENGTH 1.11MM(1.051MM)
GROUP

MAGNIFICATION = 1.35X(MIN. 0.549MM.)												
MAGNIFICATION = 1.35X(MIN. 0.549MM.)												
-6 GROUP LENGTH = 1.35MM.					-6 GROUP LENGTH = 1.35MM.							
GROUP					GROUP							
-6	-5	-4	-3	-2	-6	-5	-4	-3	-2			
15.7	17.7	25.4	70.7	141.4	802.0	17.2	34.3	68.7	137.4	274.0		
15.5	19.8	29.1	79.4	153.7	317.5	12.2	24.3	49.3	77.1	154.2	308.6	
15.3	22.3	44.5	89.1	178.6	356.4	10.8	21.6	43.3	66.6	123.2	364.2	
11.1	25.0	50.0	100.0	200.0	400.0	8.4	12.1	24.3	48.6	97.2	194.2	388.6
12.5	28.1	56.1	112.2	224.5	449.0	13.6	27.3	54.3	109.1	218.1	436.2	
14.0	21.5	63.0	126.0	252.0	504.0	15.3	30.6	61.2	122.4	244.8	489.6	

MAGNIFICATION = .001073
 - GROUP LENGTH = 1.435MM; .0551IN.
 GROUPS

	-5	-4	-3	-2	-1
0.0	16.7	11.4	64.7	132.9	247.6
0.4	16.7	37.5	76.6	149.9	249.7
1.0	21.3	62.0	64.1	188.0	336.4
1.6	23.0	47.2	56.0	185.8	377.5
2.2	26.3	52.0	105.9	211.4	662.4
2.8	26.3	50.7	56.4	119.4	227.6

MAGNIFICATION = = GROUP LENGTH = = GROUP NUMBER =		MAGNIFICATION = = GROUP LENGTH = = GROUP NUMBER =	
-5	-4	-5	-4
-6	-5	-6	-5
0.1	1.6-2	32-4	64-8
0.2	1.6-2	32-4	72-8
0.3	2.0-2	40-8	81-7
0.4	2.0-2	40-8	91-7
0.5	2.5-2	50-5	91-7
0.6	2.5-2	50-5	102-0
0.7	2.5-2	50-5	115-0
0.8	2.5-2	50-5	115-0

MAGNIFICATION = 0.002342		MATERIAL = 1.545401 - 0.01615401	
GROUP	LENGTH	END	END
0-0	-0.5	-0.5	-0.5
0-0	0.5	0.5	0.5
0-0	1.5	1.5	1.5
0-0	2.5	2.5	2.5
0-0	3.5	3.5	3.5
0-0	4.5	4.5	4.5
0-0	5.5	5.5	5.5
0-0	6.5	6.5	6.5
0-0	7.5	7.5	7.5
0-0	8.5	8.5	8.5
0-0	9.5	9.5	9.5
0-0	10.5	10.5	10.5
0-0	11.5	11.5	11.5
0-0	12.5	12.5	12.5
0-0	13.5	13.5	13.5
0-0	14.5	14.5	14.5
0-0	15.5	15.5	15.5
0-0	16.5	16.5	16.5
0-0	17.5	17.5	17.5
0-0	18.5	18.5	18.5
0-0	19.5	19.5	19.5
0-0	20.5	20.5	20.5
0-0	21.5	21.5	21.5
0-0	22.5	22.5	22.5
0-0	23.5	23.5	23.5
0-0	24.5	24.5	24.5
0-0	25.5	25.5	25.5
0-0	26.5	26.5	26.5
0-0	27.5	27.5	27.5
0-0	28.5	28.5	28.5
0-0	29.5	29.5	29.5
0-0	30.5	30.5	30.5
0-0	31.5	31.5	31.5
0-0	32.5	32.5	32.5
0-0	33.5	33.5	33.5
0-0	34.5	34.5	34.5
0-0	35.5	35.5	35.5
0-0	36.5	36.5	36.5
0-0	37.5	37.5	37.5
0-0	38.5	38.5	38.5
0-0	39.5	39.5	39.5
0-0	40.5	40.5	40.5
0-0	41.5	41.5	41.5
0-0	42.5	42.5	42.5
0-0	43.5	43.5	43.5
0-0	44.5	44.5	44.5
0-0	45.5	45.5	45.5
0-0	46.5	46.5	46.5
0-0	47.5	47.5	47.5
0-0	48.5	48.5	48.5
0-0	49.5	49.5	49.5
0-0	50.5	50.5	50.5
0-0	51.5	51.5	51.5
0-0	52.5	52.5	52.5
0-0	53.5	53.5	53.5
0-0	54.5	54.5	54.5
0-0	55.5	55.5	55.5
0-0	56.5	56.5	56.5
0-0	57.5	57.5	57.5
0-0	58.5	58.5	58.5
0-0	59.5	59.5	59.5
0-0	60.5	60.5	60.5
0-0	61.5	61.5	61.5
0-0	62.5	62.5	62.5
0-0	63.5	63.5	63.5
0-0	64.5	64.5	64.5
0-0	65.5	65.5	65.5
0-0	66.5	66.5	66.5
0-0	67.5	67.5	67.5
0-0	68.5	68.5	68.5
0-0	69.5	69.5	69.5
0-0	70.5	70.5	70.5
0-0	71.5	71.5	71.5
0-0	72.5	72.5	72.5
0-0	73.5	73.5	73.5
0-0	74.5	74.5	74.5
0-0	75.5	75.5	75.5
0-0	76.5	76.5	76.5
0-0	77.5	77.5	77.5
0-0	78.5	78.5	78.5
0-0	79.5	79.5	79.5
0-0	80.5	80.5	80.5
0-0	81.5	81.5	81.5
0-0	82.5	82.5	82.5
0-0	83.5	83.5	83.5
0-0	84.5	84.5	84.5
0-0	85.5	85.5	85.5
0-0	86.5	86.5	86.5
0-0	87.5	87.5	87.5
0-0	88.5	88.5	88.5
0-0	89.5	89.5	89.5
0-0	90.5	90.5	90.5
0-0	91.5	91.5	91.5
0-0	92.5	92.5	92.5
0-0	93.5	93.5	93.5
0-0	94.5	94.5	94.5
0-0	95.5	95.5	95.5
0-0	96.5	96.5	96.5
0-0	97.5	97.5	97.5
0-0	98.5	98.5	98.5
0-0	99.5	99.5	99.5
0-0	100.5	100.5	100.5

