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USER'S MANUAL
MANUEL UTILISATEUR

angēnieux **OPTIMO 24-290**

Reference : 304 880 C
Edition : juillet 2008

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1 DESCRIPTION GENERALE ET CONSEILS POUR LA MAINTENANCE

1.1 GENERAL DESCRIPTION
1.1 DESCRIPTION GENERALE

Angénieux OPTIMO 24 -290 35 mm Film Lens

Zoom ratio:	**12x**		
Focal length:	**24-290mm**		
Aperture:	**T2.8 - f/2.5**		
MOD:	**1.22 m - 4'**		
Weight (approx.):	**11kg - 24 lbs**		
Front Diameter:	**162 mm**		
Focal length		**24mm**	**290mm**
Horizontal angular field of view		**49.2°**	**4.2°**
Object dimentions at MOD(mm)		**799x571**	**67x49**

Objectif Film 35 mm Angénieux OPTIMO 24 -290

Zoom ratio:	***12x***		
Focale:	***24-290mm***		
Ouverture:	***T2.8 - f/2.5***		
Distance minimun:	***1.22 m - 4'***		
Poids (approx.):	***11kg - 24 lbs***		
Diamètre avant:	***162 mm***		
Focale		***24mm***	***290mm***
Angle de champs		***49.2°***	***4.2°***
Dimentions objet à la distance minimum (mm)		***799x571***	***67x49***

1.2 MAINTENANCE RECOMMENDATIONS
1.2 CONSEILS POUR LA MAINTENANCE

The complete maintenance of such a lens should only be performed by highly qualified people or factory trained technicians.
If you are uncertain of your capabilities to do the repair, feel free to send the lens to our THALES ANGENIEUX After Sales Service. Our qualified technicians will ensure proper handling of all maintenance and repair related items.
In addition,THALES ANGENIEUX can offer preventive maintenance operations, to keep your lens, always in perfect conditions
Feel free to contact us for :
France and International customer support at : marc.thelisson@fr.thalesgroup.com
Americas customer support at :jbouchut@tccus.com

La maintenance complète de ce type d'objectif ne peut être effectuée que par des personnes hautement qualifiées et formées par THALES ANGENIEUX.
Si vous avez un doute sur votre capacité à effectuer cette réparation, n'hésitez pas à confier le produit au Service Après-Ventes de THALES ANGENIEUX. Vous aurez ainsi la garantie d'avoir un produit parfaitement réparé.
En outre, THALES ANGENIEUX peut vous proposer des actions de maintenance préventive afin de maintenir votre produit toujours à son meilleur niveau
Veuillez nous contacter à : : marc.thelisson@fr.thalesgroup.com

2 MAINTENANCE ITEMS
2 ARTICLES POUR LA MAINTENANCE

Description	Spanner *Référence de la clé*	Retaining ring # *Référence de l'écrou*
Neutral mount retaining ring spanner ***Clé pour écrou monture neutre***	214 310	212 690

- Cleaning fluid 283 562
  Liquide de nettoyage optique

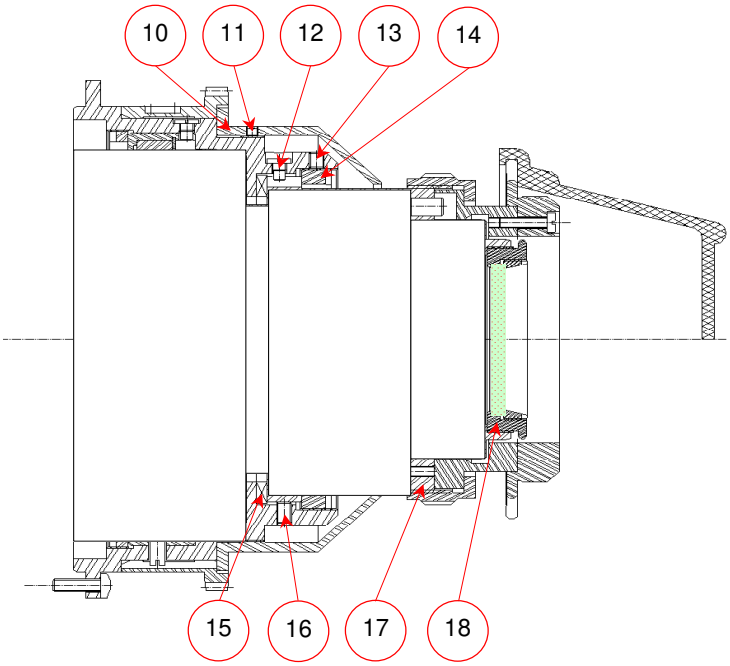
- Locking varnish (Epikot) 287 154
  Vernis de blocage (Epikot)

- Locking varnish 286 642
  Vernis de blocage

3 EXTERNAL VIEW
3 VUE EXTERIEURE

Indication *Indice*	P/N *P/N*	Designation *Désignation*	Quantity *Quantité*
1	212 858	**Front cap** ***Bouchon avant***	1
2	212 925	**Lens bracket** ***Support d'objectif***	1
3	986 297	**Screws for bracket** ***Vis du support d'objectif***	2
4	212 748	**Focus rubber ring** ***Bague crantée de MAP***	1
5	212 926	**Focus lever** ***Levier de MAP***	2
6	212 926	**Zoom lever** ***Levier focale***	1
7	212 751	**Zoom rubber ring** ***Bague crantée focale***	1
8	188 975	**PL mount subassembly** ***Sous-ensemble monture PL***	1
9	188 245	**PL mount cap** ***Bouchon de la monture PL***	1

4 REAR GROUP VIEW (FOR BACK FOCUS AN TRACKING ADJUSTMENT)
4 VUE DU GROUPE ARRIERE (POUR LE REGLAGE DU TIRAGE ET DU TRACKING)



Indication *Indice*	P/N *P/N*	Designation *Désignation*	Quantity *Quantité*
10	212 754	**Rear ring** ***Cache arrière***	3
11	992 417	**Rear core fixation screws** ***Vis du cache arrière***	3
12	992 597	**Scews** ***Vis***	2
13	986 667	**Stop screw for the flange locking ring** ***Vis d'arrêt de l'écrou de tirage***	3
14	212 690	**Neutral mount retaining ring** ***Ecrou monture neutre***	1
15	212 678	**Flange shim** ***Rondelle de tirage***	1
16	987 367	**Tracking adjustment screws** ***Vis de réglage du tracking***	8
17	212 692	**Neutral mount** ***Monture neutre***	1
18	214 220	**Neutral filter subssembly** ***Sous-ensemble filtre AR neutre***	1

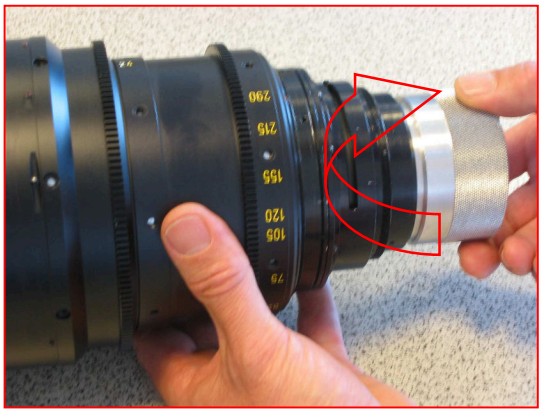
4.1 FLANGE/BACK-FOCUS ADJUSTMENT

To adjust the flange, change the thickness of the flange shim (15)

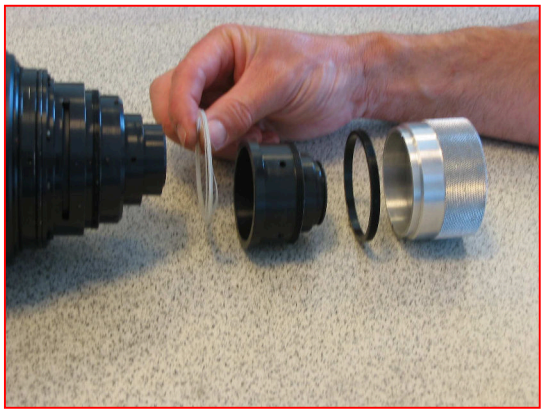
- Mount a PL checker on the lens
- Mount the lens on a projector at around 6' from the screen
- Optimize the focus at long focal length, then, zoom to short focal length
    - If the plan of the best focus is between the screen and the lens, it is necessary to decrease the thickness of the flange shim
    - If the plan of the best focus is behind the screen, it is necessary to increase the thickness of the flange shim.

