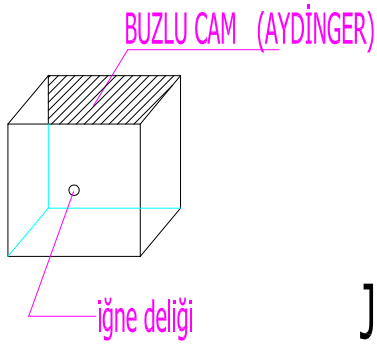
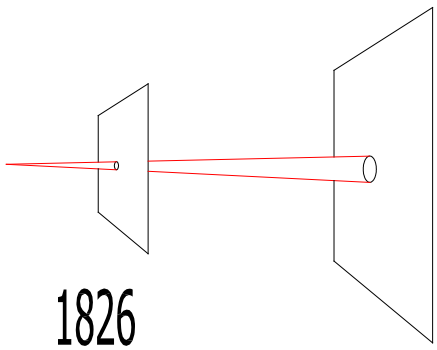
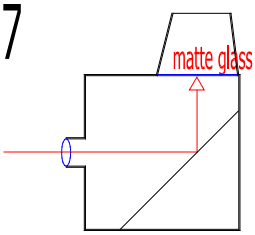
CAMERA OBSCURA

IMAGE FORMATION

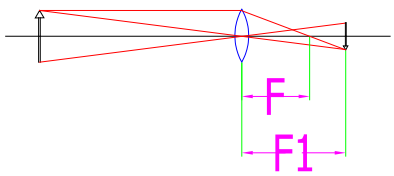


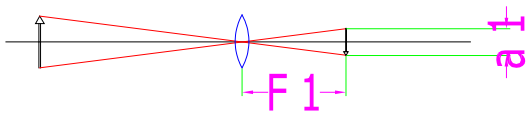


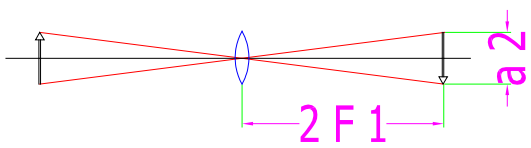
J. N. NIEPCE 1826
L. J. M. DAGUERRE 1837



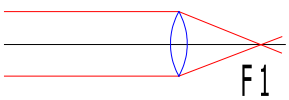
REFLEKS CAMERA

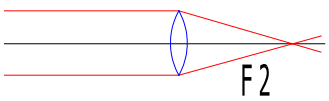


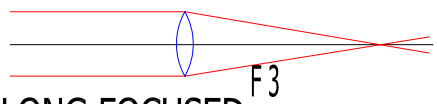




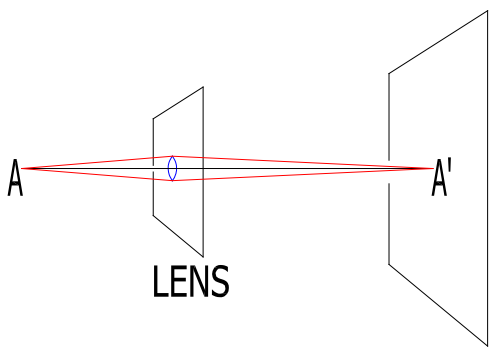
SHORT FOCUSED

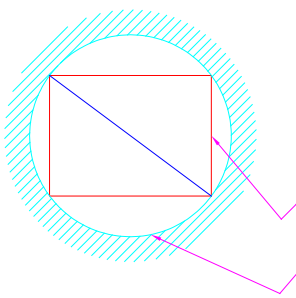




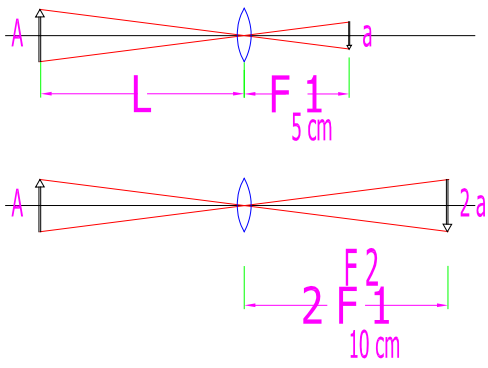


LONG FOCUSED





FOCAL LENGTH

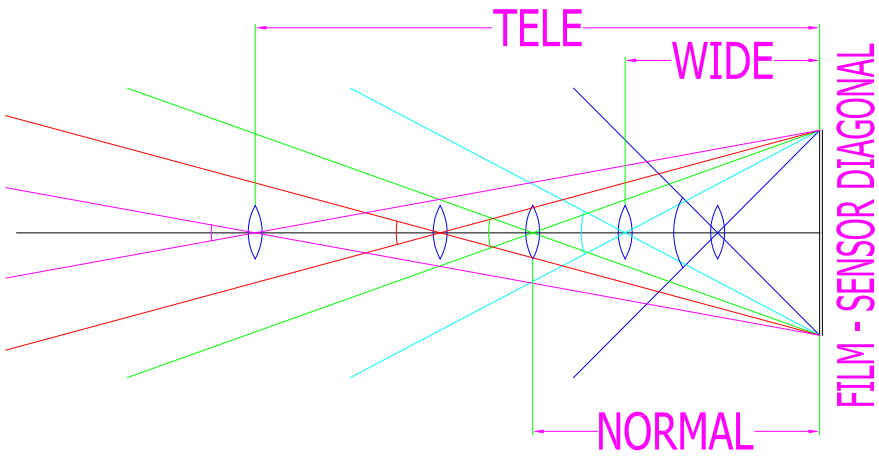


35 MM CAMERA

3,5 / 135	TELE - OBJECTIVE
1,4 / 50	NORMAL- OBJECTIVE
2,8 / 28	WIDE ANGLE

FOCAL LENGTH - PİCTURE RATİO

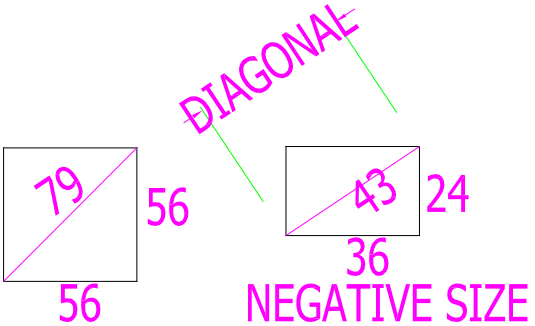
FOCUS LENGTH - VIEW ANGLE



35 mm FORM LENS SIZES

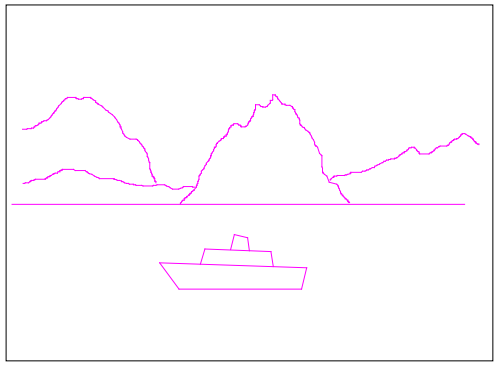
	F mm	Açı
Wide Angle	18	100
	21	92
	24	83
	28	75
	35	63
Normal	50	47

	F mm	Açı
Tele	75	32
	85	29
	100	24
	135	18
	150	16
	200	12
	300	8
	400	6
	1000	2,5

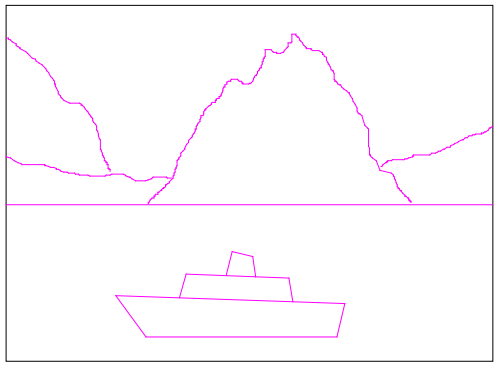


FOCAL LENGTH AND PERSPEKTIVE

DISTANCE BETWEEN OBJECT AND CAMERA IS STABIL



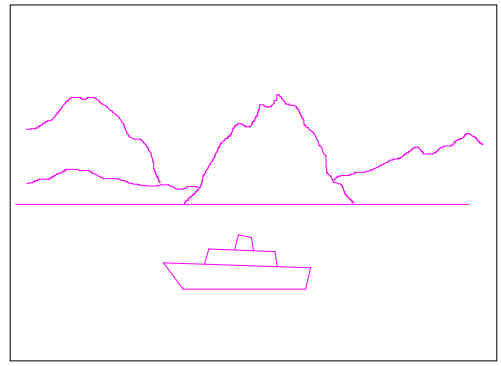
WIDE ANGLE



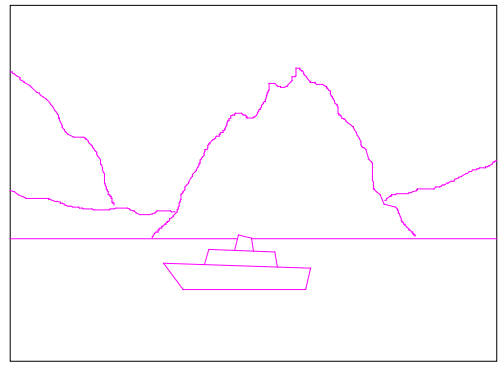
NORMAL

TELE

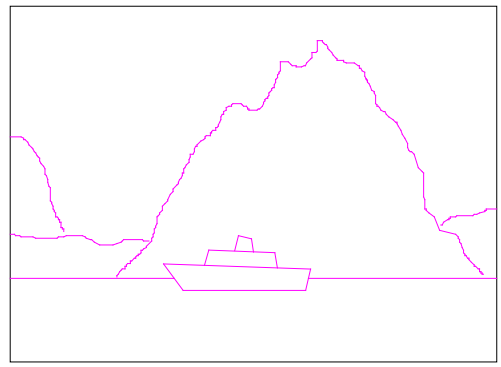
DISTANCE BETWEEN OBJECT AND CAMERA CHANGES