MAGNIFICATION -		MAGNIFICATION -	
- 002102		- 002164	
- 6 GROUP LENGTH	- 6 GROUP LENGTH	- 6 GROUP LENGTH	- 6 GROUP LENGTH
GROUP	GROUP	GROUP	GROUP
.4	.4	.4	.4
.5	.5	.5	.5
.6	.6	.6	.6
.7	.7	.7	.7
.8	.8	.8	.8
.9	.9	.9	.9
1.0	1.0	1.0	1.0
1.1	1.1	1.1	1.1
1.2	1.2	1.2	1.2
1.3	1.3	1.3	1.3
1.4	1.4	1.4	1.4
1.5	1.5	1.5	1.5
1.6	1.6	1.6	1.6
1.7	1.7	1.7	1.7
1.8	1.8	1.8	1.8
1.9	1.9	1.9	1.9
2.0	2.0	2.0	2.0
2.1	2.1	2.1	2.1
2.2	2.2	2.2	2.2
2.3	2.3	2.3	2.3
2.4	2.4	2.4	2.4
2.5	2.5	2.5	2.5
2.6	2.6	2.6	2.6
2.7	2.7	2.7	2.7
2.8	2.8	2.8	2.8
2.9	2.9	2.9	2.9
3.0	3.0	3.0	3.0

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER)

MAGNIFICATION - .0022277		MAGNIFICATION - .0022993		MAGNIFICATION - .002360				
-6 GROUP LENGTH- 1.706MM(.06721IN.)		-6 GROUP LENGTH- 1.756MM(.06911IN.)		-6 GROUP LENGTH- 1.806MM(.07121IN.)				
GROUP	GROUP	GROUP	GROUP	GROUP	GROUP			
E	-6 -5 -4	-3 -2 -1	E -6 -5	-3 -2 -1	E -6 -5	-3 -2 -1		
L 1	7.0 14.0 28.1	56.1 112.2 224.5	L 2	6.3 13.6 27.3	54.5 106.1 218.1	L 1	6.6 13.2 26.5	53.0 105.9 211.9
E 2	7.9 15.7 31.5	63.0 126.0 252.0	E 2	7.7 15.3 20.6	61.2 122.4 244.8	E 2	7.4 14.9 29.7	59.5 116.9 237.8
E 3	8.8 17.7 35.7	70.7 141.4 242.8	E 3	8.6 17.2 24.3	66.7 137.4 274.8	H 3	8.3 16.7 33.4	66.7 133.5 267.0
E 4	9.9 19.8 39.7	79.4 158.7 317.5	E 4	9.6 19.3 38.6	77.1 154.2 308.4	E 4	9.4 18.7 37.5	74.9 149.8 249.7
E 5	11.1 22.3 44.5	89.1 178.2 356.4	E 5	10.8 21.6 43.3	96.6 173.1 346.2	N 5	10.5 21.0 42.0	84.1 168.5 336.4
T 6	12.5 25.0 52.0	100.0 200.0 400.0	T 6	12.1 24.3 48.6	97.2 194.3 388.6	T 6	11.8 23.6 47.2	94.4 186.8 377.5

MAGNIFICATION - .0022627		MAGNIFICATION - .002500		MAGNIFICATION - .002573				
-6 GROUP LENGTH- 1.860MM(.07321IN.)		-6 GROUP LENGTH- 1.915MM(.07541IN.)		-6 GROUP LENGTH- 1.971MM(.07761IN.)				
GROUP	GROUP	GROUP	GROUP	GROUP	GROUP			
E	-6 -5 -4	-3 -2 -1	E -6 -5	-3 -2 -1	E -6 -5	-3 -2 -1		
L 1	6.4 12.9 28.9	51.5 102.9 205.9	L 1	6.3 12.5 25.0	50.0 100.0 200.0	L 1	6.1 12.1 24.3	48.6 97.2 194.3
E 2	7.2 14.0 29.7	57.8 115.5 231.1	E 2	7.0 14.9 26.1	56.1 112.3 221.5	E 2	6.8 13.6 27.3	54.5 109.1 218.1
E 3	8.1 16.2 32.4	64.0 129.7 259.4	H 3	7.9 15.7 31.5	63.0 126.0 252.0	H 3	7.7 15.3 30.6	61.2 122.4 244.8
E 4	9.1 18.2 36.4	72.8 145.4 261.1	E 4	8.6 17.1 35.4	70.7 141.4 262.8	E 4	8.4 16.7 34.3	68.7 137.4 274.6
E 5	10.2 20.4 40.4	81.7 163.4 326.0	N 5	9.9 17.6 39.7	79.4 158.7 311.5	N 5	9.6 19.3 38.6	77.1 154.2 308.4
T 6	11.5 22.9 45.9	91.7 193.4 366.8	T 6	11.1 22.3 44.5	69.1 178.2 356.1	T 6	10.8 21.6 43.3	86.6 173.1 346.2

MAGNIFICATION - .0022569		MAGNIFICATION - .002725		MAGNIFICATION - .002806				
-6 GROUP LENGTH- 2.029MM(.07991IN.)		-6 GROUP LENGTH- 2.088MM(.08221IN.)		-6 GROUP LENGTH- 2.150MM(.08461IN.)				
GROUP	GROUP	GROUP	GROUP	GROUP	GROUP			
E	-6 -5 -4	-3 -2 -1	E -6 -5	-3 -2 -1	E -6 -5	-3 -2 -1		
L 1	6.9 11.8 23.6	53.0 105.9 211.9	L 1	5.7 11.5 22.9	45.9 91.7 182.4	L 1	5.6 11.1 22.3	44.5 89.1 176.2
E 2	7.6 14.0 26.5	59.5 118.9 237.6	E 2	6.4 12.9 25.7	51.5 103.9 205.9	E 2	6.3 12.5 25.0	50.0 100.0 200.0
E 3	8.3 16.7 33.4	66.7 133.5 267.0	H 3	7.2 14.4 26.9	57.8 115.5 231.1	H 3	7.0 14.0 26.1	56.1 112.2 224.5
E 4	9.4 18.7 37.5	74.9 147.7 299.7	E 4	8.1 16.2 32.4	64.6 129.7 259.4	E 4	7.9 15.7 252.0	63.0 126.0 252.0
E 5	10.5 21.0 42.0	84.1 169.2 336.4	T 6	10.2 20.4 40.8	72.6 145.6 291.1	N 5	8.8 17.7 35.4	70.7 141.4 262.0
T 6			T 6	10.2 20.4 40.8	81.7 163.4 326.8	T 6	9.9 19.8 39.7	79.4 158.7 317.5