- To replace the flange shim, remove the PL mount (8)
- Unscrew the 3 screws (11) and remove the rear ring (10)
- Unscrew the 3 screws (13), then remove the retaining ring (14) with the spanner 214 310
- Unscrew the tracking screws (16)
- Remove the neutral mount subassembly (17)
- Unlock the screw (12)
- Remove the flange shim (15)
- Modify the thickness of the flange shim (15)
- Reinstall the flange shim (15)
- Tighten the screw(12)
- Mount the neutral mount (17)
- Lock the neutral mount retaining ring with the spanner 214 310 at 4Nm
- Mount the PL mount (8)
- If the flange is correct, adjust the tracking (§ 4.2)

Picture 4



Picture 5



4.1 REGLAGE DU TIRAGE

Le réglage s'effectue par modification de l'épaisseur de la cale de tirage (15):

- *Monter un vérificateur PL sur l'objectif,*
- *Monter le zoom sur une lanterne de projection,*
- *Se positionner à une distance de 1,80m (entre l'écran et plan de l'image),*
- *Faire la meilleure MAP à la longue focale,*
- *Puis se mettre à la courte focale :*
  - *Si le plan de la bonne MAP est entre l'écran et le zoom, il faut diminuer l'épaisseur de la rondelle de tirage.*
  - *Si le plan de la bonne MAP est derrière l'écran il faut augmenter l'épaisseur de la rondelle de tirage.*
- *Pour changer la rondelle de tirage, enlever la monture PL (8,)*
- *Dévisser les 3 vis (11) et enlever le cache arrière (10)*
- *Dévisser les 3 vis (13), puis enlever l'écrou (14) avec la clé 214 310,*
- *Desserrer les vis de tracking (16),*
- *Sortir le sous-ensemble monture neutre (17),*
- *Débloquer la vis (12)*
- *Sortir la rondelle de tirage(15),*
- *Modifier l'épaisseur de la cale pelable de tirage 15,*
- *Remonter la rondelle de tirage(15),*
- *Bloquer la vis (12)*
- *Monter la monture neutre (17)*
- *Serrer l'écrou (131) avec la clé 214 310 au couple 40 cmkg*
- *Monter la monture PL (8)*
- *Si le tirage est correct passer au réglage du tracking (§ 4.2)*

Photo 4

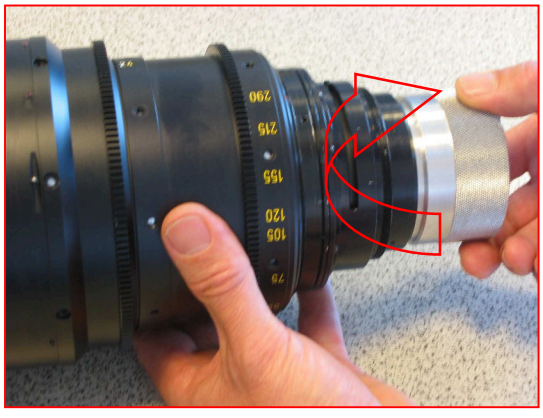
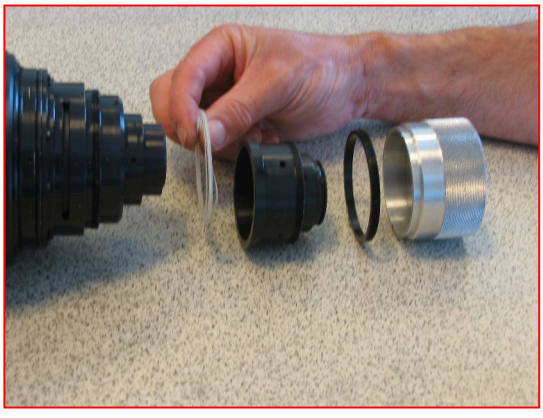


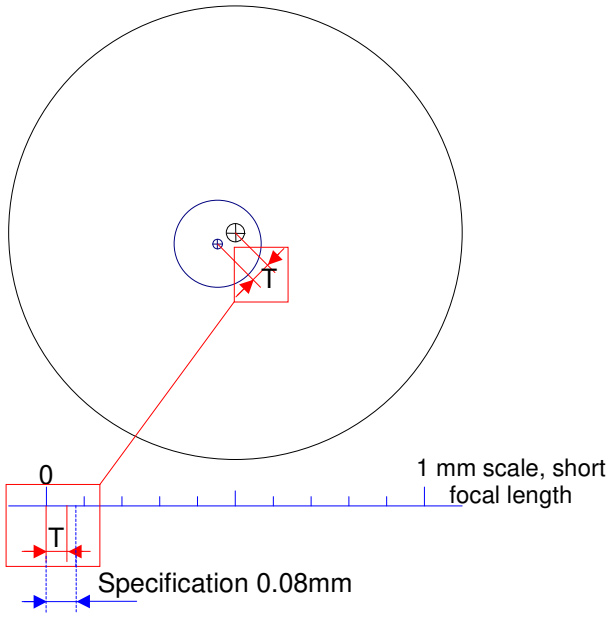
Photo 5

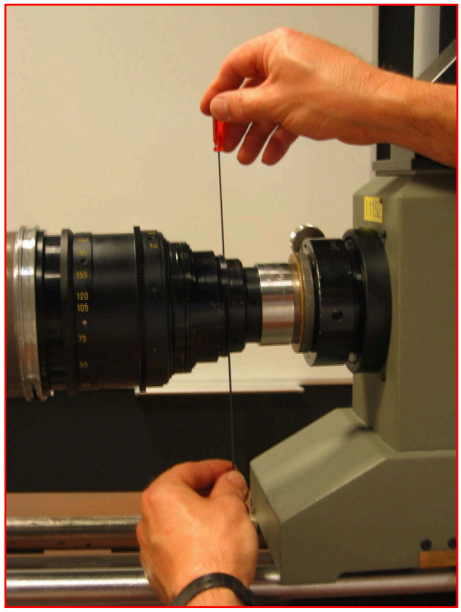


4.2 TRACKING ADJUSTMENT

- Remove the PL mount (8)
- Unscrew the 3 screws (11) and remove the rear ring (10)
- Remount the PL mount (8)
- Mount a PL checker
- Mount the lens on a projector at around 6' from the screen
- Measure the tracking T between long focal length and short focal length
- Adjust the tracking T at short focal length with the screws (16)
- Reinstall the rear ring (10)

Picture 6





4.2 REGLAGE DU TRACKING

- *Enlever la monture PL (8)*
- *Desserrer les 3 vis (11) et enlever le cache arrière (10)*
- *Remettre la monture PL (8)*
- *Monter un vérificateur PL*
- *Se positionner à une distance d'environ 2 m en longue focale,*
- *Mesurer le tracking T entre la longue focale et la courte focale*
- *Régler le tracking T à l'aide des vis réf (16)*
- *Remonter le cache arrière (10).*

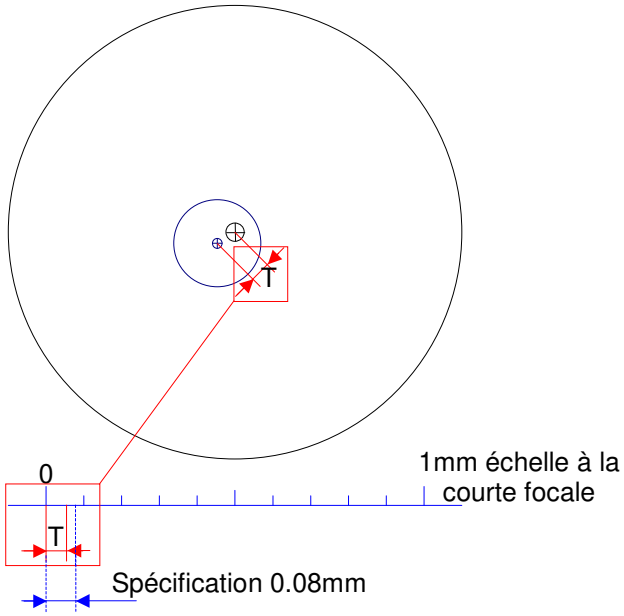
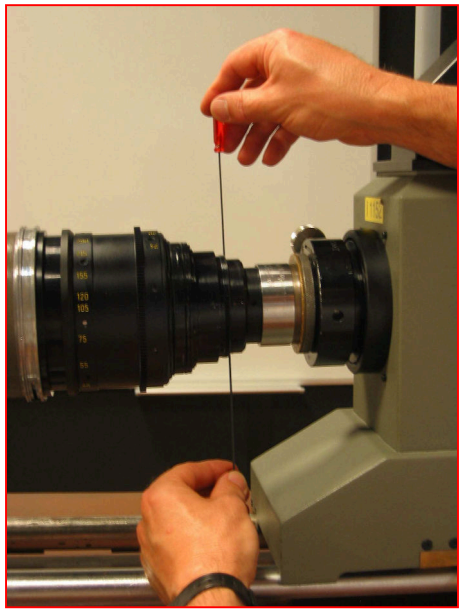