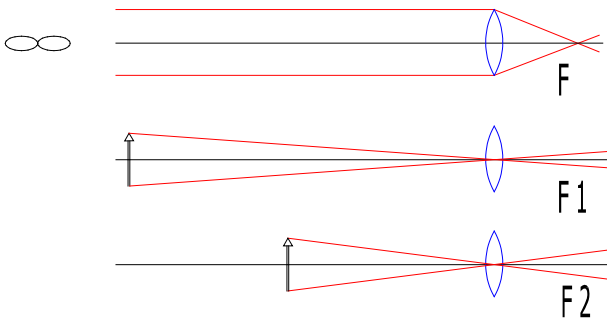
WIDE ANGLE



NORMAL



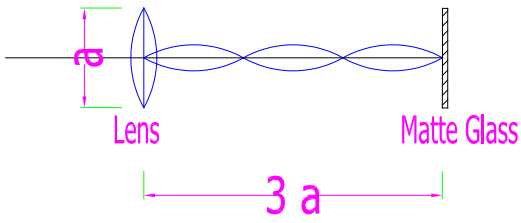
TELE



DISTANCE OF OBJECT - DISTANCE OF PİCTURE

F < F1 < F2

DIAPHRAGM AND RELATIVE OPENING

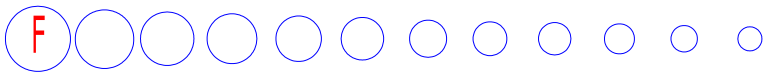


$$\frac{3\,a}{a} = 3$$

$$\text{Rel.Opening} = \frac{\text{Focal Length}}{\text{Lens Diameter}}$$

1 : 2,8 1 / 2,8

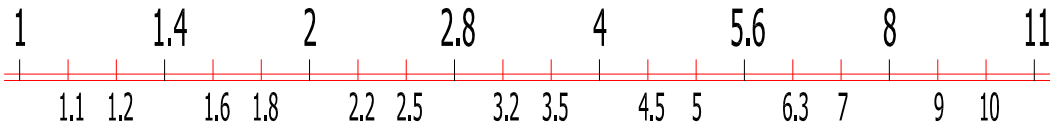
2,8 / 50



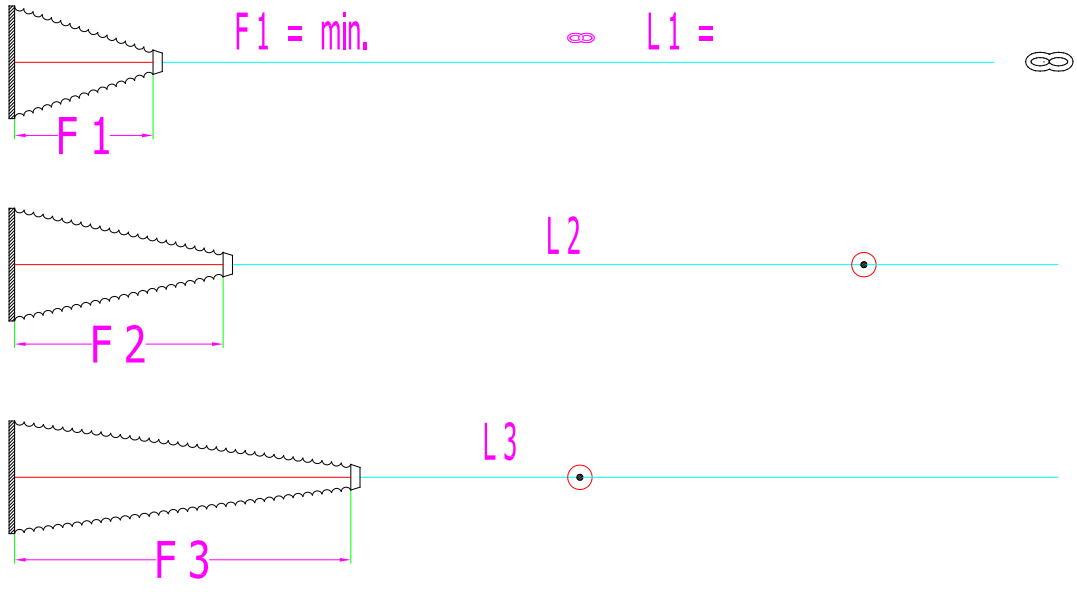
Diaphragm no.	0,7	1	1,4	2	2,8	4	5,6	8	11	16	22	32
Prop. duration	1 / 2	1	2	4	8	16	32	64	128	256	512	1024

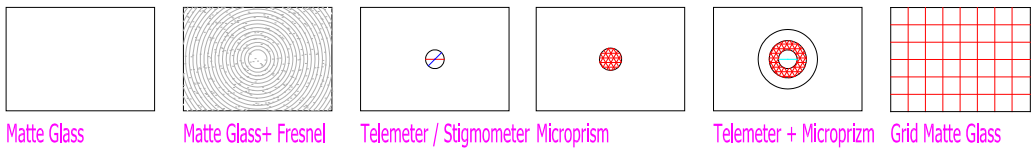
Diaphgram Opening Increase
Stop Numbers Decrease
Depth of Focus Decrease
Exposure Time Decrease
Matte Glass Illuminated

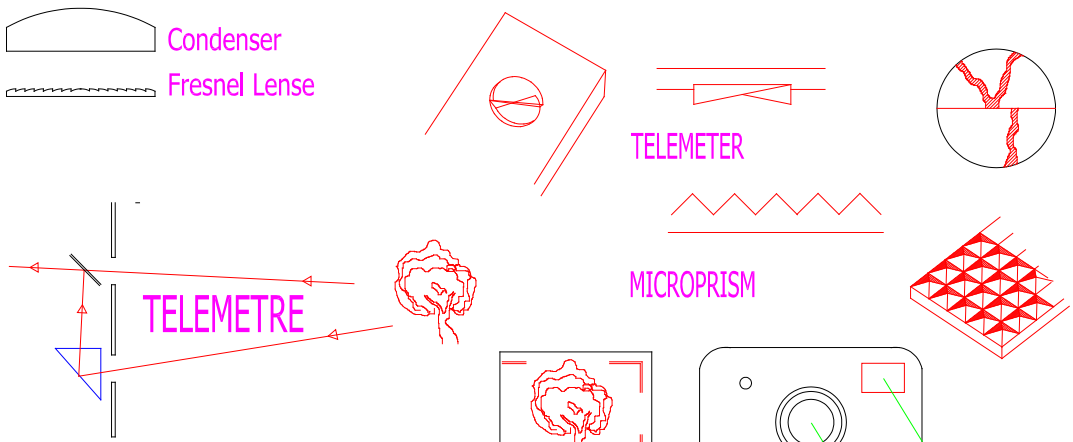
Diaphgram Opening Decrease
Stop Numbers Increase
Depth of Focus Increase
Exposure Time Increase
Matte Glass Dimmed