MAGNIFICATION - .0022868		MAGNIFICATION - .002973		MAGNIFICATION - .003060				
-6 GROUP LENGTH- 2.213MM(.08711IN.)		-6 GROUP LENGTH- 2.277MM(.08971IN.)		-6 GROUP LENGTH- 2.344MM(.09231IN.)				
GROUP	GROUP	GROUP	GROUP	GROUP	GROUP			
E	-6 -5 -4	-3 -2 -1	E -6 -5	-3 -2 -1	E -6 -5	-3 -2 -1		
L 1	5.9 10.6 21.6	43.3 96.6 173.1	L 1	5.3 10.5 21.0	42.0 94.4 168.2	L 1	5.1 10.2 20.4	40.6 91.7 163.4
E 2	6.1 12.1 24.3	48.6 97.2 194.3	E 2	5.9 11.8 23.6	47.0 94.4 168.2	E 2	5.7 11.5 22.3	45.9 91.7 183.4
E 3	6.8 13.6 27.3	54.5 109.1 216.1	E 3	6.6 13.2 26.5	53.0 105.9 211.9	H 3	6.4 12.9 25.7	51.5 102.9 205.9
E 4	7.7 15.0 30.6	61.2 122.4 244.8	E 4	7.4 14.9 29.7	59.5 116.9 227.8	E 4	7.2 14.4 28.9	57.8 115.5 231.5
E 5	8.6 16.7 34.3	66.7 137.4 274.8	E 5	8.3 16.7 33.4	66.7 133.5 267.8	N 5	8.1 16.2 32.4	64.6 129.7 259.4
T 6	9.6 19.3 38.4	77.1 154.2 336.4	T 6	9.4 18.7 37.5	74.9 149.8 299.7	T 6	9.1 18.2 35.4	72.8 145.6 291.1

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER)

MAGNIFICATION = +0.003150		MAGNIFICATION = +0.003242		MAGNIFICATION = +0.003337	
-6 GROUP LENGTH= 2.413MM(.095IN.)		-6 GROUP LENGTH= 2.483MM(.0978IN.)		-6 GROUP LENGTH= 2.556MM(.1006IN.)	
GROUP		GROUP		GROUP	
-6	-5	-6	-5	-6	-5
E	5.0	9.9	14.4	19.4	24.4
L 1	5.1	11.1	22.3	46.5	89.1
E 2	5.0	12.5	25.0	50.0	100.0
B 3	6.2	14.0	28.1	56.1	112.2
E 4	7.0	15.7	31.5	63.0	126.0
E 5	7.9	17.7	35.4	70.7	141.4
T 6	8.8	17.7	35.4	70.7	141.4

MAGNIFICATION = +0.003425		MAGNIFICATION = +0.003536		MAGNIFICATION = +0.003639	
-6 GROUP LENGTH= 2.613MM(.1034IN.)		-6 GROUP LENGTH= 2.708MM(.1066IN.)		-6 GROUP LENGTH= 2.788MM(.1097IN.)	
GROUP		GROUP		GROUP	
E	-6	-5	-6	-6	-5
L 1	4.5	9.1	18.2	36.4	72.4
E 2	5.1	10.2	20.4	40.8	81.7
B 3	5.7	11.5	22.9	45.9	91.7
E 4	6.4	12.4	25.7	51.5	102.6
H 5	7.2	14.4	28.9	57.5	115.5
T 6	8.1	16.2	32.4	64.6	129.7

MAGNIFICATION = +0.003760		MAGNIFICATION = +0.003850		MAGNIFICATION = +0.003969	
-6 GROUP LENGTH= 2.869MM(.1133IN.)		-6 GROUP LENGTH= 2.953MM(.1163IN.)		-6 GROUP LENGTH= 3.040MM(.1197IN.)	
GROUP		GROUP		GROUP	
E	-6	-5	-6	-6	-5
L 1	4.2	8.3	16.7	33.4	66.7
E 2	4.7	9.4	18.7	37.5	74.9
B 3	5.3	10.5	21.0	42.0	84.1
E 4	5.9	11.6	23.6	47.2	94.6
H 5	6.6	13.2	26.5	53.0	105.0
T 6	7.4	14.5	29.7	59.5	118.9

MAGNIFICATION = +0.004095		MAGNIFICATION = +0.004204		MAGNIFICATION = +0.004326	
-6 GROUP LENGTH= 3.129MM(.1232IN.)		-6 GROUP LENGTH= 3.221MM(.1268IN.)		-6 GROUP LENGTH= 3.315MM(.1305IN.)	
GROUP		GROUP		GROUP	
E	-6	-5	-6	-6	-5
L 1	3.8	7.7	15.3	30.6	61.2
E 2	4.3	8.0	17.0	34.4	68.7
B 3	4.8	9.4	19.3	38.4	77.1
E 4	5.4	10.6	21.6	41.3	86.6
H 5	6.1	12.1	24.3	49.6	94.8
T 6	6.8	13.6	27.3	54.5	109.9

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER)