Photo 6



4.3 REPLACEMENT OF THE FOCUS ENGRAVED RING (FEET INTO METERS)

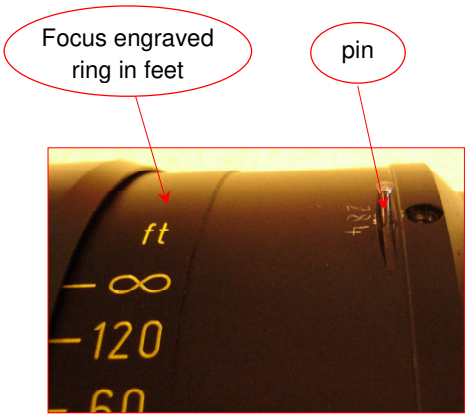
- Remove the Focus rubber ring (4)
- Remove the pin for positioning the focus control ring Picture 7
- Put acetone on the head of the focus ring fixations screws
- Remove the 6 screws Picture 8
- Put acetone inside the holes, after having removed the fixations screws (to dissolve the glue)

- **BE CAREFULL** : to remove the focus engraved ring in feet picture 9, it is necessary to rotate it until reaching the appropriate position to pass over the focus end-stop.

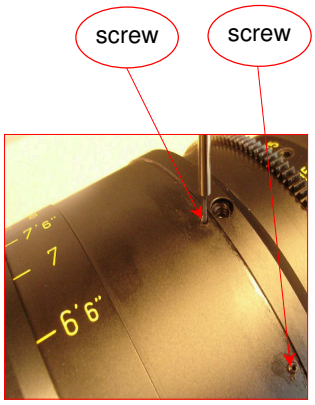
- Clean the V groove with acetone to dissolve the glue

- **BE CAREFULL**: to Install the focus engraved ring in meters Pictures 10-11, it is necessary to rotate it to find the appropriate position to pass over the focus end-stop

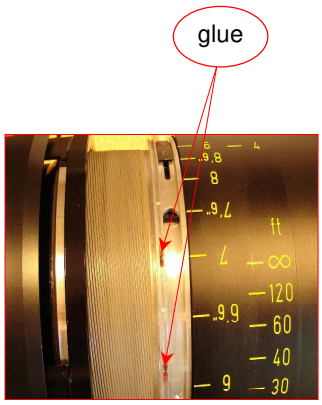
- Put locking varnish 286642 in the hole of the 6 screws Picture 11
- Install the pin for positioning the focus control ring Picture 12
- Mount the 6 screws and tighten them to the contact to prevent to have a too much stiff focus torque
- Re mount the focus rubber ring (4)



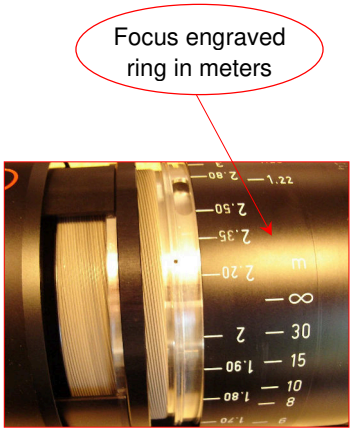
Picture 7



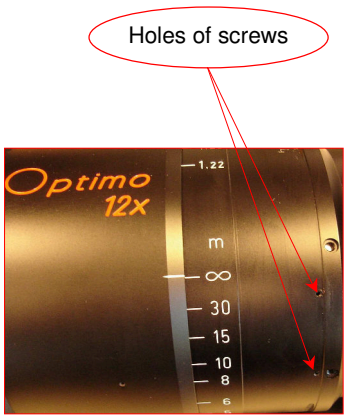
Picture 8



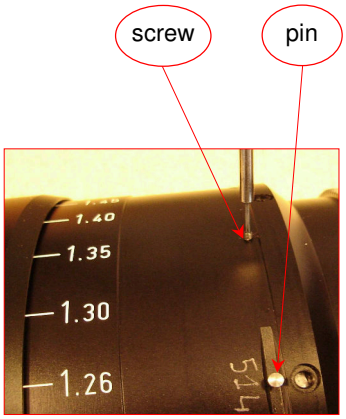
Picture 9



Picture 10



Picture 11



Picture 12

4.3 CHANGEMENT DE LA BAGUE GRAVEE MAP (PIEDS EN METRES)

- *Enlever la bague crantée de MAP (4)*
- *Enlever la goupille d'orientation de la bague de commande MAP photo 7*
- *Mettre de l'acétone sur les têtes des vis de fixation de la bague de commande MAP*
- *Enlever les 6 vis photo 8*
- *Mettre de l'acétone dans les trous après avoir enlevé les vis (pour dissoudre la colle)*

- ***ATTENTION :** pour sortir la bague gravée MAP en pieds photo 9, il faut rechercher le passage de la butée MAP en faisant tourner la bague sur elle même, puis la retirer*

- *Nettoyer la gorge en V à l'acétone pour dissoudre la colle*

- ***ATTENTION :** pour monter la bague gravée MAP en mètre photos 10 –11, faire tourner la bague pour trouver le passage de la butée MAP*

- *Mettre du vernis de blocage 286642 dans les 6 trous des vis photo 11*
- *Monter la goupille d'orientation de la bague de commande MAP photo 12*
- *Monter les 6 vis , les mettre seulement au contact pour éviter de détériorer le couple MAP photo 12*
- *Monter le bague crantée de MAP (4)*