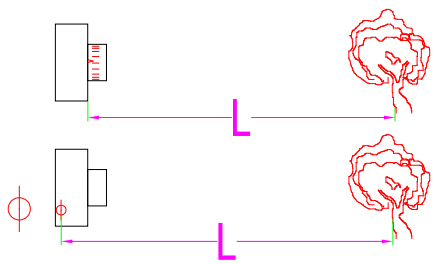
DISTANCE SETTING

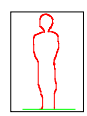




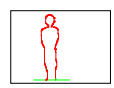


Lens or Camera
distance setting diagrams





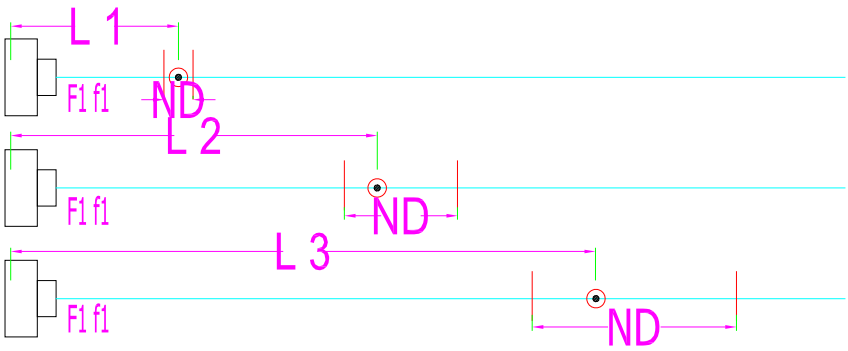
F = 50 mm L = 270 cm



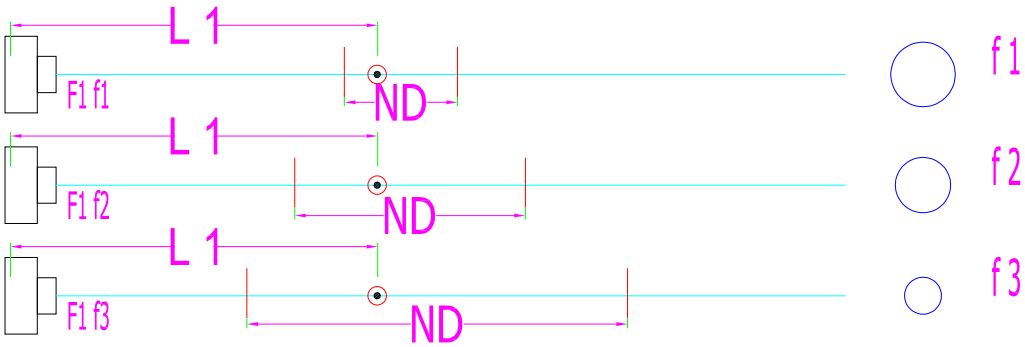
F = 50 mm L = 4,80 m

DEPTH OF FIELD

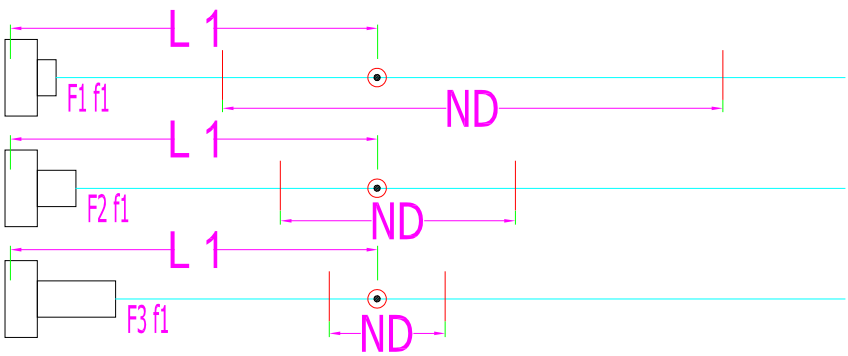
DISTANCE DIAPHRAGM FOCAL LENGTH



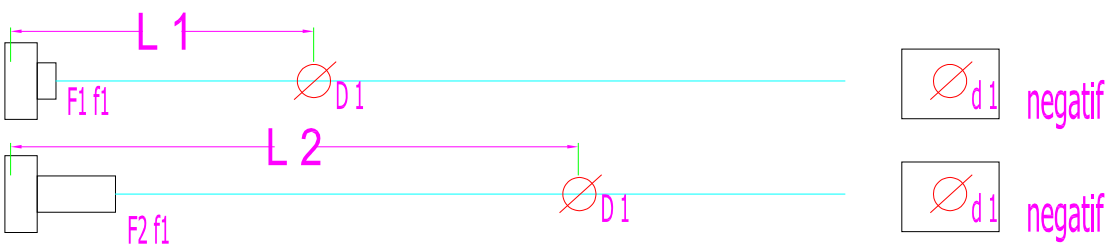
△ DEPTH OF FIELD INCREASES IF OBJECTS ARE AT A FAR DISTANCE △



△ DEPTH OF FIELD INCREASES BY CLOSED DIAPHRAGMS △

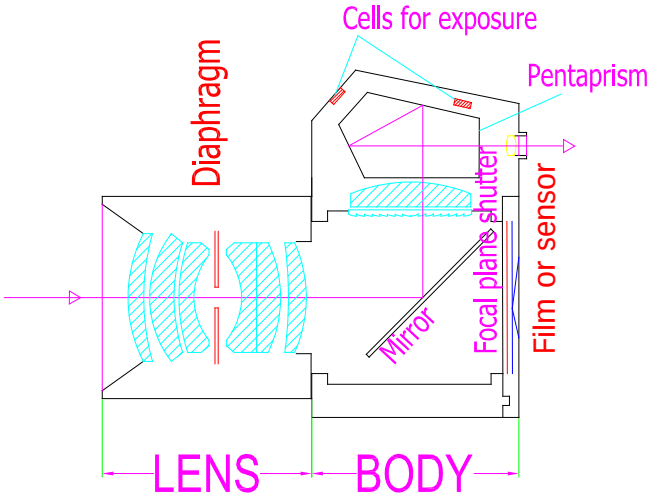


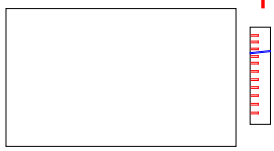
△ DEPTH OF FIELD DECREASES BY USING LONG FOCUSED LENCES (TELEOBJECTIVES) △

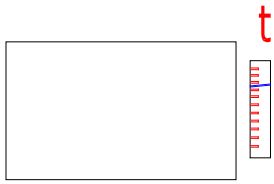


△ STANDARD OBJECT SIZE
DIFFERENT FOCUSLENGTH AND OBJECT DISTANCE
SAME DIAPHRAGM
> DEPTH OF FIELD WILL NOT CHANGE

SINGLE LENS REFLEX CAMERA







FOR A 35 MM CAMERA

WIDE ANGLE		35	28 mm
NORMAL		43	58 mm
TELE	100	135	200 mm

ZOOM LENS
(Makro -- Zoom)

28 --- 200
35 --- 105
28 --- 135

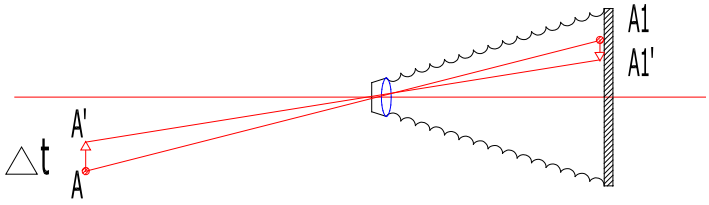
YAKINDAN ÇEKİM MERCEĞİ
(CLOSE - UP LENS)

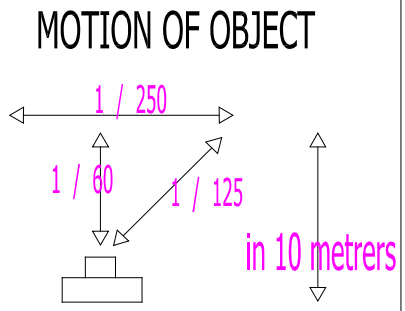
50 MM OBJEKTİF İLE

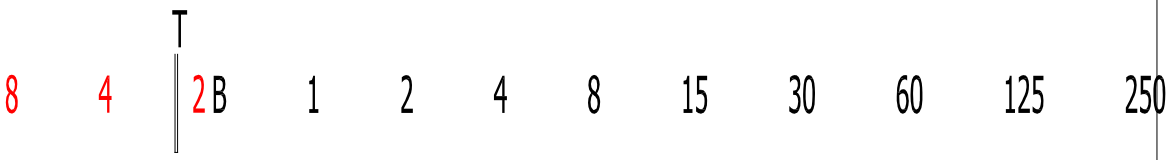
+1	+2	+3	+4	+5
cm	cm	cm	cm	cm
100 -- 50	50 -- 33	33 -- 25	25 -- 20	20 -- 17
cm	cm	cm		
25 x 38	17 x 26	13 x 19		
50 x 76	27 x 40	18 x 27		