MAGNIFICATION = .004454 -6 GROUP LENGTH= 3.412MM (.1341IN.)												MAGNIFICATION = .004585 -6 GROUP LENGTH= 3.512MM (.1383IN.)												MAGNIFICATION = .004719 -6 GROUP LENGTH= 3.615MM (.1423IN.)						
GROUP			GROUP			GROUP			GROUP			GROUP			GROUP			GROUP			GROUP			GROUP						
-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1					
L 1	3.5	7.0	14.0	28.1	56.1	112.2	L 1	3.4	6.8	13.6	27.3	54.5	109.1	L 1	3.3	6.6	13.2	26.5	53.0	105.9	L 1	3.2	6.4	13.0	25.8	52.0	104.7			
L 2	2.9	7.9	15.7	31.1	63.0	126.0	E 2	3.6	7.7	15.3	30.6	61.2	122.4	E 2	3.7	7.4	14.9	29.7	59.5	118.9	E 2	3.6	7.3	14.7	29.4	59.0	118.5			
B 3	4.4	8.8	17.7	35.4	70.7	161.4	F 3	4.3	8.6	17.2	34.3	68.7	137.4	H 3	4.2	8.3	16.7	33.4	66.7	133.5	F 4	4.1	8.1	16.2	32.9	65.7	132.5			
E 5	5.0	9.9	19.8	39.7	79.4	158.7	E 4	5.8	9.6	19.3	38.6	77.1	154.2	E 4	4.7	9.4	18.7	37.5	74.5	131.9	N 5	5.3	10.6	21.0	42.0	84.1	168.2			
N 6	5.6	11.1	22.3	44.5	89.1	178.2	N 5	5.4	10.8	21.6	43.3	86.6	173.1	N 5	5.3	10.5	21.0	42.0	84.1	168.2	T 6	5.9	11.8	23.6	47.2	94.6	168.6			
T 6	6.3	12.5	25.9	50.0	100.0	200.0	T 6	6.1	12.1	24.3	48.6	97.2	194.3	T 6	5.9	11.8	23.6	47.2	94.6	168.6										
MAGNIFICATION = .004458 -6 GROUP LENGTH= 3.721MM (.1465IN.)												MAGNIFICATION = .005000 -6 GROUP LENGTH= 3.830MM (.1508IN.)												MAGNIFICATION = .005147 -6 GROUP LENGTH= 3.942MM (.1552IN.)						
GROUP			GROUP			GROUP			GROUP			GROUP			GROUP			GROUP			GROUP			GROUP						
-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1					
L 1	3.2	6.4	12.9	25.7	51.5	102.9	L 1	3.1	6.3	12.5	25.0	50.0	100.0	L 1	3.0	6.1	12.1	24.3	48.6	98.2	L 1	2.9	6.0	11.9	23.5	47.6	97.2			
L 2	3.6	7.2	14.4	28.9	57.8	115.5	E 2	3.5	7.0	14.0	28.1	56.1	112.3	E 2	3.4	6.8	13.6	27.3	54.5	109.1	E 2	3.3	6.7	13.5	27.0	54.3	108.9			
B 3	6.1	12.1	24.2	48.4	93.4	192.7	F 3	5.9	7.9	15.7	31.5	63.0	126.0	H 3	5.8	7.7	15.3	30.6	61.2	122.4	F 4	5.7	7.6	15.1	30.3	60.7	121.4			
E 4	4.5	9.1	18.2	36.4	72.4	165.0	E 4	4.4	8.8	17.7	35.4	70.7	141.4	E 4	4.3	8.6	17.2	34.3	69.6	137.4	N 5	5.1	10.2	20.4	45.6	91.3	168.2			
N 6	5.7	10.2	20.4	40.6	81.7	163.4	T 6	5.6	9.9	19.8	39.7	79.4	158.7	N 5	5.4	9.6	19.3	38.6	77.1	154.2	T 6	5.3	10.1	22.3	44.5	89.1	173.1			
MAGNIFICATION = .005297 -6 GROUP LENGTH= 4.058MM (.1599IN.)												MAGNIFICATION = .005453 -6 GROUP LENGTH= 4.177MM (.1644IN.)												MAGNIFICATION = .005612 -6 GROUP LENGTH= 4.299MM (.1693IN.)						
GROUP			GROUP			GROUP			GROUP			GROUP			GROUP			GROUP			GROUP			GROUP						
-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1					
L 1	2.9	5.9	11.7	23.4	47.2	96.4	L 1	2.9	5.7	11.5	22.9	45.9	91.7	L 1	2.8	5.6	11.1	22.3	44.5	89.1	L 1	2.7	5.5	10.7	21.5	43.5	88.1			
L 2	3.3	6.0	13.2	26.5	53.0	105.4	E 2	3.2	6.0	12.9	25.7	51.5	102.9	E 2	3.1	5.9	12.5	25.0	50.0	100.0	E 2	3.0	5.8	12.1	24.7	43.1	87.1			
B 3	3.7	7.4	14.4	29.7	59.7	118.9	F 3	3.6	7.2	14.2	28.9	57.6	107.5	H 3	3.5	7.0	14.0	28.1	56.1	112.2	F 4	3.4	6.9	13.6	27.3	55.5	106.0			
E 4	4.2	8.3	16.7	33.4	66.7	133.5	E 4	4.1	8.1	16.2	32.4	64.8	129.5	E 4	3.9	7.9	13.7	27.0	54.7	109.4	E 4	3.8	7.8	13.5	26.8	54.0	108.4			
N 5	4.7	9.4	18.7	37.5	74.9	149.8	N 5	4.5	9.1	17.2	36.4	72.8	145.6	N 5	4.4	8.9	17.0	35.4	73.0	146.0	N 5	4.3	8.8	16.8	34.4	72.4	145.7			
T 6	5.3	10.5	21.6	42.0	86.1	148.2	T 6	5.1	10.2	20.4	40.8	81.7	163.4	T 6	5.0	9.9	19.6	39.7	79.4	158.7	T 6	4.9	9.8	19.4	39.7	79.4	158.7			
MAGNIFICATION = .005777 -6 GROUP LENGTH= 4.425MM (.1762IN.)												MAGNIFICATION = .005946 -6 GROUP LENGTH= 4.555MM (.1793IN.)												MAGNIFICATION = .006120 -6 GROUP LENGTH= 4.686MM (.1846IN.)						
GROUP			GROUP			GROUP			GROUP			GROUP			GROUP			GROUP			GROUP			GROUP						
-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1					
L 1	2.7	5.4	10.4	21.5	43.3	86.0	L 1	2.6	5.2	9.9	21.0	42.0	84.1	L 1	2.5	5.1	10.2	20.4	40.8	81.7	L 1	2.4	5.0	10.1	20.2	40.6	81.7			
L 2	3.0	6.1	12.1	24.3	48.4	97.2	E 2	2.9	5.9	11.9	23.6	47.2	96.4	E 2	2.8	5.7	11.5	22.9	45.9	91.7	E 2	2.7	5.6	11.1	22.5	45.7	91.5			
B 3	3.4	6.6	13.6	27.3	54.5	109.1	F 3	3.3	6.4	13.2	26.5	53.0	105.9	H 3	3.2	6.4	12.9	25.7	51.7	91.9	F 4	3.1	6.3	12.6	24.9	50.7	91.9			
E 4	3.8	7.7	15.3	30.6	61.2	122.4	E 4	3.7	7.4	14.9	29.7	59.7	116.9	E 4	3.6	7.2	14.7	29.4	59.7	116.9	E 4	3.5	7.0	14.4	29.1	59.7	116.9			
N 5	4.3	8.6	17.2	34.3	68.7	137.4	N 5	4.2	8.3	16.7	33.4	66.7	133.5	N 5	4.1	8.1	16.2	32.4	64.8	129.7	N 5	4.0	8.0	16.0	32.4	64.8	129.7			
T 6	4.6	9.6	19.3	36.6	77.1	154.2	T 6	4.7	9.4	18.7	37.5	74.9	149.8	T 6	4.5	9.1	18.2	36.4	72.8	145.6	T 6	4.4	9.0	18.0	36.4	72.8	145.6			