Photo 7

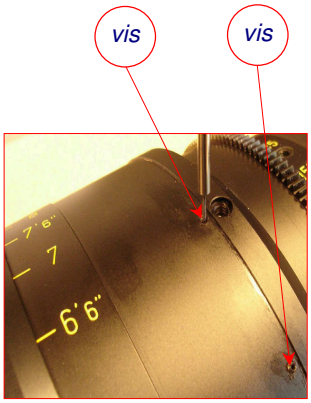


Photo 8

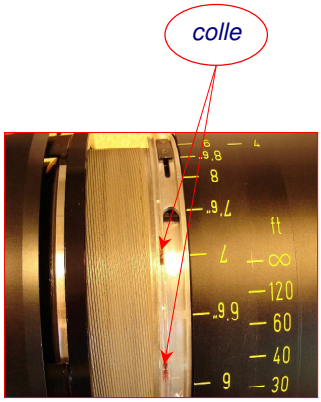


Photo 9

Photo 10

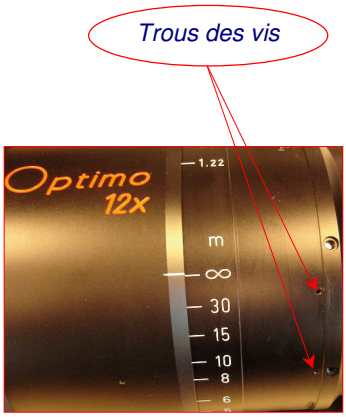


Photo 11

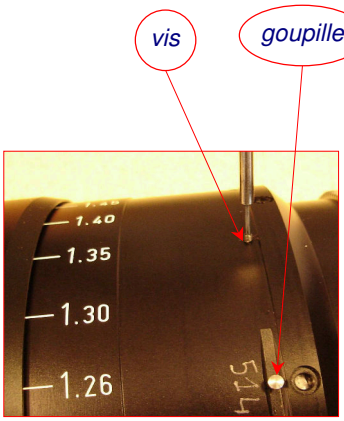
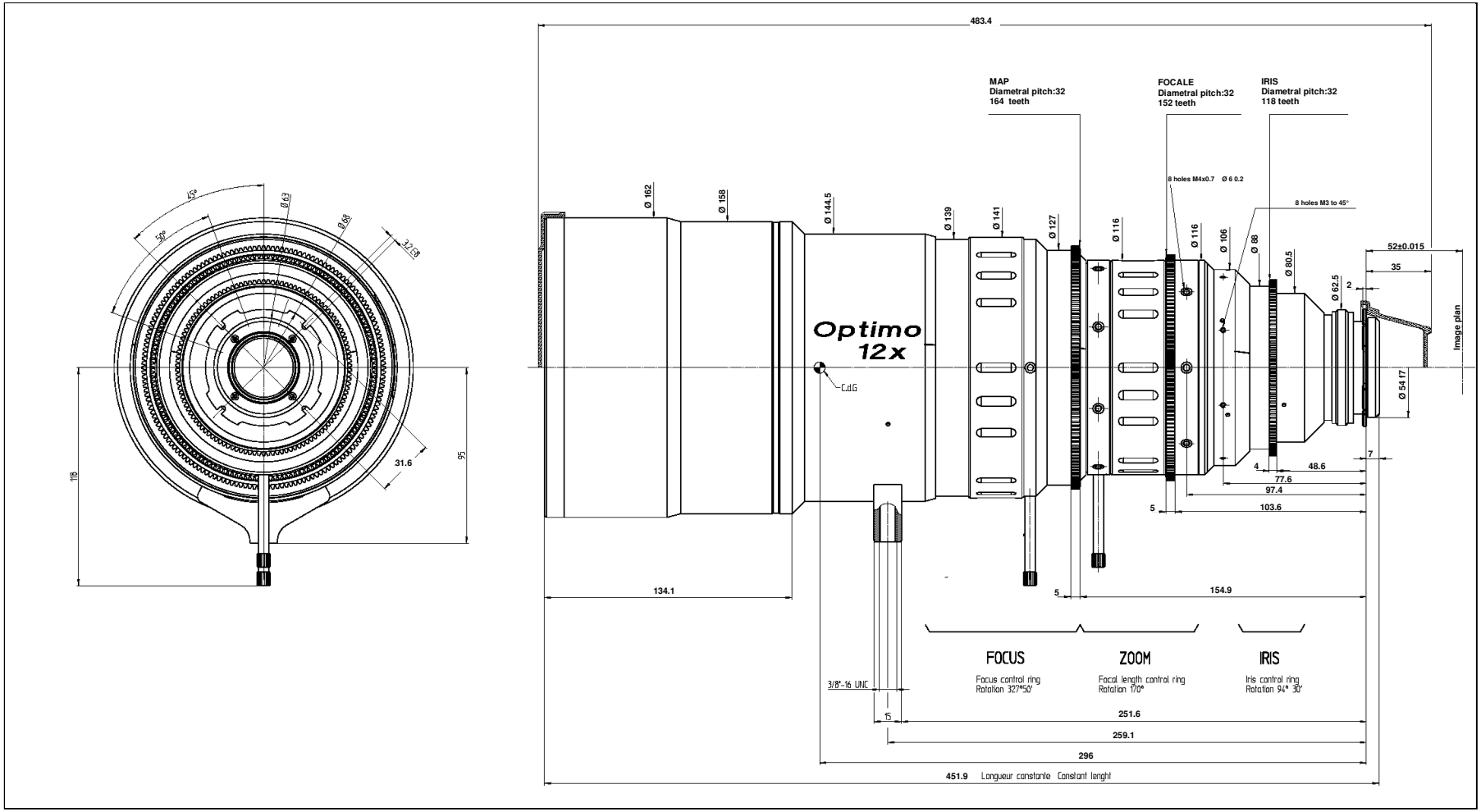


Photo 12

5 OUTLINE DRAWING
5 PLAN D'ENCOMBREMENT



6 DEPTH-OF-FIELD TABLES
6 TABLES DE PROFONDEUR DE CHAMP

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F = 24 - 290 mm

When you set the focusing-scale to a given distance, the lens is not in focus only on that distance, a zone of sharpness extends in front of and behind that distance. The width of that zone of sharpness is not constant : it increases at short focal length and small aperture, and decreases at long focal length and wide aperture.

In practice there is no need to systematically refer to the depth-of-field tables ; you will only use them for a special shot to determine the amount of movement you can permit your object to undergo. This information is most useful at short distances, long focal length, or wide aperture

La mise au point que vous effectuez ne concerne pas la seule distance que vous placez face au repère, mais elle s'étend de part et d'autre du plan principal de netteté. La profondeur de la zone de netteté n'est pas constante : elle augmente pour les courtes distances focales et les petites ouvertures de diaphragme et diminue avec l'accroissement de la focale et l'ouverture du diaphragme

Dans le pratique courante, il n'est pas indispensable de se reporter aux tables de profondeur de champ. Vous ne les consulterez que pour connaître, dans des cas précis, les limites à imposer aux déplacements du sujet. Ces renseignements présentent surtout de l'intérêt aux distances rapprochées et lorsque vous filmez à grande ouverture ou avec une longue focale

angēnieux **ZOOM OPTIMO 24 - 290**

1 - Aperture
2 - Hyperfocal distance
3 - Object distance far/near
4 - Confusion circle : 0.025 mm

Distances in feet

F = 24 mm

1	Aperture	T : 2.80	T : 4.03	T : 5.59	T : 8.05	T : 10.96	T : 16	T : 22.04
2	Hyperfocal distance	33'81''	24'07''	17'73''	12'71''	9'67''	7'01''	5'42''
3	Object distance	Far Near	Far Near	Far Near	Far Near	Far Near	Far Near	Far Near
	50 feet	∞ 20.71	∞ 16.74	∞ 13.52	∞ 10.49	∞ 8.4	∞ 6.38	∞ 5.08
	30 feet	259.92 16.46	∞ 13.91	∞ 11.67	∞ 9.39	∞ 7.72	∞ 6.02	∞ 4.87
	20 feet	46.15 13.09	111.75 11.48	∞ 9.96	∞ 8.31	∞ 7.01	∞ 5.61	∞ 4.63
	16 feet	28.56 11.35	44.08 10.15	159.42 8.97	∞ 7.64	∞ 6.55	∞ 5.35	∞ 4.46
	13 feet	19.84 9.84	25.96 8.95	44.06 8.05	∞ 6.99	∞ 6.1	∞ 5.06	∞ 4.29
	11 feet	15.31 8.71	18.57 8.03	25.91 7.32	75.36 6.46	∞ 5.71	∞ 4.82	∞ 4.12
	9 feet	11.52 7.47	13.17 6.99	16.27 6.47	26.66 5.81	140.82 5.23	∞ 4.5	∞ 3.91
	7 feet	8.3 6.11	9.05 5.8	10.28 5.47	13.27 5.02	21 4.61	∞ 4.07	∞ 3.61
	5 feet	5.53 4.59	5.8 4.44	6.2 4.27	7 4.03	8.37 3.79	13.35 3.47	75.85 3.17
	4 feet	4.28 3.77	4.42 3.68	4.61 3.58	4.97 3.43	5.52 3.28	6.97 3.06	10.88 2.85

F = 30 mm

1	Aperture	T : 2.80	T : 4.03	T : 5.59	T : 8.05	T : 10.96	T : 16	T : 22.04
2	Hyperfocal distance	48'12''	34'08''	24'96''	17'72''	13'34''	9'52''	7'23''
3	Object distance	Far Near	Far Near	Far Near	Far Near	Far Near	Far Near	Far Near
	50 feet	∞ 25.08	∞ 20.81	∞ 17.15	∞ 13.52	∞ 10.9	∞ 8.29	∞ 6.55
	30 feet	76.28 19.01	239.14 16.52	∞ 14.18	∞ 11.67	∞ 9.71	∞ 7.63	∞ 6.17
	20 feet	32.72 14.59	45.48 13.13	93.37 11.66	∞ 9.96	∞ 8.54	∞ 6.94	∞ 5.74
	16 feet	22.91 12.42	28.3 11.37	40.99 10.28	152.6 8.97	∞ 7.83	∞ 6.49	∞ 5.46
	13 feet	17.03 10.6	19.72 9.86	24.9 9.05	43.54 8.05	606.66 7.15	∞ 6.04	∞ 5.16
	11 feet	13.64 9.29	15.24 8.72	18.04 8.11	25.74 7.32	54.62 6.59	∞ 5.66	∞ 4.9
	9 feet	10.59 7.87	11.48 7.48	12.91 7.04	16.2 6.47	23.65 5.92	161.19 5.19	∞ 4.57
	7 feet	7.84 6.35	8.28 6.11	8.93 5.84	10.25 5.47	12.54 5.09	21.37 4.58	302.81 4.12
	5 feet	5.35 4.7	5.52 4.59	5.76 4.46	6.19 4.27	6.83 4.07	8.42 3.78	12.13 3.5
	4 feet	4.19 3.83	4.28 3.77	4.4 3.69	4.61 3.58	4.9 3.45	5.54 3.27	6.67 3.08