TIMER SETTING

1. MOTION OF OBJECT
2. MOTION OF CAMERA
3. CORRECT EXPOSURE







HOLDIN THE CAMERA IN HAND, WE HAVE TO CHOOSE A SHUTTER SPEED ANALOG TO FOCAL LENGTH

35 MM KAMERADA	50 MM	1 / 30 -- 1 / 60
	100 MM	1 / 125
	200 MM	1 / 250
	35 MM	1 / 30

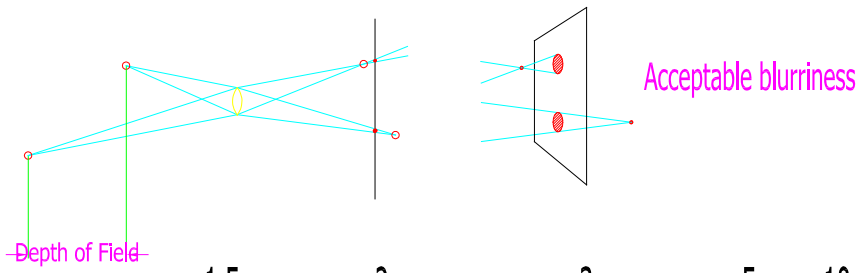
CORRECT EXPOSURE

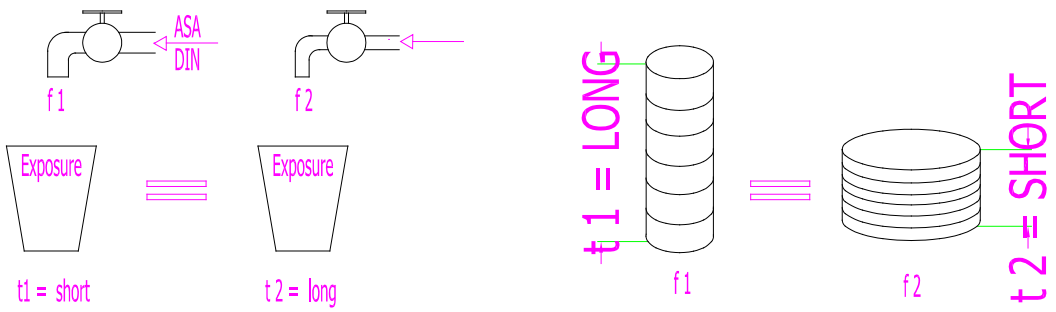
APERTURE

SHUTTER SPEED

APERTURE AND SHUTTER SPEED

Diaphragm numbers		1,4	2	2,8	4	5,6	8	11	16	22	32
Proportional shutter speed		1/500	1/250	1/125	1/60	1/30	1/15	1/8	1/4	1/2	1
Distance adjustment	Make the distance adjustment carefully, depth of field is decreasing ←									→ Distance adjustment is not importatnt, depth of field is increasing	
Depth of Field	Too limited				Exsistent					Increasing	
Sharpness of moving object	Very Sharp		Sharp			Blury				Increasing Blur	
RESULT	If object movement increases Setting on higher shutterspeed → WE CAN HOLD THE CAMERA									For getting increasing deptth of field Setting on closed apertures → USE A TRİPOT	

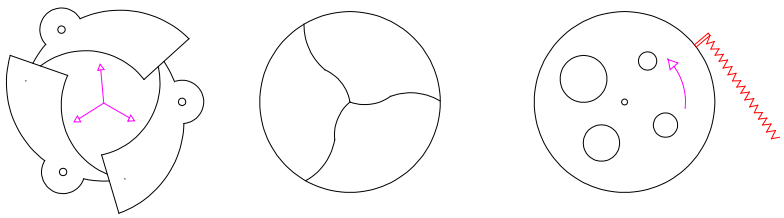




SHUTTERS

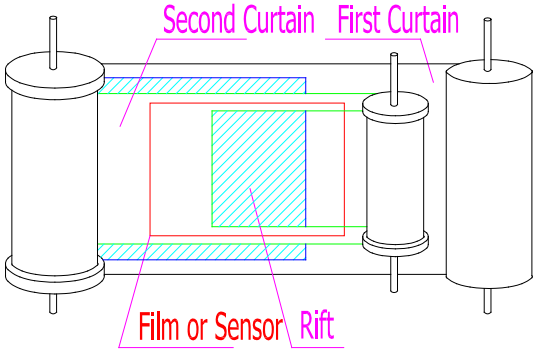
1. DIAPFRAGM TYPE SHUTTERS (BY LENSE)
2. CURTAIN TYPE SHUTTERS (BY FOCAL PLANE)

1



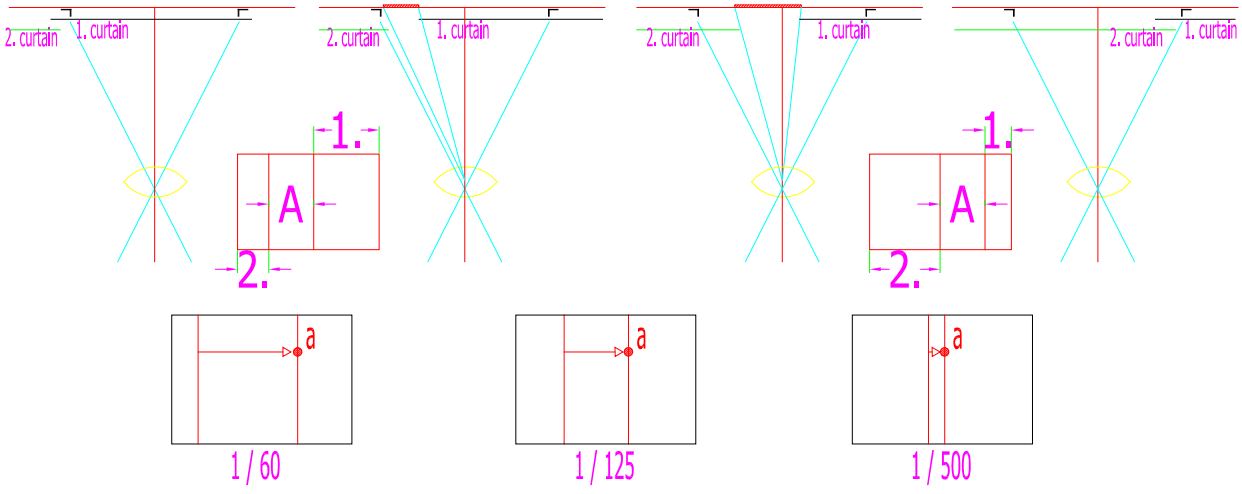
OPEN CLOSED

2



Electronic Flash

1 / 30
1 / 60 X
1 / 125



EMULSION / FILM / HIDDEN IMAGE

Bromide Paper — Silver Bromide, Silver Chloride → Film

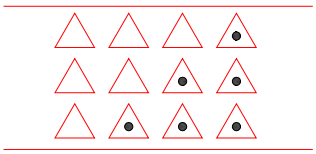
$Br \rightarrow Br + e^-$ (Bromide Ion (poz almamış) → Light Mass)

$Ag + e^- \rightarrow Ag$ (Silver Ion → Silver Atom (poz almış))

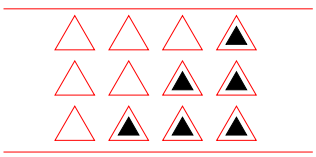
Silver salt crystal

Developement

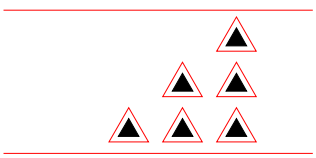
Metalic Silver



POZ

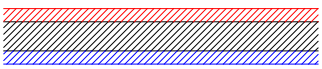


Development
(1. bath)



Fixation
(2. bath)

Negative Film



emulsion
carrier
anti halo

PHOTOSESIVITY = FILM SPEED

ASA = American Standart Association

DIN = Deutsche Indutrie Normen

ASA = ARITMETICAL STRING X2 100 X 2 = 200 ASA

DIN = LOGARITMICAL STRING +3 21 + 3 = 240 DIN

ISO = ASA / DIN 100 / 21

DIN	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
ASA	8	10	12	16	20	25	32	40	50	64	80	100	125	160	200	250	320	400	500

100 125 160 200 ASA

21 22 23 24 DIN

T 1/60 T 1/60

F / 8 F / 11

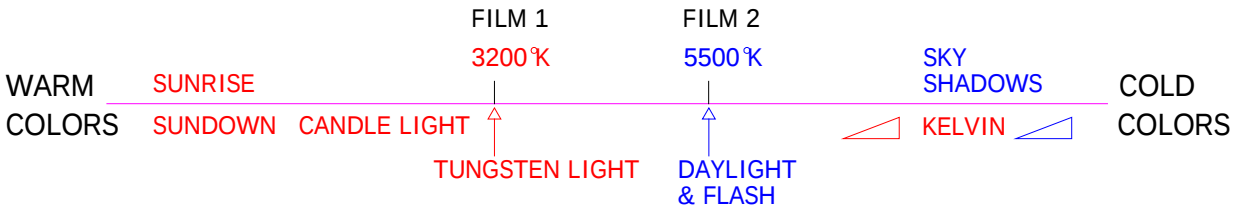
T 1/60 T 1/125

F / 8 F / 8

COLOR SENSIVITY

B / W
- ORTHOCHROMATIC : NON-SENSİBLE TO RED
- PANCHROMATIC : SENSİBLE TO ALL COLORS

COLOR
- TUNGSTEN (FILM 1)
- DAYLIGHT (FILM 2)



GRAIN

FINE GRAIN

ROUGH GRAIN

BUILD OF FILM
EXPOSURE
BATH TYPE
DEVELOPE TIME
EXPANTION RATIO

CONTRAST

BUILD OF FILM
SCENE CONTRAST
LIGHT CONTRAST
EXPOSURE : MIN. OR MAX.
BATH TYPE
DEVELOPE TIME

FILM KUTUSU

SIZE : 135 - 36 , 120 , APS

B / W
COLOR
- NEGATIVE
- POSITIVE (DIA SLIDE)

TUNGSTEN
DAYLIGHT

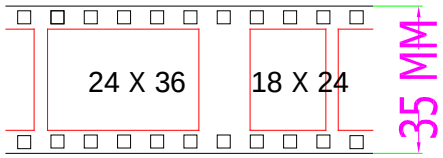
SENSIVITY ASA DIN ISO
DEVELOPEMENT TYPE
DATE : EXPIRATION TIME

FILM SPEED

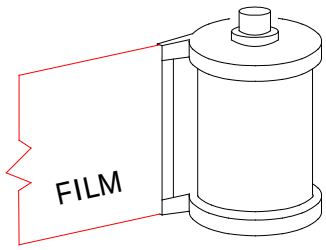
SLOW	15 - 18 DIN (25 - 5O ASA) Ilford PAN F (50 ASA) , Kodak PANATOMIC - X (40 ASA) , Agfapan 25 (ASA) , OR-WO NP 15 (25 ASA)
MID SPEED	20 - 22 DIN (80 - 125 ASA) Ilford FP 4 (125 ASA) , Kodak Plus - X (125 ASA) , Agfapan 100 (125 ASA) , OR-WO NP 20 (80 ASA)
SPEED	25 - 27 DIN (250 - 400 ASA) Ilford HP 5 (400 ASA) , Kodak Tri - X (400 ASA) , Agfapan 400 (400 ASA) , OR-WO NP 27 (400 ASA)
VERY SPEED	31 DIN (100O ASA) Kodak , Agfa , Ilford