TABLE 8. THE OBSERVATION OF LINES PER MILLIMETER

MAGNIFICATION - 0006484										MAGNIFICATION - 0066674									
-A GROUP LENGTH- 4.967MM(.1955IN.)					-B GROUP LENGTH- 5.112MM(.2013IN.)					-C GROUP LENGTH- 5.112MM(.2013IN.)					-D GROUP LENGTH- 5.112MM(.2013IN.)				
-6 GROUP LENGTH- 4.967MM(.1955IN.)		-6 GROUP LENGTH- 5.112MM(.2013IN.)		-6 GROUP LENGTH- 5.112MM(.2013IN.)		-6 GROUP LENGTH- 5.112MM(.2013IN.)		-6 GROUP LENGTH- 5.112MM(.2013IN.)		-6 GROUP LENGTH- 5.112MM(.2013IN.)		-6 GROUP LENGTH- 5.112MM(.2013IN.)		-6 GROUP LENGTH- 5.112MM(.2013IN.)		-6 GROUP LENGTH- 5.112MM(.2013IN.)			
-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1
2.5	5.0	9.9	19.8	39.7	74.6	L 1	2.5	5.0	9.9	19.8	38.6	77.1	L 1	2.3	4.7	9.4	18.7	37.5	74.9
2.8	5.0	11.1	22.3	44.5	84.1	E 2	2.7	5.4	10.8	21.6	43.3	86.6	E 2	2.6	5.3	10.5	21.0	42.0	84.1
3.1	6.2	12.5	25.0	50.0	100.0	R 3	3.0	6.1	12.1	24.0	48.0	97.2	H 3	2.9	5.9	11.6	23.6	47.0	94.4
3.5	7.0	14.0	28.1	56.1	112.2	E 4	3.4	6.8	13.6	27.3	54.5	109.1	E 4	3.3	6.6	13.2	26.5	53.0	105.9
3.9	7.9	15.7	31.5	63.0	126.0	N 5	3.5	7.0	15.3	30.6	61.2	122.4	N 5	3.7	7.4	14.9	29.7	59.5	118.9
4.4	8.9	17.7	35.4	70.7	141.4	T 6	4.3	8.6	17.2	36.3	68.7	137.4	T 6	4.2	8.3	16.7	33.4	66.7	133.5

MAGNIFICATION = .006750									
MAGNIFICATION = .007071									
MAGNIFICATION = .007391									
#-6	GROUP LENGTH= 5.242MM (.20721IN.)	#-6	GROUP LENGTH= 5.416MM (.21321IN.)	#-6	GROUP LENGTH= 5.675MM (.21951IN.)	#-6	GROUP LENGTH= 5.937MM (.22677IN.)	#-6	GROUP LENGTH= 6.195MM (.23376IN.)
GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP
E	-6	-5	-4	-3	-2	-1	E	-5	-4
L	2.3	2.5	9.1	16.2	36.4	72.8	L	1	2.1
L	2.0	5.1	10.2	20.4	40.6	61.7	E	1	1.1
L	2.9	5.7	11.3	22.9	45.9	61.7	N	3	2.7
E	3.2	6.4	12.4	25.7	51.5	61.2	E	4	3.0
N	3.4	7.2	14.4	26.6	57.4	61.5	N	5	3.4
T	4.1	16.4	32.4	64.4	170.7	17.6	T	6	3.8
T	4.0	16.2	32.2	64.2	170.5	17.4	T	7	3.8

MAGNIFICATION - 007711		MAGNIFICATION - 007711		MAGNIFICATION - 007711	
-6 GROUP LENGTH - 5.90MM(+ 2325IN.)		-6 GROUP LENGTH - 5.90MM(+ 2325IN.)		-6 GROUP LENGTH - 6.00MM(+ 2394IN.)	
GROUP	GROUP	GROUP	GROUP	GROUP	GROUP
E	-6	-5	-4	-3	-2
E	2.1	2.0	1.9	1.8	1.7
L 1	2.1	2.0	1.9	1.8	1.7
L 2	2.3	2.2	2.1	2.0	1.9
M 2	2.0	1.9	1.8	1.7	1.6
E 4	2.0	1.9	1.8	1.7	1.6
N 5	3.3	3.2	3.1	3.0	2.9
T 6	3.7	3.6	3.5	3.4	3.3

IMAGE PLANE RESOLUTION (LINES PER MILLIMETER)

MAGNIFICATION = .0004909 -6 GROUP LENGTH = 6.174MM (.2647IN.)		MAGNIFICATION = .000170 -6 GROUP LENGTH = 7.024MM (.2765IN.)		MAGNIFICATION = .000639 -6 GROUP LENGTH = 7.230MM (.2846IN.)	
GROUP		GROUP		GROUP	
-6	.5	-3	-2	-1	
E	1.5	3.5	7.1	14.0	28.1
L	2.0	3.4	7.0	15.7	31.3
E	2.5	6.4	9.4	17.7	35.4
E	3.0	5.0	9.3	14.4	39.4
E	3.5	5.6	11.1	22.2	44.5
E	4.0	6.3	12.7	25.0	50.0
T	4.1				

MAGNIFICATION = .0009115 -6 GROUP LENGTH = 7.642MM (.2933IN.)		MAGNIFICATION = .010000 -6 GROUP LENGTH = 7.660MM (.3016IN.)		MAGNIFICATION = .010293 -6 GROUP LENGTH = 7.884MM (.3104IN.)	
GROUP		GROUP		GROUP	
-6	.5	-3	-2	-1	
E	1.0	2.2	5.4	12.9	25.7
L	1.5	2.6	7.0	14.4	28.9
E	2.0	4.1	6.1	16.2	32.4
E	2.5	6.5	9.1	18.2	36.4
E	3.0	5.1	10.2	21.4	40.4
E	3.5	5.7	11.7	21.7	45.4
T	4.0				