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1 - Aperture
2 - Hyperfocal distance
3 - Object distance far/near
4 - Confusion circle : 0.025 mm

Distances in feet

F = 40 mm

1	Aperture	T : 2.80	T : 4.03	T : 5.59	T : 8.05	T : 10.96	T : 16	T : 22.04
2	Hyperfocal distance	84'56''	59'61''	43'38''	30'52''	22'73''	15'93''	11'87''
3	Object distance	Far / Near	Far / Near	Far / Near	Far / Near	Far / Near	Far / Near	Far / Near
	50 feet	119.02 / 31.95	297.27 / 27.75	∞ / 23.79	∞ / 19.48	∞ / 16.11	∞ / 12.49	∞ / 9.93
	30 feet	45.27 / 22.58	58.11 / 20.46	92.09 / 18.28	1499.02 / 15.69	∞ / 13.49	∞ / 10.92	∞ / 8.96
	20 feet	25.51 / 16.52	28.98 / 15.4	35.21 / 14.17	53.72 / 12.62	148.25 / 11.2	∞ / 9.42	∞ / 7.97
	16 feet	19.23 / 13.75	21.07 / 12.98	24.07 / 12.13	31.19 / 11	48.65 / 9.94	∞ / 8.55	∞ / 7.37
	13 feet	14.97 / 11.52	16.02 / 11	17.64 / 10.4	21.03 / 9.58	27.43 / 8.79	60.42 / 7.72	∞ / 6.77
	11 feet	12.33 / 9.95	13 / 9.57	14.01 / 9.13	15.99 / 8.52	19.28 / 7.9	30.61 / 7.05	118.37 / 6.27
	9 feet	9.82 / 8.32	10.22 / 8.07	10.8 / 7.76	11.88 / 7.34	13.5 / 6.9	17.9 / 6.27	30.35 / 5.67
	7 feet	7.44 / 6.61	7.66 / 6.46	7.95 / 6.28	8.47 / 6.02	9.19 / 5.74	10.85 / 5.33	14.05 / 4.93
	5 feet	5.19 / 4.83	5.27 / 4.76	5.39 / 4.67	5.59 / 4.55	5.85 / 4.41	6.37 / 4.2	7.18 / 3.97
	4 feet	4.1 / 3.9	4.15 / 3.87	4.21 / 3.82	4.31 / 3.74	4.44 / 3.66	4.69 / 3.53	5.05 / 3.39

F = 55 mm

1	Aperture	T : 2.80	T : 4.03	T : 5.59	T : 8.05	T : 10.96	T : 16	T : 22.04
2	Hyperfocal distance	158'82''	111'65''	80'96''	56'65''	41'92''	29'07''	21'38''
3	Object distance	Far / Near	Far / Near	Far / Near	Far / Near	Far / Near	Far / Near	Far / Near
	50 feet	71.91 / 38.44	88.62 / 35.01	126.64 / 31.44	398.63 / 27.12	∞ / 23.36	∞ / 18.9	∞ / 15.45
	30 feet	36.46 / 25.53	40.19 / 24.02	46.3 / 22.33	61.05 / 20.12	98.75 / 18.03	∞ / 15.33	∞ / 13.03
	20 feet	22.56 / 17.98	23.88 / 17.25	25.83 / 16.39	29.67 / 15.21	36.1 / 14.03	58.44 / 12.39	244.74 / 10.9
	16 feet	17.55 / 14.72	18.31 / 14.24	19.4 / 13.66	21.42 / 12.86	24.47 / 12.03	32.68 / 10.83	55.63 / 9.7
	13 feet	13.97 / 12.17	14.43 / 11.85	15.07 / 11.46	16.22 / 10.91	17.84 / 10.32	21.67 / 9.46	29.43 / 8.61
	11 feet	11.66 / 10.42	11.97 / 10.19	12.39 / 9.91	13.13 / 9.51	14.13 / 9.08	16.34 / 8.42	20.22 / 7.76
	9 feet	9.41 / 8.63	9.6 / 8.48	9.86 / 8.29	10.3 / 8.02	10.87 / 7.73	12.06 / 7.27	13.93 / 6.8
	7 feet	7.23 / 6.79	7.33 / 6.7	7.47 / 6.6	7.69 / 6.44	7.98 / 6.26	8.55 / 5.98	9.37 / 5.68
	5 feet	5.1 / 4.91	5.14 / 4.87	5.2 / 4.82	5.29 / 4.75	5.4 / 4.66	5.62 / 4.53	5.91 / 4.38
	4 feet	4.05 / 3.95	4.08 / 3.93	4.11 / 3.9	4.16 / 3.86	4.22 / 3.81	4.33 / 3.73	4.47 / 3.64

angēnieux **ZOOM OPTIMO 24 - 290**

1 - Aperture
2 - Hyperfocal distance
3 - Object distance far/near
4 - Confusion circle : 0.025 mm

Distances in feet

F = 75 mm

1	Aperture	T : 2.80	T : 4.03	T : 5.59	T : 8.05	T : 10.96	T : 16	T : 22.04
2	Hyperfocal distance	294'35''	206'65''	149'60''	104'39''	77'01''	53'10''	38'82''
3	Object distance	Far / Near	Far / Near	Far / Near	Far / Near	Far / Near	Far / Near	Far / Near
	50 feet	59.76 / 43.02	65.22 / 40.61	73.9 / 37.9	93.65 / 34.3	137.34 / 30.85	743.39 / 26.32	∞ / 22.41
	30 feet	33.15 / 27.41	34.71 / 26.44	36.95 / 25.3	41.16 / 23.69	47.61 / 22.04	65.57 / 19.69	121.06 / 17.48
	20 feet	21.3 / 18.86	21.91 / 18.41	22.74 / 17.87	24.21 / 17.08	26.21 / 16.24	30.65 / 14.97	38.6 / 13.7
	16 feet	16.79 / 15.28	17.16 / 15	17.65 / 14.65	18.49 / 14.13	19.61 / 13.56	21.91 / 12.69	25.56 / 11.79
	13 feet	13.5 / 12.54	13.73 / 12.35	14.03 / 12.12	14.54 / 11.78	15.19 / 11.39	16.49 / 10.79	18.39 / 10.16
	11 feet	11.34 / 10.68	11.5 / 10.55	11.7 / 10.38	12.04 / 10.14	12.47 / 9.86	13.3 / 9.42	14.46 / 8.95
	9 feet	9.22 / 8.79	9.31 / 8.71	9.44 / 8.6	9.65 / 8.44	9.91 / 8.26	10.4 / 7.96	11.06 / 7.64
	7 feet	7.12 / 6.88	7.17 / 6.84	7.24 / 6.78	7.35 / 6.68	7.49 / 6.58	7.74 / 6.4	8.07 / 6.21
	5 feet	5.05 / 4.95	5.07 / 4.93	5.1 / 4.9	5.15 / 4.86	5.21 / 4.81	5.31 / 4.73	5.44 / 4.64
	4 feet	4.03 / 3.97	4.04 / 3.96	4.06 / 3.95	4.08 / 3.92	4.11 / 3.9	4.17 / 3.85	4.24 / 3.8

F = 105 mm

1	Aperture	T : 2.80	T : 4.03	T : 5.59	T : 8.05	T : 10.96	T : 16	T : 22.04
2	Hyperfocal distance	575'83''	404'05''	292'25''	203'64''	149'98''	103'12''	75'12''
3	Object distance	Far / Near	Far / Near	Far / Near	Far / Near	Far / Near	Far / Near	Far / Near
	50 feet	54.54 / 46.17	56.74 / 44.71	59.84 / 42.97	65.5 / 40.5	73.79 / 37.92	94.61 / 34.17	143.49 / 30.56
	30 feet	31.53 / 28.62	32.23 / 28.07	33.17 / 27.39	34.79 / 26.4	36.92 / 25.31	41.34 / 23.63	48.3 / 21.9
	20 feet	20.64 / 19.4	20.93 / 19.16	21.31 / 18.85	21.94 / 18.39	22.73 / 17.88	24.26 / 17.05	26.41 / 16.16
	16 feet	16.39 / 15.62	16.57 / 15.47	16.8 / 15.28	17.18 / 14.98	17.65 / 14.65	18.53 / 14.11	19.72 / 13.51
	13 feet	13.25 / 12.76	13.36 / 12.66	13.5 / 12.53	13.74 / 12.34	14.03 / 12.12	14.56 / 11.76	15.25 / 11.36
	11 feet	11.17 / 10.83	11.25 / 10.76	11.35 / 10.68	11.51 / 10.54	11.7 / 10.39	12.05 / 10.13	12.51 / 9.84
	9 feet	9.11 / 8.89	9.16 / 8.85	9.22 / 8.79	9.32 / 8.71	9.44 / 8.6	9.66 / 8.44	9.93 / 8.24
	7 feet	7.06 / 6.94	7.09 / 6.92	7.12 / 6.88	7.18 / 6.83	7.24 / 6.78	7.36 / 6.68	7.5 / 6.57
	5 feet	5.03 / 4.97	5.04 / 4.96	5.05 / 4.95	5.08 / 4.93	5.1 / 4.9	5.15 / 4.86	5.21 / 4.81
	4 feet	4.01 / 3.99	4.02 / 3.98	4.03 / 3.97	4.04 / 3.96	4.06 / 3.95	4.08 / 3.92	4.12 / 3.89