NEGATIVE

SIZE
COLOR SENSIVITY
LIGHT SENSIVITY = DIN / ASA
GRAIN
CONTRAST

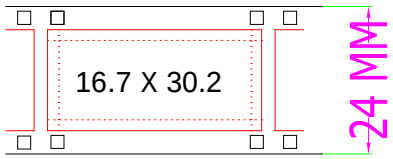


L = 160 CM 135 - 36
135 - 24
135 - 12



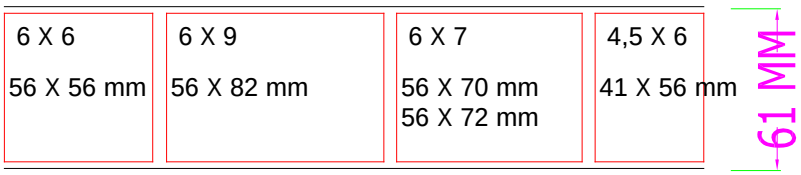
CARTRIDGE

135 SIZE

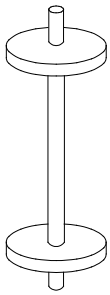


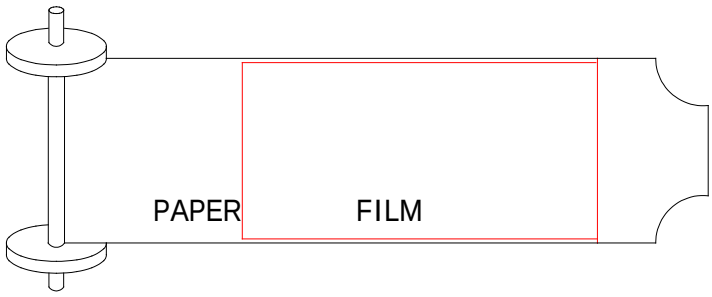
CLASSIC	10.7 X 23.4 MM
WIDE	16.7 X 30.2 MM
PANORAMIC	9.5 X 30.2 MM

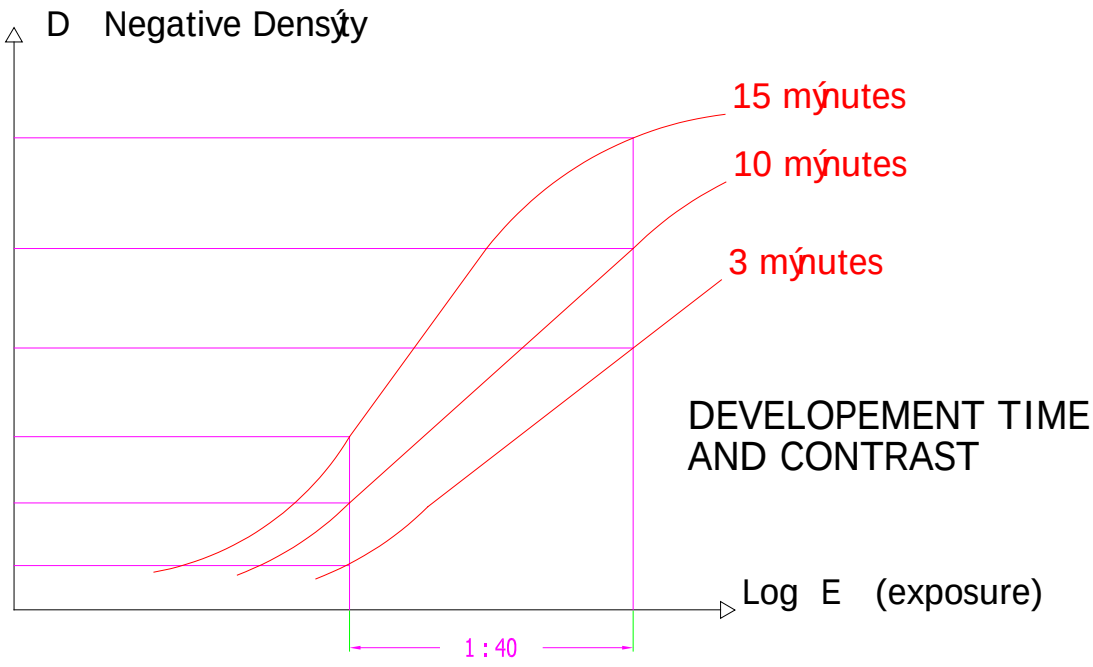
APS (ADVANCED PHOTO SYSTEM) SIZE



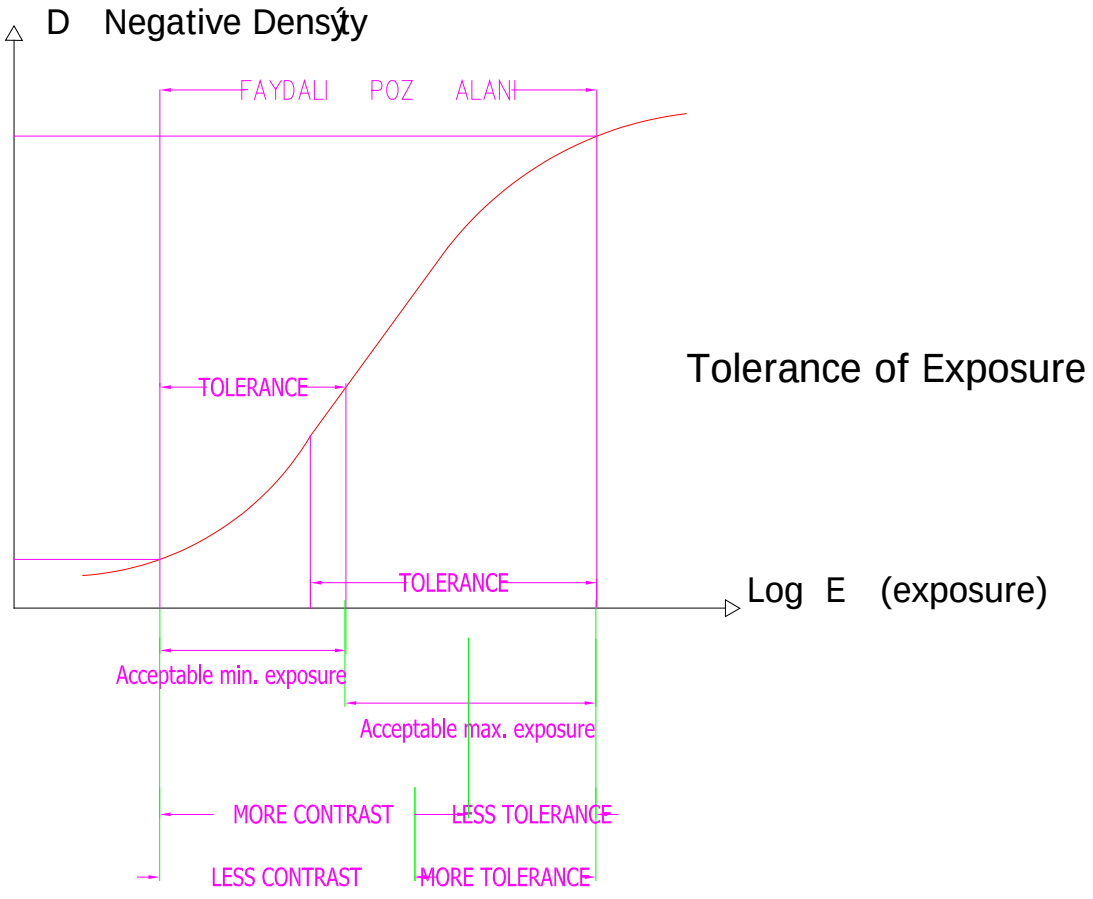
120 L = 80 CM
220 L = 160 CM



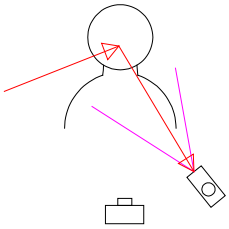




Luminescence difference of subject

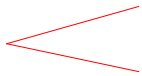


EXPOSURE / MEASUREMENT



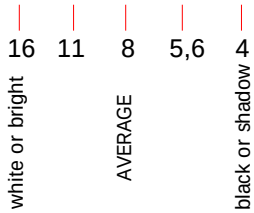
MEASURİNG REFLECTED LIGHT

a.) Measuring on Greycard or



Measuring on white paper
& exposing plus 2,5 stops

b.) Average measuring

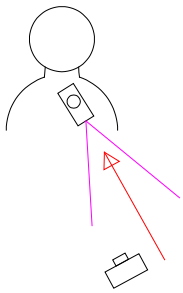


c.) Measurig at important spots

1. On bright area for diapositive
2. On shadowed area for black - white and color film

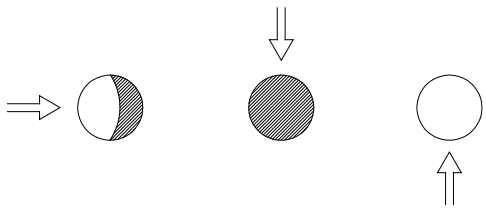
d.) Zone System

e.) f /16 rule > f / 16 t = ASA

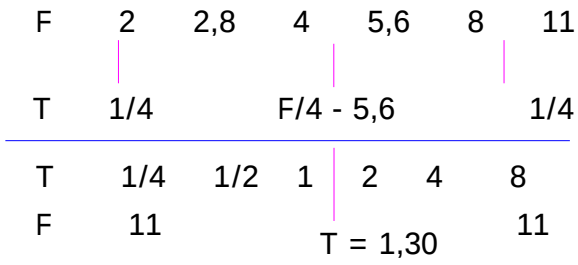


MEASURİNG DIRECT LIGHT (Incident)