MAGNIFICATION = .0101095 -6 GROUP LENGTH = 6.115MM (.3193IN.)		MAGNIFICATION = .010905 -6 GROUP LENGTH = 8.353MM (.3289IN.)		MAGNIFICATION = .011225 -6 GROUP LENGTH = 8.598MM (.3385IN.)	
GROUP		GROUP		GROUP	
-6	.5	-1	-2	-1	
E	1.0	2.4	5.1	11.4	23.4
L	1.5	3.1	6.2	14.2	26.5
E	2.0	4.7	9.0	16.9	29.7
E	2.5	6.4	10.7	16.7	33.4
E	3.0	7.0	12.7	17.0	37.0
E	3.5	7.6	14.7	18.0	40.7
T	4.0				

MAGNIFICATION = .0110950 -6 GROUP LENGTH = 6.115MM (.3193IN.)		MAGNIFICATION = .011892 -6 GROUP LENGTH = 9.109MM (.3586IN.)		MAGNIFICATION = .012241 -6 GROUP LENGTH = 9.376MM (.3691IN.)	
GROUP		GROUP		GROUP	
-6	.5	-1	-2	-1	
E	1.0	2.7	5.4	10.3	21.0
L	1.5	3.0	6.1	11.5	23.6
E	2.0	4.7	8.2	13.2	26.5
E	2.5	5.4	10.7	14.9	29.7
E	3.0	6.1	11.9	16.7	33.4
E	3.5	6.7	12.2	18.7	37.5
T	4.0				

MAGNIFICATION = .011892 -6 GROUP LENGTH = 9.109MM (.3586IN.)		MAGNIFICATION = .012241 -6 GROUP LENGTH = 9.376MM (.3691IN.)	
GROUP		GROUP	
-6	.5	-1	-2
E	1.0	2.7	5.4
L	1.5	3.0	6.1
E	2.0	4.7	8.2
E	2.5	5.4	10.7
E	3.0	6.1	11.9
E	3.5	6.7	12.2
T	4.0		

IMAGE PLATE RESOLUTION (LINES PER MILLIMETER)

MAGNIFICATION - 0.12599 -6 GROUP LENGTH - 9.651MM (.382IN.)		MAGNIFICATION - 0.12968 -6 GROUP LENGTH - 9.934MM (.391IN.)		MAGNIFICATION - 0.13348 -6 GROUP LENGTH - 10.225MM (.40261IN.)	
GROUP	LINEAR	GROUP	LINEAR	GROUP	LINEAR
E	-5	-5	-2	-1	-1
E 1	1.0	2.0	9.5	19.7	38.6
E 2	1.0	2.0	11.1	22.3	43.3
E 3	1.0	2.0	12.5	25.0	48.6
E 4	1.0	2.0	13.0	26.1	54.5
E 5	2.0	3.0	12.7	31.5	43.0
E 6	2.0	3.0	12.7	31.5	53.0
E 7	2.0	3.0	17.7	35.4	59.5
E 8	2.0	3.0	17.7	35.4	66.7

MAGNIFICATION - 0.14170 -6 GROUP LENGTH - 10.426MM (.4141IN.)		MAGNIFICATION - 0.14162 -6 GROUP LENGTH - 10.833MM (.4265IN.)		MAGNIFICATION - 0.14557 -6 GROUP LENGTH - 11.150MM (.4390IN.)	
GROUP	LINEAR	GROUP	LINEAR	GROUP	LINEAR
E	-5	-4	-3	-2	-1
E 1	1.0	2.0	4.0	9.1	16.7
E 2	1.0	2.0	10.2	20.4	40.0
E 3	1.0	2.0	11.5	22.9	45.9
E 4	1.0	2.0	11.5	21.5	45.5
E 5	1.0	2.0	11.5	21.5	45.5
E 6	1.0	2.0	11.5	21.5	45.5
E 7	1.0	2.0	11.5	21.5	45.5
E 8	1.0	2.0	11.5	21.5	45.5
E 9	1.0	2.0	11.5	21.5	45.5
E 10	1.0	2.0	11.5	21.5	45.5
E 11	1.0	2.0	11.5	21.5	45.5
E 12	1.0	2.0	11.5	21.5	45.5
E 13	1.0	2.0	11.5	21.5	45.5
E 14	1.0	2.0	11.5	21.5	45.5
E 15	1.0	2.0	11.5	21.5	45.5
E 16	1.0	2.0	11.5	21.5	45.5
E 17	1.0	2.0	11.5	21.5	45.5
E 18	1.0	2.0	11.5	21.5	45.5
E 19	1.0	2.0	11.5	21.5	45.5
E 20	1.0	2.0	11.5	21.5	45.5

MAGNIFICATION - 0.14542 -6 GROUP LENGTH - 11.465MM (.4551IN.)		MAGNIFICATION - 0.15422 -6 GROUP LENGTH - 11.813MM (.4651IN.)		MAGNIFICATION - 0.15874 -6 GROUP LENGTH - 12.159MM (.4787IN.)	
GROUP	LINEAR	GROUP	LINEAR	GROUP	LINEAR
E	-5	-4	-3	-2	-1
E 1	1.0	2.0	4.0	9.1	16.7
E 2	1.0	2.0	10.2	20.4	40.0
E 3	1.0	2.0	11.5	22.9	45.9
E 4	1.0	2.0	11.5	21.5	45.5
E 5	1.0	2.0	11.5	21.5	45.5
E 6	1.0	2.0	11.5	21.5	45.5
E 7	1.0	2.0	11.5	21.5	45.5
E 8	1.0	2.0	11.5	21.5	45.5
E 9	1.0	2.0	11.5	21.5	45.5
E 10	1.0	2.0	11.5	21.5	45.5
E 11	1.0	2.0	11.5	21.5	45.5
E 12	1.0	2.0	11.5	21.5	45.5
E 13	1.0	2.0	11.5	21.5	45.5
E 14	1.0	2.0	11.5	21.5	45.5
E 15	1.0	2.0	11.5	21.5	45.5
E 16	1.0	2.0	11.5	21.5	45.5
E 17	1.0	2.0	11.5	21.5	45.5
E 18	1.0	2.0	11.5	21.5	45.5
E 19	1.0	2.0	11.5	21.5	45.5
E 20	1.0	2.0	11.5	21.5	45.5