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1 - Aperture
2 - Hyperfocal distance
3 - Object distance far/near
4 - Confusion circle : 0.025 mm

Distances in feet

F = 155 mm

1	Aperture	T : 2.80	T : 4.03	T : 5.59	T : 8.05	T : 10.96	T : 16	T : 22.04
2	Hyperfocal distance	1192'5''	879'42''	635'83''	442'73''	325'80''	223'69''	162'67''
3	Object distance	Far Near	Far Near	Far Near	Far Near	Far Near	Far Near	Far Near
	50 feet	52.09 48.07	52.88 47.42	54.08 46.51	56.08 45.13	58.65 43.61	63.72 41.2	71.13 38.65
	30 feet	30.72 29.32	30.98 29.08	31.38 28.74	32.02 28.23	32.82 27.64	34.3 26.68	36.27 25.62
	20 feet	20.3 19.71	20.41 19.6	20.58 19.45	20.84 19.23	21.16 18.96	21.75 18.52	22.49 18.03
	16 feet	16.19 15.82	16.26 15.75	16.36 15.66	16.52 15.52	16.71 15.35	17.06 15.07	17.51 14.75
	13 feet	13.12 12.88	13.16 12.84	13.23 12.78	13.33 12.69	13.45 12.58	13.67 12.4	13.94 12.19
	11 feet	11.08 10.92	11.11 10.89	11.16 10.85	11.23 10.78	11.31 10.71	11.46 10.58	11.64 10.43
	9 feet	9.05 8.95	9.07 8.93	9.1 8.9	9.14 8.86	9.2 8.81	9.29 8.73	9.4 8.63
	7 feet	7.03 6.97	7.04 6.96	7.05 6.95	7.08 6.92	7.11 6.9	7.16 6.85	7.22 6.79
	5 feet	5.01 4.99	5.02 4.98	5.02 4.98	5.03 4.97	5.05 4.95	5.07 4.93	5.1 4.91
	4 feet	4.01 3.99	4.01 3.99	4.01 3.99	4.02 3.98	4.03 3.97	4.04 3.96	4.05 3.95

F = 215 mm

1	Aperture	T : 2.80	T : 4.03	T : 5.59	T : 8.05	T : 10.96	T : 16	T : 22.04
2	Hyperfocal distance	2144'27''	1691'96''	1222'98''	851'26''	626'20''	429'70''	312'28''
3	Object distance	Far Near	Far Near	Far Near	Far Near	Far Near	Far Near	Far Near
	50 feet	51.14 48.91	51.45 48.63	52.04 48.12	52.98 47.34	54.15 46.46	56.29 45	59.11 43.37
	30 feet	30.39 29.62	30.5 29.52	30.7 29.33	31.02 29.05	31.4 28.73	32.09 28.18	32.95 27.55
	20 feet	20.17 19.84	20.21 19.79	20.3 19.71	20.43 19.59	20.59 19.45	20.87 19.2	21.22 18.92
	16 feet	16.1 15.9	16.13 15.87	16.18 15.82	16.26 15.74	16.36 15.65	16.53 15.5	16.75 15.32
	13 feet	13.07 12.93	13.08 12.92	13.12 12.89	13.17 12.84	13.23 12.78	13.34 12.68	13.47 12.56
	11 feet	11.05 10.95	11.06 10.94	11.08 10.92	11.12 10.89	11.16 10.85	11.23 10.78	11.32 10.7
	9 feet	9.03 8.97	9.04 8.96	9.05 8.95	9.07 8.93	9.1 8.9	9.15 8.86	9.2 8.81
	7 feet	7.02 6.98	7.02 6.98	7.03 6.97	7.04 6.96	7.06 6.95	7.08 6.92	7.11 6.89
	5 feet	5.01 4.99	5.01 4.99	5.01 4.99	5.02 4.98	5.02 4.98	5.04 4.97	5.05 4.95
	4 feet	4 4	4 4	4.01 3.99	4.01 3.99	4.01 3.99	4.02 3.98	4.03 3.97

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1 - Aperture
2 - Hyperfocal distance
3 - Object distance far/near
4 - Confusion circle : 0.025 mm

Distances in feet

F = 290 mm

1	Aperture	T : 2.80	T : 4.03	T : 5.59	T : 8.05	T : 10.96	T : 16	T : 22.04
2	Hyperfocal distance	3426'16"	2874'70"	2075'59"	1443'96"	1061'87"	728'41"	529'20"
3	Object distance	Far Near	Far Near	Far Near	Far Near	Far Near	Far Near	Far Near
	50 feet	50.71 49.31	50.85 49.18	51.18 48.87	51.71 48.4	52.36 47.85	53.52 46.92	54.99 45.86
	30 feet	30.25 29.76	30.29 29.71	30.41 29.6	30.59 29.43	30.81 29.23	31.19 28.9	31.67 28.5
	20 feet	20.1 19.9	20.12 19.88	20.17 19.83	20.25 19.76	20.34 19.67	20.5 19.52	20.7 19.35
	16 feet	16.06 15.94	16.08 15.92	16.11 15.89	16.16 15.85	16.21 15.79	16.31 15.7	16.43 15.59
	13 feet	13.04 12.96	13.05 12.95	13.07 12.93	13.1 12.9	13.13 12.87	13.2 12.81	13.27 12.74
	11 feet	11.03 10.97	11.03 10.97	11.05 10.95	11.07 10.93	11.09 10.91	11.14 10.87	11.19 10.82
	9 feet	9.02 8.98	9.02 8.98	9.03 8.97	9.04 8.96	9.06 8.94	9.09 8.92	9.12 8.88
	7 feet	7.01 6.99	7.01 6.99	7.02 6.98	7.02 6.98	7.03 6.97	7.05 6.95	7.07 6.94
	5 feet	5 5	5.01 4.99	5.01 4.99	5.01 4.99	5.01 4.99	5.02 4.98	5.03 4.97
	4 feet	4 4	4 4	4 4	4.01 3.99	4.01 3.99	4.01 3.99	4.02 3.98

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ZOOM OPTIMO 24 - 290

1 - Ouverture
2 - Distance hyperfocale
3 - Distance objet : loin/près
4 - Cercle de confusion : 0.025 mm

Distances en mètres

F = 24 mm

1	Ouverture	T : 2.80	T : 4.00	T : 5.60	T : 8.00	T : 11.00	T : 16	T : 22.00
2	Distance hyperfocale	10.31	7.34	5.40	3.87	2.95	2.14	1.65
3	Distance objet	Loin Près	Loin Près	Loin Près	Loin Près	Loin Près	Loin Près	Loin Près
	30 m	∞ 7.8	∞ 6	∞ 4.67	∞ 3.5	∞ 2.74	∞ 2.03	∞ 1.6
	10 m	383.9 5.25	∞ 4.4	∞ 3.66	∞ 2.93	∞ 2.39	∞ 1.86	∞ 1.5
	8 m	34.07 4.67	∞ 4	∞ 3.39	∞ 2.76	∞ 2.29	∞ 1.8	∞ 1.46
	5 m	9.13 3.52	14.52 3.14	67.49 2.77	∞ 2.35	∞ 2.01	∞ 1.64	∞ 1.37
	4 m	6.14 3.02	8.08 2.74	13.93 2.47	∞ 2.14	∞ 1.86	∞ 1.55	∞ 1.31
	3 m	3.97 2.44	4.65 2.27	6.01 2.09	11.67 1.86	∞ 1.66	∞ 1.42	∞ 1.22
	2.50 m	3.1 2.12	3.47 1.99	4.14 1.86	6.04 1.68	14.55 1.52	∞ 1.32	∞ 1.16
	2.00 m	2.33 1.76	2.52 1.68	2.82 1.59	3.52 1.47	5.1 1.36	38.62 1.21	∞ 1.08
	1.50 m	1.65 1.38	1.73 1.34	1.85 1.28	2.08 1.21	2.47 1.14	3.84 1.05	16.65 0.96
	1.22 m	1.31 1.15	1.35 1.12	1.41 1.09	1.52 1.05	1.68 1	2.13 0.93	3.33 0.87