Building shadow and light on curved surface

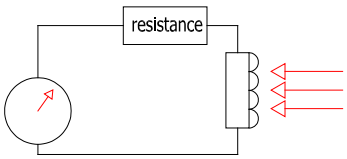


	Lighted Area	Shadowed Area	
T	1/4	1/4	8
F	11	2	11

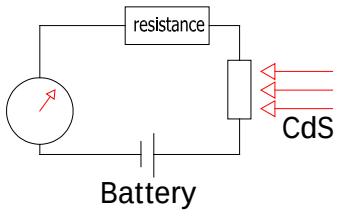


EXPOSURE METER

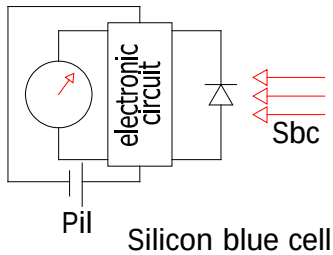
1. Selenium
2. Cadmium Sulphide (CdS)
3. Silicon (Sbc)



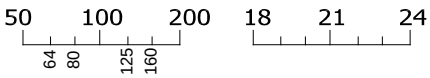
Selenyumlu



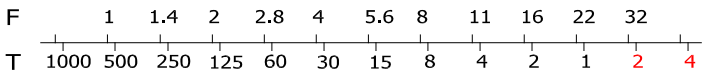
CdS



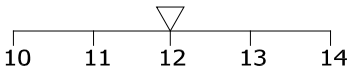
Silicon blue cell

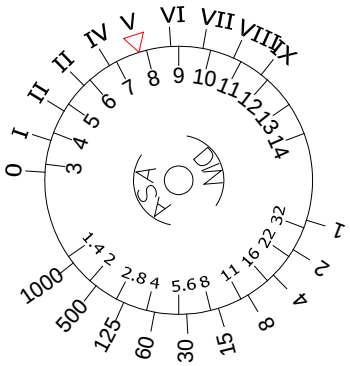


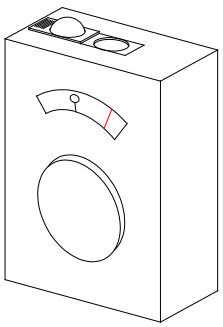
ASA DIN

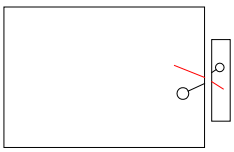


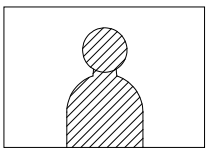
EV - LV

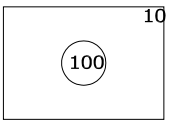


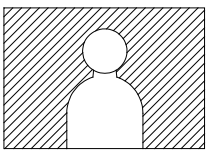


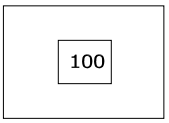












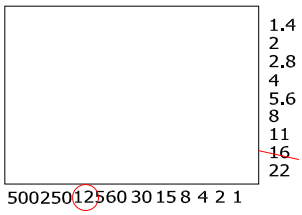
FILTER COEFFICIENT

X 2 double exposure = 1 stop
- 2 2 stops more exposure = quadruple

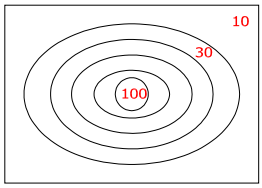
X 1.5 = - 2/3 stops
X 2 = - 1 stops
X 2.5 = - 1 1/3 stops
X 3 = - 1 1/2 stops
X 4 = - 2 stops
X 5 = - 2 1/3 stops

$$\frac{\text{ASA}}{\text{X 2.5}} = \text{ADJUSTED ASA}$$

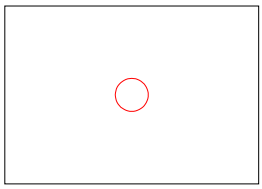
CAMERA EXPOSURE METERS



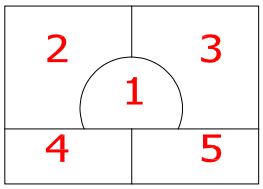
OVERALL



CENTER WEIGHTED



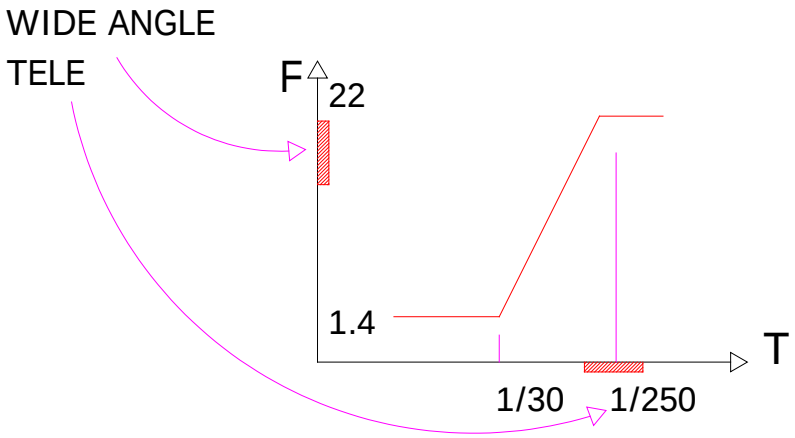
SPOT



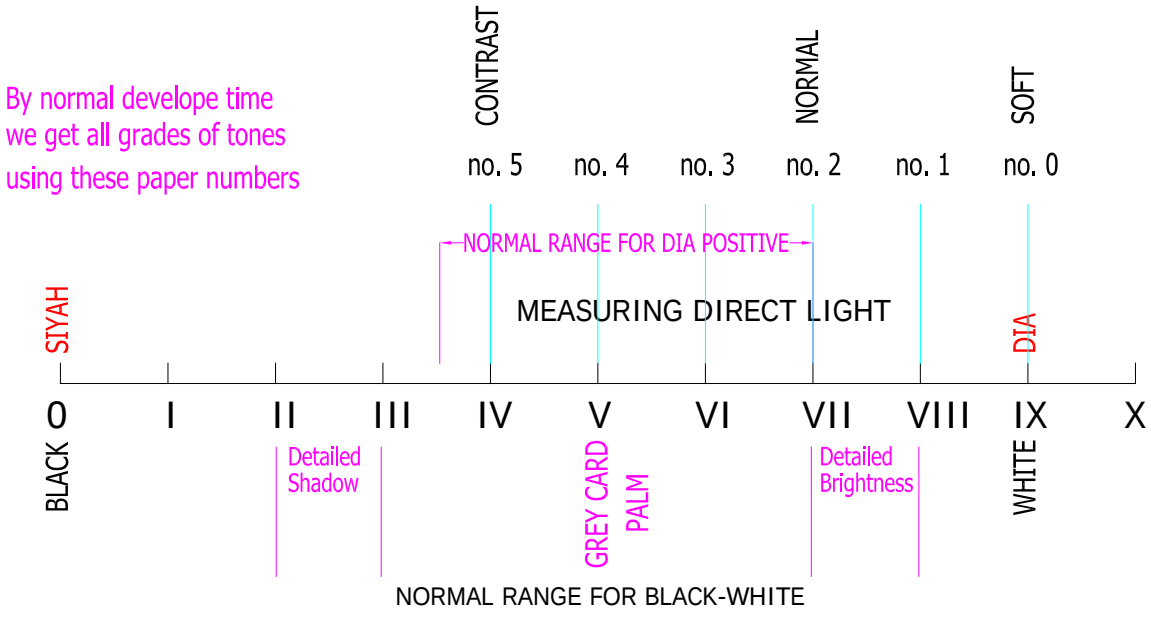
MATRIKS (Evaluative)