MAGNIFICATION - 0.16618 -6 GROUP LENGTH - 12.883MM (.5072IN.)		MAGNIFICATION - 0.17311 -6 GROUP LENGTH - 13.260MM (.52220IN.)	
GROUP	LINEAR	GROUP	LINEAR
E	-5	-5	-1
E 1	1.0	2.0	7.7
E 2	1.0	2.0	17.2
E 3	1.0	2.0	19.1
E 4	1.0	2.0	21.1
E 5	1.0	2.0	21.1
E 6	1.0	2.0	21.1
E 7	1.0	2.0	21.1
E 8	1.0	2.0	21.1
E 9	1.0	2.0	21.1
E 10	1.0	2.0	21.1
E 11	1.0	2.0	21.1
E 12	1.0	2.0	21.1
E 13	1.0	2.0	21.1
E 14	1.0	2.0	21.1
E 15	1.0	2.0	21.1
E 16	1.0	2.0	21.1
E 17	1.0	2.0	21.1
E 18	1.0	2.0	21.1
E 19	1.0	2.0	21.1
E 20	1.0	2.0	21.1

IMAGE PLATE RESOLUTION (LINES PER MILLIMETER)

MAGNIFICATION = .017160							
-6 GROUP LENGTH=13.70CM(.537 IN.)							
-6 GROUP GROUP							
-6	-5	-4	-3	-2	-1	E	-6
E	1	0	1.0	2.0	3.0	L 1	E
E	2	0	1.0	2.0	3.0	L 2	E
E	3	0	1.0	2.0	3.0	M 3	E
E	4	0	1.0	2.0	3.0	E 4	E
E	5	0	1.0	2.0	3.0	N 5	L 3
E	6	0	1.0	2.0	3.0	T 6	L 4
E	7	0	1.0	2.0	3.0		

MAGNIFICATION = .018877							
-6 GROUP LENGTH=14.460MM(.5693IN.)							
-6 GROUP GROUP							
-6	-5	-4	-3	-2	-1	E	-6
E	1	0	1.0	2.0	3.0	L 1	E
E	2	0	1.0	2.0	3.0	L 2	E
E	3	0	1.0	2.0	3.0	M 3	E
E	4	0	1.0	2.0	3.0	E 4	E
E	5	0	1.0	2.0	3.0	N 5	L 3
E	6	0	1.0	2.0	3.0	T 6	L 4
E	7	0	1.0	2.0	3.0		

MAGNIFICATION = .020586							
-6 GROUP LENGTH=15.769MM(.6206IN.)							
-6 GROUP GROUP							
-6	-5	-4	-3	-2	-1	E	-6
E	1	0	1.0	2.0	3.0	L 1	E
E	2	0	1.0	2.0	3.0	L 2	E
E	3	0	1.0	2.0	3.0	M 3	E
E	4	0	1.0	2.0	3.0	E 4	E
E	5	0	1.0	2.0	3.0	N 5	L 3
E	6	0	1.0	2.0	3.0	T 6	L 4
E	7	0	1.0	2.0	3.0		

MAGNIFICATION = .022449							
-6 GROUP LENGTH=17.196MM(.6770IN.)							
-6 GROUP GROUP							
-6	-5	-4	-3	-2	-1	E	-6
E	1	0	1.0	2.0	3.0	L 1	E
E	2	0	1.0	2.0	3.0	L 2	E
E	3	0	1.0	2.0	3.0	M 3	E
E	4	0	1.0	2.0	3.0	E 4	E
E	5	0	1.0	2.0	3.0	N 5	L 3
E	6	0	1.0	2.0	3.0	T 6	L 4
E	7	0	1.0	2.0	3.0		

MAGNIFICATION = .024481							
-6 GROUP LENGTH=18.753MM(.7303IN.)							
-6 GROUP GROUP							
-6	-5	-4	-3	-2	-1	E	-6
E	1	0	1.0	2.0	3.0	L 1	E
E	2	0	1.0	2.0	3.0	L 2	E
E	3	0	1.0	2.0	3.0	M 3	E
E	4	0	1.0	2.0	3.0	E 4	E
E	5	0	1.0	2.0	3.0	N 5	L 3
E	6	0	1.0	2.0	3.0	T 6	L 4
E	7	0	1.0	2.0	3.0		

IMAGE PLATE RESOLUTION (LINES PER MILLIMETER)

MAGNIFICATION - 0.1251498
-A GROUP LENGTH-14.312MM(.75022IN.)
GROUP

E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1
E	1.1	1.2	2.1	2.0	9.4	19.8	L 1	1.1	1.2	2.4	4.6	19.3	L 1
E 2	1.1	1.4	2.1	7.6	11.1	22.3	E 2	1.4	2.7	5.4	10.8	21.6	E 2
E 3	1.6	1.6	3.1	6.3	12.5	25.0	E 3	1.5	3.0	6.1	12.1	24.3	E 3
E 4	1.9	1.9	3.1	7.0	16.1	28.1	E 4	1.9	3.6	6.8	13.6	26.5	E 4
E 5	1.0	2.0	3.1	7.9	15.7	31.5	E 5	1.0	1.8	7.7	15.3	30.6	E 5
E 6	1.1	2.2	3.1	4.8	17.4	35.6	E 6	1.1	2.1	4.3	17.2	34.3	E 6

MAGNIFICATION - 0.127014
-A GROUP LENGTH-21.77MM(.82721IN.)
GROUP

E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1
E	1.1	1.1	2.1	6.1	16.2	21.1	E 1	1.1	1.1	2.2	4.4	17.7	L 1
E 2	1.3	2.1	5.1	10.7	20.6	22.3	E 2	1.2	2.5	5.0	9.9	19.8	E 2
E 3	1.4	2.1	5.7	12.5	22.7	25.9	E 3	1.4	2.6	5.6	11.1	22.3	E 3
E 4	1.6	2.1	6.4	12.4	25.7	24.5	E 4	1.6	3.1	6.2	12.5	25.0	E 4
E 5	1.8	3.1	6.4	14.4	26.4	24.5	E 5	1.8	3.5	7.0	14.0	28.1	E 5
E 6	1.9	3.1	7.2	14.4	26.4	24.5	E 6	1.9	3.6	7.9	15.7	31.5	E 6
E 7	2.0	4.1	6.1	16.7	32.4	32.4	E 7	2.0	3.6	7.0	15.3	30.6	E 7