F = 30 mm

1	Ouverture	T : 2.80	T : 4.00	T : 5.60	T : 8.00	T : 11.00	T : 16	T : 22.00
2	Distance hyperfocale	14.67	10.39	7.61	5.40	4.07	2.90	2.20
3	Distance objet	Loin Près	Loin Près	Loin Près	Loin Près	Loin Près	Loin Près	Loin Près
	30 m	∞ 10	∞ 7.85	∞ 6.18	∞ 4.66	∞ 3.65	∞ 2.7	∞ 2.09
	10 m	30.12 6.11	269.6 5.27	∞ 4.49	∞ 3.66	∞ 3.03	∞ 2.37	∞ 1.9
	8 m	16.84 5.33	32.86 4.69	∞ 4.07	∞ 3.39	∞ 2.85	∞ 2.26	∞ 1.84
	5 m	7.25 3.86	9.05 3.53	13.42 3.18	63.52 2.77	∞ 2.41	∞ 1.99	∞ 1.67
	4 m	5.26 3.26	6.1 3.02	7.74 2.78	13.76 2.47	387.94 2.19	∞ 1.85	∞ 1.58
	3 m	3.61 2.58	3.96 2.44	4.54 2.29	5.98 2.09	9.83 1.89	∞ 1.65	∞ 1.44
	2.50 m	2.88 2.22	3.09 2.12	3.42 2.01	4.12 1.86	5.54 1.71	15.18 1.51	∞ 1.34
	2.00 m	2.22 1.83	2.33 1.77	2.49 1.69	2.82 1.59	3.35 1.49	5.17 1.35	18.28 1.22
	1.50 m	1.6 1.41	1.65 1.38	1.72 1.34	1.85 1.28	2.03 1.23	2.48 1.14	3.51 1.06
	1.22 m	1.28 1.17	1.3 1.15	1.34 1.13	1.41 1.09	1.49 1.05	1.69 1	2.04 0.94

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ZOOM OPTIMO 24 - 290

1 - Ouverture
2 - Distance hyperfocale
3 - Distance objet : loin/près
4 - Cercle de confusion : 0.025 mm

Distances en mètres

F = 40 mm

1	Ouverture	T : 2.80	T : 4.00	T : 5.60	T : 8.00	T : 11.00	T : 16	T : 22.00
2	Distance hyperfocale	25.78	18.17	13.22	9.3	6.93	4.86	3.62
3	Distance objet	Loin Près	Loin Près	Loin Près	Loin Près	Loin Près	Loin Près	Loin Près
	30 m	∞ 14	∞ 11.48	∞ 9.32	∞ 7.22	∞ 5.73	∞ 4.26	∞ 3.29
	10 m	15.91 7.34	21.4 6.61	38.81 5.86	∞ 4.99	∞ 4.26	∞ 3.42	∞ 2.79
	8 m	11.3 6.23	13.76 5.7	19.2 5.15	52.53 4.47	∞ 3.88	∞ 3.18	∞ 2.64
	5 m	6.04 4.28	6.65 4.04	7.63 3.76	10.03 3.41	16.17 3.07	∞ 2.64	∞ 2.27
	4 m	4.61 3.54	4.94 3.38	5.45 3.19	6.52 2.94	8.55 2.69	19.39 2.36	∞ 2.07
	3 m	3.31 2.75	3.47 2.66	3.69 2.55	4.12 2.39	4.79 2.24	6.78 2.02	14.22 1.81
	2.50 m	2.7 2.33	2.8 2.27	2.93 2.19	3.18 2.08	3.55 1.97	4.47 1.8	6.62 1.64
	2.00 m	2.12 1.9	2.17 1.86	2.24 1.81	2.38 1.74	2.56 1.67	2.96 1.56	3.69 1.44
	1.50 m	1.56 1.45	1.58 1.43	1.61 1.4	1.67 1.37	1.75 1.33	1.9 1.26	2.13 1.2
	1.22 m	1.25 1.19	1.27 1.18	1.28 1.16	1.32 1.14	1.35 1.12	1.43 1.08	1.54 1.04

F = 55 mm

1	Ouverture	T : 2.80	T : 4.00	T : 5.60	T : 8.00	T : 11.00	T : 16	T : 22.00
2	Distance hyperfocale	48.41	34	24.68	17.27	12.78	8.86	6.52
3	Distance objet	Loin Près	Loin Près	Loin Près	Loin Près	Loin Près	Loin Près	Loin Près
	30 m	77.62 18.68	244.9 16.11	∞ 13.71	∞ 11.12	∞ 9.1	∞ 6.96	∞ 5.45
	10 m	12.42 8.38	13.87 7.85	16.33 7.26	22.73 6.49	42.83 5.78	∞ 4.87	∞ 4.11
	8 m	9.45 6.95	10.25 6.58	11.5 6.17	14.29 5.61	20.11 5.08	71.63 4.38	∞ 3.76
	5 m	5.5 4.59	5.75 4.43	6.1 4.25	6.76 4	7.77 3.73	10.53 3.35	18.74 3
	4 m	4.3 3.74	4.44 3.64	4.64 3.52	5 3.35	5.51 3.17	6.72 2.9	9.19 2.64
	3 m	3.16 2.86	3.23 2.81	3.32 2.74	3.49 2.64	3.72 2.53	4.19 2.37	4.97 2.2
	2.50 m	2.6 2.41	2.65 2.37	2.71 2.32	2.81 2.26	2.95 2.18	3.23 2.06	3.64 1.94
	2.00 m	2.06 1.94	2.09 1.92	2.12 1.89	2.18 1.85	2.25 1.81	2.4 1.73	2.6 1.65
	1.50 m	1.53 1.47	1.54 1.46	1.56 1.45	1.58 1.43	1.62 1.4	1.68 1.36	1.76 1.32
	1.22 m	1.24 1.2	1.24 1.2	1.25 1.19	1.27 1.18	1.29 1.16	1.32 1.14	1.36 1.11

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1 - Ouverture
2 - Distance hyperfocale
3 - Distance objet : loin/près
4 - Cercle de confusion : 0.025 mm

Distances en mètres

F = 75 mm

1	Ouverture	T : 2.80	T : 4.00	T : 5.60	T : 8.00	T : 11.00	T : 16	T : 22.00
2	Distance hyperfocale	89.72	62.99	45.6	31.82	23.47	16.19	11.83
3	Distance objet	Loin Près	Loin Près	Loin Près	Loin Près	Loin Près	Loin Près	Loin Près
	30 m	44.7 22.61	56.58 20.47	86.01 18.26	487.73 15.61	∞ 13.34	∞ 10.67	∞ 8.62
	10 m	11.17 9.06	11.76 8.71	12.61 8.3	14.25 7.73	16.87 7.16	24.83 6.34	58.2 5.6
	8 m	8.72 7.4	9.06 7.17	9.56 6.89	10.45 6.5	11.76 6.1	15.07 5.51	22.9 4.94
	5 m	5.26 4.77	5.37 4.68	5.53 4.57	5.81 4.4	6.17 4.22	6.92 3.94	8.13 3.66
	4 m	4.16 3.86	4.23 3.8	4.32 3.73	4.48 3.62	4.68 3.5	5.09 3.31	5.69 3.12
	3 m	3.08 2.92	3.12 2.89	3.17 2.85	3.24 2.79	3.34 2.73	3.53 2.62	3.79 2.5
	2.50 m	2.55 2.45	2.58 2.43	2.61 2.4	2.66 2.36	2.72 2.32	2.84 2.24	2.99 2.16
	2.00 m	2.03 1.97	2.04 1.96	2.06 1.94	2.09 1.92	2.13 1.89	2.19 1.84	2.28 1.79
	1.50 m	1.52 1.49	1.52 1.48	1.53 1.47	1.54 1.46	1.56 1.44	1.59 1.42	1.63 1.39
	1.22 m	1.23 1.21	1.23 1.21	1.24 1.2	1.25 1.2	1.25 1.19	1.27 1.17	1.29 1.16