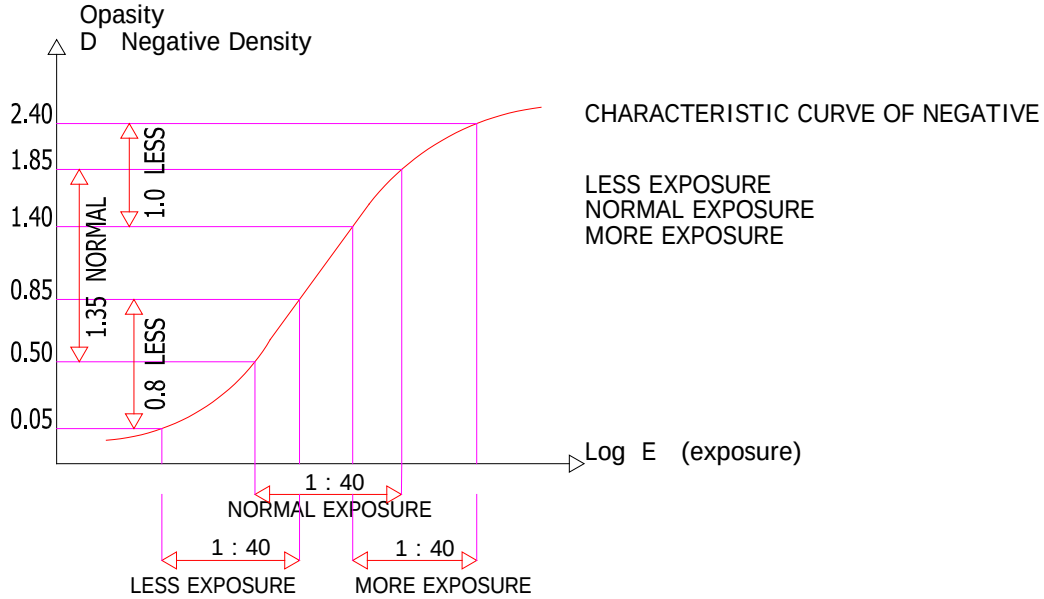
OTOMASION

APERTURE PRIORITY	F	selectable	T	by camera
SHUTTER PRIORITY	T	selectable	F	by camera
PROGRAMMED	F	and T		by camera



KONU PARLAKLIĞINA GÖRE POZ VERME SİSTEMİ = ZONE SYSTEM

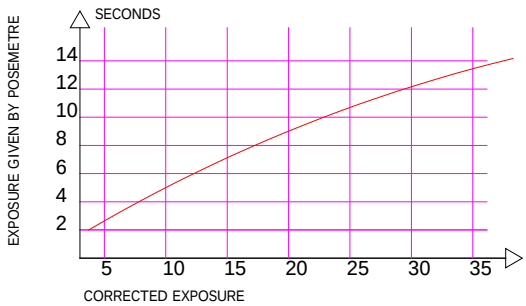




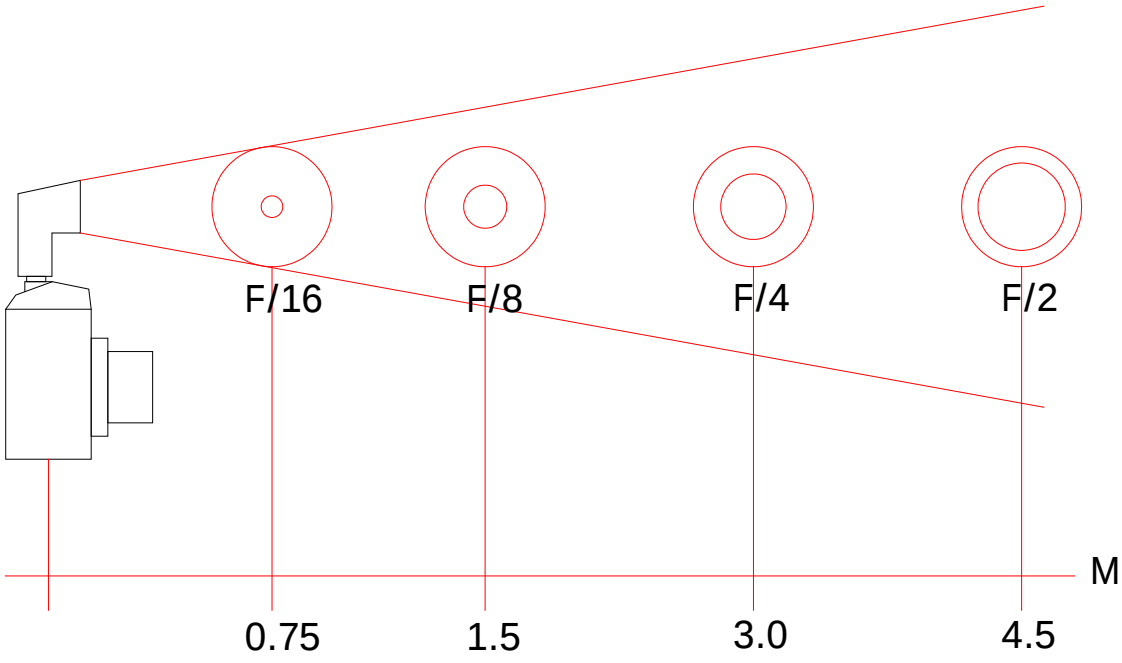
CHARACTERISTIC CURVE OF NEGATIVE

LESS EXPOSURE
NORMAL EXPOSURE
MORE EXPOSURE

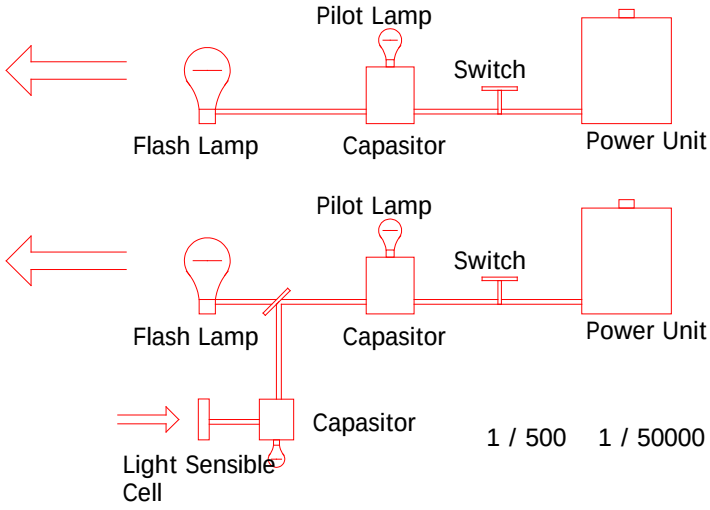
LONG EXPOSURE PROBLEM
(FOR BLACK-WHITE)

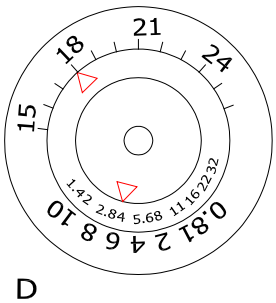


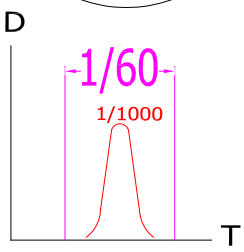
FLASH



DIAPHRAGM TYPE SHUTTERS B - 1 / 30 1 / 60 1 / 125 Max
CURTAIN TYPE SHUTTERS B - 1 / 500





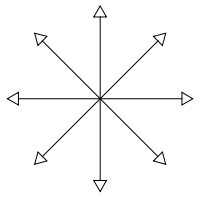


FLOURESANT LAMBA

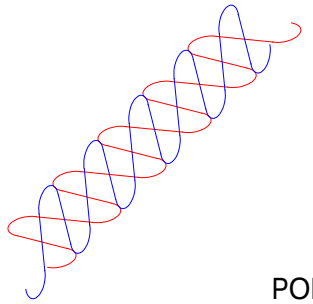
X2 = 1 stop
+1 = 1 stop

COLOR ADJUSTMENT FILTERS FOR DAYLIGHT FLUORESCENT	Ekta. 200 Koda. 25	Ekta. 400 Ekta. 64 Koda. 64	Ekta. 50 Tungsten Ekta. 160 Tungsten
	40 M + 40 Y + 1 stop	50 M + 50 Y + 1 1/3 stop	85 B + 40 M + 40 Y + 1 2/3 stop