MAGNIFICATION - 0.1274460
-A GROUP LENGTH-22.45MM(.89371IN.)
GROUP

E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1
E	1.1	1.4	2.1	6.2	16.3	16.7	E 1	1.1	1.4	2.0	4.1	16.2	L 1
E 2	1.2	2.1	6.1	14.1	24.4	24.4	E 2	1.2	2.3	4.5	9.1	18.7	E 2
E 3	1.3	2.1	6.3	10.5	21.0	21.0	E 3	1.3	2.6	5.1	10.2	20.4	E 3
E 4	1.5	2.1	7.0	11.4	23.6	23.6	E 4	1.5	2.9	5.7	11.5	22.9	E 4
E 5	1.6	2.1	7.7	13.7	26.5	25.5	E 5	1.6	3.2	6.4	12.0	25.0	E 5
E 6	1.7	3.1	7.1	14.4	24.7	24.7	E 6	1.7	3.6	7.2	14.0	28.1	E 6
E 7	1.8	3.1	7.6	14.4	24.7	24.7	E 7	1.8	3.6	7.6	14.0	28.1	E 7

MAGNIFICATION - 0.132670
-A GROUP LENGTH-25.32MM(1.00541IN.)
GROUP

E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1
E	1.1	1.5	2.1	7.7	15.3	15.3	E 1	1.1	1.9	3.7	7.4	14.9	L 1
E 2	1.1	2.1	6.3	8.6	17.2	17.2	E 2	1.0	2.1	4.2	8.3	16.7	E 2
E 3	1.2	2.1	6.8	9.6	19.3	19.3	E 3	1.2	2.3	4.7	9.4	18.7	E 3
E 4	1.4	2.1	10.4	10.6	21.6	21.6	E 4	1.3	2.6	5.3	10.5	21.0	E 4
E 5	1.5	3.1	12.1	14.3	23.6	23.6	E 5	1.5	3.7	5.9	11.8	23.6	E 5
E 6	1.7	3.1	13.4	13.6	24.7	24.7	E 6	1.7	3.8	6.0	12.1	24.3	E 6
E 7	1.8	3.1	13.4	13.6	24.7	24.7	E 7	1.8	3.8	6.0	12.1	24.3	E 7

MAGNIFICATION - 0.133636
-A GROUP LENGTH-25.765MM(1.01441IN.)
GROUP

E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1
E	1.1	1.4	2.1	7.7	15.3	15.3	E 1	1.1	1.9	3.7	7.4	14.9	L 1
E 2	1.1	2.1	6.3	8.6	17.2	17.2	E 2	1.0	2.1	4.2	8.3	16.7	E 2
E 3	1.2	2.1	6.8	9.6	19.3	19.3	E 3	1.2	2.3	4.7	9.4	18.7	E 3
E 4	1.4	2.1	10.4	10.6	21.6	21.6	E 4	1.3	2.6	5.3	10.5	21.0	E 4
E 5	1.5	3.1	12.1	14.3	23.6	23.6	E 5	1.5	3.7	5.9	11.8	23.6	E 5
E 6	1.7	3.1	13.4	13.6	24.7	24.7	E 6	1.7	3.8	6.0	12.1	24.3	E 6
E 7	1.8	3.1	13.4	13.6	24.7	24.7	E 7	1.8	3.8	6.0	12.1	24.3	E 7

MAGNIFICATION - 0.1363636
-A GROUP LENGTH-25.765MM(1.01441IN.)
GROUP

E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1
E	1.1	1.4	2.1	7.7	15.3	15.3	E 1	1.1	1.9	3.7	7.4	14.9	L 1
E 2	1.1	2.1	6.3	8.6	17.2	17.2	E 2	1.0	2.1	4.2	8.3	16.7	E 2
E 3	1.2	2.1	6.8	9.6	19.3	19.3	E 3	1.2	2.3	4.7	9.4	18.7	E 3
E 4	1.4	2.1	10.4	10.6	21.6	21.6	E 4	1.3	2.6	5.3	10.5	21.0	E 4
E 5	1.5	3.1	12.1	14.3	23.6	23.6	E 5	1.5	3.7	5.9	11.8	23.6	E 5
E 6	1.7	3.1	13.4	13.6	24.7	24.7	E 6	1.7	3.8	6.0	12.1	24.3	E 6
E 7	1.8	3.1	13.4	13.6	24.7	24.7	E 7	1.8	3.8	6.0	12.1	24.3	E 7

MAGNIFICATION - 0.139621
-A GROUP LENGTH-26.520MM(1.0441IN.)
GROUP

E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1
E	1.1	1.4	2.1	7.7	15.3	15.3	E 1	1.1	1.9	3.7	7.4	14.9	L 1
E 2	1.1	2.1	6.3	8.6	17.2	17.2	E 2	1.0	2.1	4.2	8.3	16.7	E 2
E 3	1.2	2.1	6.8	9.6	19.3	19.3	E 3	1.2	2.3	4.7	9.4	18.7	E 3
E 4	1.4	2.1	10.4	10.6	21.6	21.6	E 4	1.3	2.6	5.3	10.5	21.0	E 4
E 5	1.5	3.1	12.1	14.3	23.6	23.6	E 5	1.5	3.7	5.9	11.8	23.6	E 5
E 6	1.7	3.1	13.4	13.6	24.7	24.7	E 6	1.7	3.8	6.0	12.1	24.3	E 6
E 7	1.8	3.1	13.4	13.6	24.7	24.7	E 7	1.8	3.8	6.0	12.1	24.3	E 7

MAGNIFICATION - 0.1441
-A GROUP LENGTH-26.520MM(1.0441IN.)
GROUP

E	-6	-5	-4	-3	-2	-1	E	-6	-5	-4	-3	-2	-1
E	1.1	1.4	2.1	7.7	15.3	15.3	E 1	1.1	1.9	3.7	7.4	14.9	L 1
E 2	1.1	2.1	6.3	8.6	17.2	17.2	E 2	1.0	2.1	4.2	8.3	16.7	E 2
E 3	1.2	2.1	6.8	9.6	19.3	19.3	E 3	1.2	2.3	4.7	9.4	18.7	E 3
E 4	1.4	2.1	10.4	10.6	21.6	21.6	E 4	1.3	2.6	5.3	10.5	21.0	E 4
E 5	1.5	3.1	12.1	14.3	23.6	23.6	E 5	1.5	3.7	5.9	11.8	23.6	E 5
E 6	1.7	3.1	13.4	13.6	24.7	24.7	E 6	1.7	3.8	6.0	12.1	24.3	E 6
E 7	1.8	3.1	13.4	13.6	24.7	24.7	E 7	1.8	3.8	6.0	12.1	24.3	E 7