F = 105 mm

1	Ouverture	T : 2.80	T : 4.00	T : 5.60	T : 8.00	T : 11.00	T : 16	T : 22.00
2	Distance hyperfocale	175.51	123.15	89.08	62.07	45.71	31.43	22.9
3	Distance objet	Loin Près	Loin Près	Loin Près	Loin Près	Loin Près	Loin Près	Loin Près
	30 m	36.04 25.71	39.43 24.23	44.86 22.57	57.32 20.38	85.51 18.28	592.56 15.52	∞ 13.15
	10 m	10.56 9.5	10.82 9.3	11.18 9.05	11.79 8.69	12.6 8.31	14.33 7.71	17.16 7.1
	8 m	8.35 7.68	8.51 7.55	8.72 7.39	9.08 7.15	9.55 6.89	10.49 6.49	11.9 6.06
	5 m	5.13 4.88	5.18 4.83	5.26 4.77	5.38 4.67	5.53 4.57	5.82 4.39	6.2 4.2
	4 m	4.08 3.93	4.11 3.89	4.16 3.86	4.23 3.8	4.32 3.73	4.49 3.62	4.7 3.49
	3 m	3.04 2.96	3.06 2.94	3.08 2.92	3.12 2.89	3.16 2.85	3.25 2.79	3.35 2.72
	2.50 m	2.53 2.47	2.54 2.46	2.55 2.45	2.58 2.43	2.61 2.4	2.66 2.36	2.73 2.31
	2.00 m	2.02 1.98	2.02 1.98	2.03 1.97	2.05 1.96	2.06 1.94	2.09 1.92	2.13 1.89
	1.50 m	1.51 1.49	1.51 1.49	1.52 1.49	1.52 1.48	1.53 1.47	1.54 1.46	1.56 1.44
	1.22 m	1.22 1.22	1.23 1.21	1.23 1.21	1.23 1.21	1.24 1.2	1.25 1.2	1.26 1.19

angēnieux ZOOM OPTIMO 24 - 290

1 - Ouverture
2 - Distance hyperfocale
3 - Distance objet : loin/près
4 - Cercle de confusion : 0.025 mm

Distances en mètres

F = 155 mm

1	Ouverture	T : 2.80	T : 4.00	T : 5.60	T : 8.00	T : 11.00	T : 16	T : 22.00
2	Distance hyperfocale	363.47	268	193.8	134.94	99.3	68.18	49.58
3	Distance objet	Loin Près	Loin Près	Loin Près	Loin Près	Loin Près	Loin Près	Loin Près
	30 m	32.64 27.76	33.69 27.04	35.37 26.06	38.37 24.65	42.67 23.16	52.97 20.98	74.67 18.85
	10 m	10.26 9.75	10.36 9.66	10.51 9.54	10.75 9.35	11.04 9.14	11.6 8.8	12.35 8.42
	8 m	8.16 7.84	8.23 7.79	8.32 7.71	8.46 7.59	8.64 7.45	8.97 7.22	9.41 6.97
	5 m	5.06 4.94	5.08 4.92	5.11 4.89	5.17 4.84	5.23 4.79	5.34 4.7	5.49 4.6
	4 m	4.04 3.96	4.05 3.95	4.07 3.93	4.1 3.9	4.14 3.87	4.21 3.81	4.29 3.75
	3 m	3.02 2.98	3.03 2.97	3.04 2.96	3.05 2.95	3.07 2.93	3.11 2.9	3.15 2.86
	2.50 m	2.51 2.49	2.52 2.48	2.52 2.48	2.54 2.47	2.55 2.45	2.57 2.43	2.6 2.41
	2.00 m	2.01 1.99	2.01 1.99	2.01 1.99	2.02 1.98	2.03 1.97	2.04 1.96	2.06 1.95
	1.50 m	1.5 1.5	1.51 1.5	1.51 1.49	1.51 1.49	1.51 1.49	1.52 1.48	1.53 1.47
	1.22 m	1.22 1.22	1.22 1.22	1.22 1.22	1.23 1.21	1.23 1.21	1.23 1.21	1.24 1.2

F = 215 mm

1	Ouverture	T : 2.80	T : 4.00	T : 5.60	T : 8.00	T : 11.00	T : 16	T : 22.00
2	Distance hyperfocale	653.57	515.71	372.77	259.46	190.87	130.97	95.18
3	Distance objet	Loin Près	Loin Près	Loin Près	Loin Près	Loin Près	Loin Près	Loin Près
	30 m	31.41 28.71	31.81 28.39	32.57 27.81	33.83 26.95	35.47 26.01	38.71 24.51	43.49 22.94
	10 m	10.14 9.86	10.18 9.82	10.26 9.76	10.37 9.65	10.52 9.53	10.77 9.34	11.09 9.11
	8 m	8.09 7.91	8.12 7.89	8.16 7.85	8.23 7.78	8.32 7.7	8.48 7.58	8.67 7.43
	5 m	5.03 4.97	5.04 4.96	5.06 4.94	5.09 4.92	5.12 4.89	5.17 4.84	5.24 4.78
	4 m	4.02 3.98	4 3.97	4.04 3.96	4.05 3.95	4.07 3.93	4.11 3.9	4.15 3.86
	3 m	3.01 2.99	3.01 2.99	3.02 2.98	3.03 2.97	3.04 2.96	3.06 2.95	3.08 2.93
	2.50 m	2.51 2.49	2.51 2.49	2.51 2.49	2.52 2.48	2.52 2.48	2.54 2.46	2.55 2.45
	2.00 m	2 2	2.01 1.99	2.01 1.99	2.01 1.99	2.01 1.99	2.02 1.98	2.03 1.97
	1.50 m	1.5 1.5	1.5 1.5	1.5 1.5	1.51 1.49	1.51 1.49	1.51 1.49	1.51 1.49
	1.22 m	1.22 1.22	1.22 1.22	1.22 1.22	1.22 1.22	1.22 1.22	1.23 1.21	1.23 1.21

angēnieux ZOOM OPTIMO 24 - 290

1 - Ouverture
2 - Distance hyperfocale
3 - Distance objet : loin/près
4 - Cercle de confusion : 0.025 mm

Distances en mètres

F = 290 mm

1	Ouverture	T : 2.80	T : 4.00	T : 5.60	T : 8.00	T : 11.00	T : 16	T : 22.00
2	Distance hyperfocale	1044.29	876.21	632.64	440.12	323.66	222.02	161.3
3	Distance objet	Loin / Près	Loin / Près	Loin / Près	Loin / Près	Loin / Près	Loin / Près	Loin / Près
	30 m	30.87 / 29.18	31.04 / 29.03	31.46 / 28.67	32.15 / 28.13	33 / 27.51	34.58 / 26.5	36.71 / 25.39
	10 m	10.09 / 9.91	10.11 / 9.89	10.15 / 9.85	10.22 / 9.79	10.3 / 9.72	10.44 / 9.6	10.62 / 9.45
	8 m	8.06 / 7.94	8.07 / 7.93	8.09 / 7.91	8.14 / 7.87	8.19 / 7.82	8.27 / 7.74	8.38 / 7.65
	5 m	5.02 / 4.98	5.02 / 4.98	5.03 / 4.97	5.05 / 4.95	5.07 / 4.93	5.1 / 4.9	5.14 / 4.87
	4 m	4.01 / 3.99	4.02 / 3.98	4.02 / 3.98	4 / 3.97	4.04 / 3.96	4.06 / 3.94	4.09 / 3.92
	3 m	3.01 / 2.99	3.01 / 2.99	3.01 / 2.99	3.02 / 2.98	3.02 / 2.98	3.03 / 2.97	3.04 / 2.96
	2.50 m	2.5 / 2.5	2.51 / 2.49	2.51 / 2.49	2.51 / 2.49	2.51 / 2.49	2.52 / 2.48	2.53 / 2.47
	2.00 m	2 / 2	2 / 2	2 / 2	2.01 / 1.99	2.01 / 1.99	2.01 / 1.99	2.02 / 1.98
	1.50 m	1.5 / 1.5	1.5 / 1.5	1.5 / 1.5	1.5 / 1.5	1.5 / 1.5	1.51 / 1.49	1.51 / 1.49
	1.22 m	1.22 / 1.22	1.22 / 1.22	1.22 / 1.22	1.22 / 1.22	1.22 / 1.22	1.22 / 1.22	1.22 / 1.22