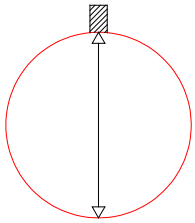
POLARIZATION FILTER



NONE POLARIZED LÝGHTBEAM

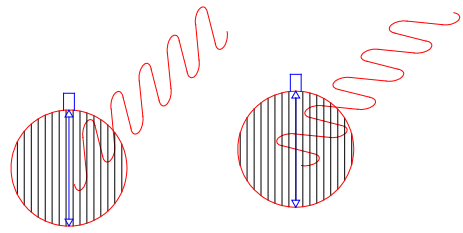


POLARIZED LÝGHTBEAM

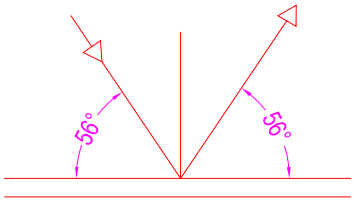


POLARIZATION FILTER
LETS TO PASS LIGHTBEAM
ON ONE DIRECTION

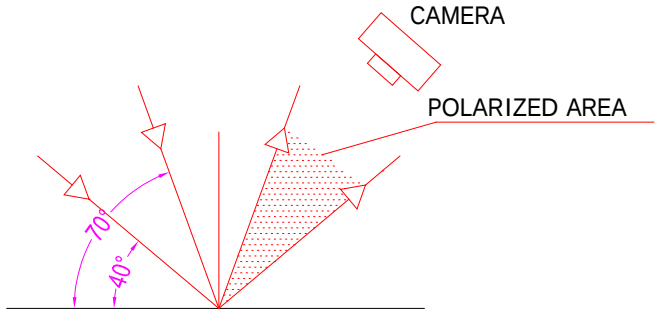
FILTRE COEFFICIENT
- 1.5 -2



PASS DO NOT PASS

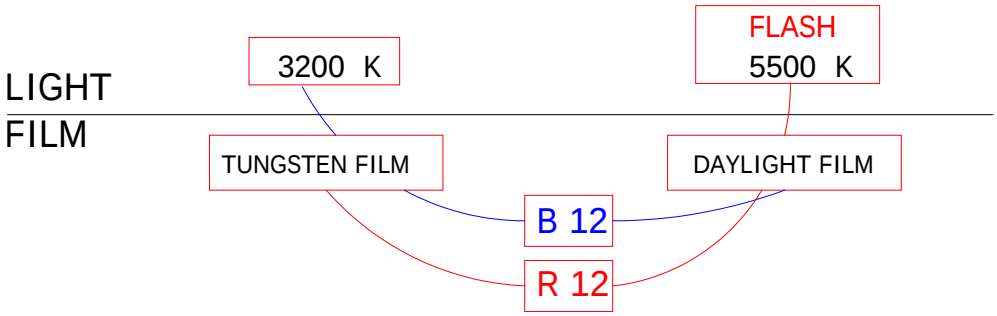


DIFFERENT SURFACES HAVE
DIFFERENT POLARIZING ANGLES

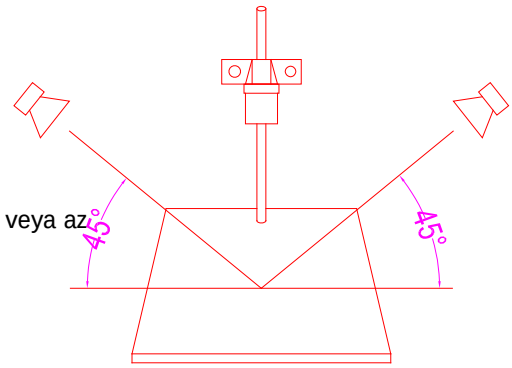


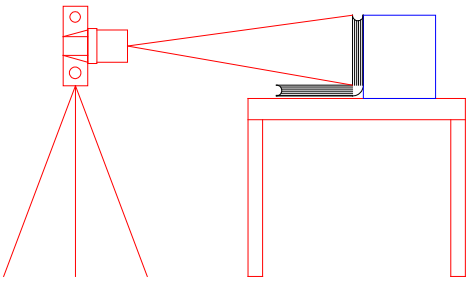
COLOR ADJUSTEMENT FILTERS (COLOR FILM)
POLARIZE LGHTBEAM PARTIALLY

COLOR ADJUSTEMENT FILTERS (COLOR FILM)



COPYING FOR BOOKS





PHOTOFLOOD LAMP 500 Watt MIRROR REFLECTOR LAMP
150 Watt

Tungsten

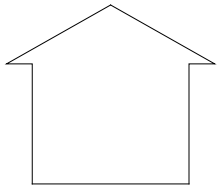
Tungsten dia film

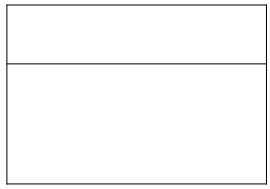
NORMAL LENS + Close- up Lense

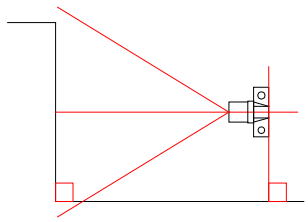
50 mm +	+ 1	100 - 50 cm	Object size		
	+ 2	50 - 33	27 X 40	-	17 X 26 cm
	+ 3	33 - 25	18 X 27	-	13 X 19 cm
	+ 4	25 - 20			
	+ 5	20 - 17			

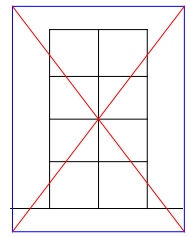
PHOTOGRAPHING BUILDINGS

Technical Drawing Rules : Viewpoint at infinite , Facades

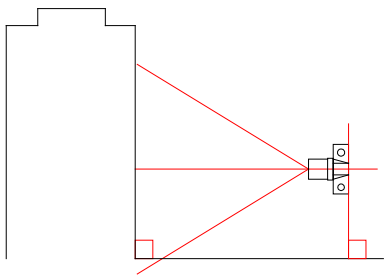


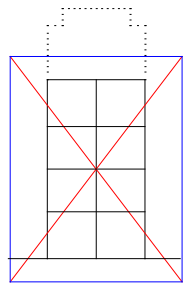




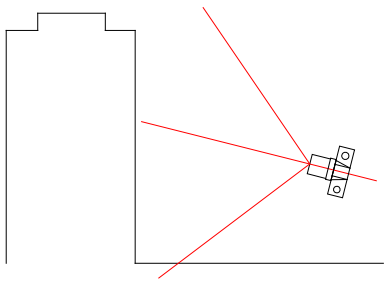


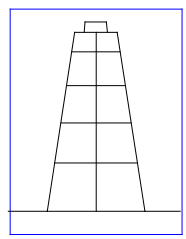
Lens plane and facade plane are parallel



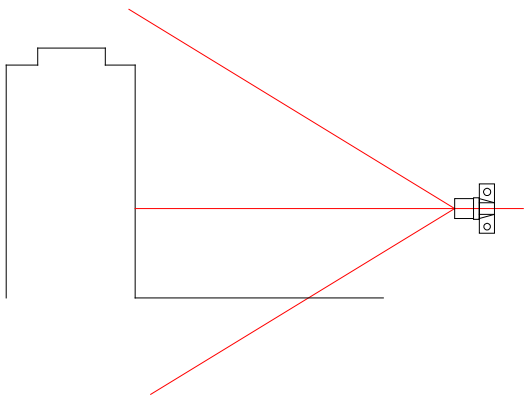


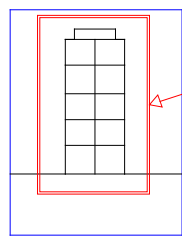
High Building : Camera on low level (Academic Perspective)





High Building: Camera is leaned on one direction



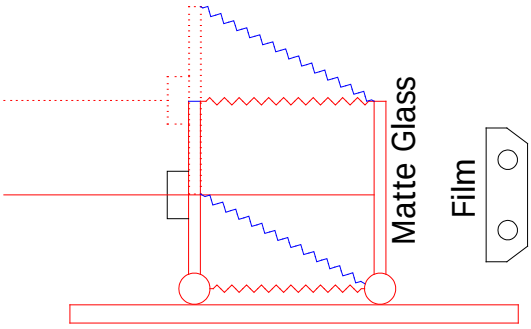


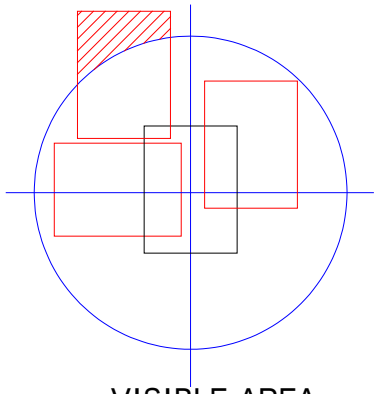
Cropping Negative
or using Tele Objective

High Building: Camera in long distance (Academic Perspective)

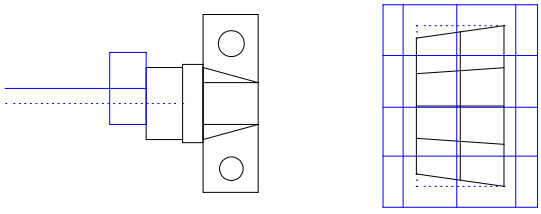
High Building: Wide Angle Lens

SPECIAL CAMERAS AND LENSES



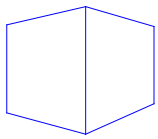


VISIBLE AREA

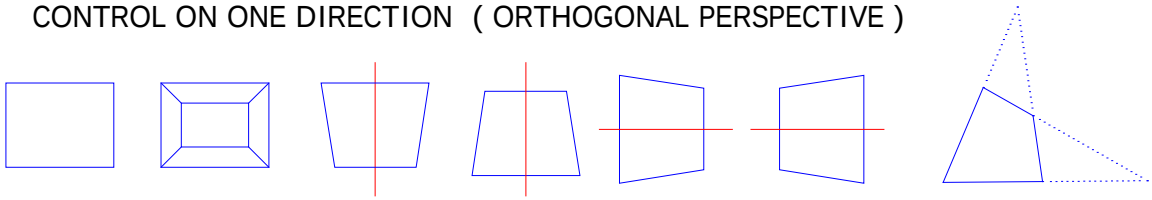


Perspective Control Lenses
34 - 28 - 24 mm
(PC LENS / SHIFT LENSE)

CONTROL ON ONE DIRECTION (ACADEMIC PERSPECTIVE)



CONTROL ON ONE DIRECTION (ORTHOGONAL PERSPECTIVE)



3D CONTROL

a - Viewpoint Distance b - View Angle