

Entrance Pupil Database

Wouldn't it be great if everyone entered their values for their [NPP / Nodal Point / Entrance Pupil](#) for lens and camera combinations. Some searching on the web will find a lot of people saying they want to start to create a database of some kind, but have not seen anything substantial so far (correct me if I am wrong).

Please enter your own values if they are not listed.

Thanks, --[Richard Korff](#) 11:12, 13 May 2005 (EDT)

To cater for all the different camera bodies and lenses, the tables have been split into 3 parts:

- The **first table** shows the position of the tripod mount in relation to the lens axis. This is easy to measure and is dependent only on the camera body.
- The **second table** shows the actual entrance pupil distance which is only dependent on the lens itself. Note that the [NPP](#) for [fisheye](#) lenses is not constant over the image circle's [FoV](#), so you will sometimes find different NPP values depending on the angle where your images overlap.
- The **third table** shows the number of pics necessary for a full 360° coverage and the rotation angle between shots.

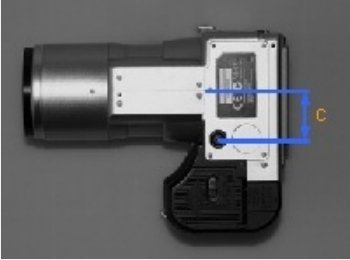
Use as much as possible actual measurements rather than the reading on your [panorama head](#), unless you are sure these are the same.

To enter a line for your combination, edit the page by clicking edit at the top of the screen (you may need to create an account or sign-in first), and edit the table below.

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Tripod Mount Measurements

Camera	Tripod mount off-center (C)	Tripod mount height (H)	Tripod mount length (L1)
			
Use the correct name of your camera. For digital camera's, please use the name as mentioned at dpreview .	Looking at the bottom of the camera, the distance between the middle of the tripod mount to the lens axis (0 if the tripod mount is over the centre of the lens)	Facing the camera, the distance from the base of the camera to the center of the lens	Looking at the bottom of the camera, the distance between the middle of the tripod mount to the base of the lens base, or base for adaptor tube. For fixed lens camera's which do not allow use of adaptors this column is not applicable.
Canon EOS 5D	0 mm	42 mm	37,5 mm
Canon EOS 5D MKII	0 mm	43.5 mm, 90 mm w/grip	38.5 mm
Canon EOS 5D MKIII	0 mm	43.5 mm	40 mm
Canon EOS 7D	0 mm	42 mm	37.5 mm
Canon EOS 10D	0 mm	42 mm	31.5 mm
Canon EOS 20D	0 mm	40 mm	36.5 mm

Canon EOS 40D	0 mm	42 mm	38.5 mm
Canon EOS 60D	0 mm	40.5 mm	38.5 mm
Canon EOS 400D	0 mm	37 mm	39 mm
Canon EOS 300D / Digital Rebel (EOS Digital Rebel)	0 mm	40 mm	40 mm
Canon EOS 300D / Digital Rebel	0 mm	40 mm	38.5 mm
Canon EOS 350D / Digital Rebel XT	0 mm	37.5 mm	38.5 mm
Canon EOS 450D / Digital Rebel XSi	0 mm	35 mm	39 mm
Canon EOS 500D / Digital Rebel X1i	0 mm	38.5 mm	39 mm
Canon EOS 550D / Digital Rebel T2i	0 mm	39 mm	39 mm
Canon EOS 600D / Digital Rebel T3i	0 mm	40 mm	39 mm
Canon EOS 650D / Digital Rebel T4i	0 mm	41 mm	39 mm
Canon EOS 1000D / Digital Rebel XS	0 mm	37 mm	39 mm
Canon G9	12 mm	29 mm	N/A
Canon PowerShot A630	15 mm	28 mm	N/A
Canon PowerShot A710 IS	21 mm	26.5 mm	N/A
Canon PowerShot S80	18 mm	25 mm	N/A
Fujifilm FinePix S7000	0 mm	32.8 mm	69mm + 37mm(Adapt. Tube)=106mm
Konica Minolta Maxxum 7D	0 mm	41 mm	36 mm
Nikon C8800	19.1 mm	67.9 mm	N/A
Nikon D2H (+D2Hs/D2X/D2Xs?)	0 mm	79 mm	29.5 mm
Nikon D40 (+D40x?)	0 mm	36 mm	42 mm
Nikon D60	0 mm	36 mm	42 mm
Nikon D70	0 mm	52 mm	36 mm
Nikon D80	0 mm	42.8 mm	40 mm
Nikon D90	0 mm	42.8 mm	40 mm
Nikon D100 with MB-D100	0 mm	93 mm	33.5 mm
Nikon D200	0 mm	47 mm	40 mm
Nikon D200 with MB-D200	0 mm	93 mm	~33 mm
Nikon D300	0 mm	47.2 mm	42.4 mm
Nikon D300 with MB-D10	0 mm	90.2 mm	31.4 mm
Nikon D700	0 mm	50 mm	44.5 mm
Nikon D700 with MB-D10	0 mm	93 mm	44.5 mm
Nikon D800, D800E	0 mm	50 mm	44.5 mm
Nikon D800, D800E	0 mm	93 mm	44.5 mm

+ MB-D12	0 mm	35 mm	44.5 mm
Nikon D3000	0 mm	35.6 mm	42.4 mm
Nikon D7000	0 mm	43 mm	40 mm
Nikon D7000 with MB-D11	0 mm	85.8 mm	25 mm
Nikon D3X	0 mm	76.9 mm	28.0 mm
Nikon D5000	0 mm	42.8 mm	40 mm
Nikon FT1 adapter	0 mm	43 mm	13 mm
Pentax *ist DS	0 mm	36 mm	43 mm
Pentax K10D/K20D	0 mm	41.6 mm	37.2 mm
Pentax K-7/K-5	0 mm	38.2 mm	41.6 mm
Panasonic Lumix DMC-LX3	21.5 mm	27.7 mm	28.9 mm
Sony Alpha A100	0 mm	37 mm	35 mm
Sony SLT-A33/55	0 mm	36 mm	31 mm
Sony NEX-7	0 mm	32 mm	20.5 mm

Entrance Pupil Measurements

Lens	Focal Length	Entrance Pupil Length (L2)
		
Enter the exact lens name, or if you are using a camera with a fixed lens the name of your camera as mentioned at DPReview .		Facing the side of the lens, the distance from the base of the lens to the Entrance Pupil. A negative value means the entrance pupil is outside the lens, in the camera body. Such is the case with many telephoto lenses. The lens base is the
Canon EF-S 10-22mm	10mm	66mm
Canon EF 15mm	15mm	45mm at F11 focus at 1m
Canon EF 16-35 mm	16mm	79mm
Canon 17-40mm	17mm	71mm
Canon 17-40mm	28mm	69mm
Canon 17-40mm	40mm	72mm
Canon 17-55mm f/2.8	17mm	75.5mm
Canon 17-55mm f/2.8	20mm	71mm
Canon 17-55mm f/2.8	28mm	59.5mm
Canon 17-55mm f/2.8	35mm	52mm
Canon 18-55mm (which version?)	18mm	47mm
Canon 18-55mm	24mm	23mm
Canon 18-55mm	35mm	45mm
Canon 18-55mm	55mm	55mm
Canon 24mm f/2.8	24mm	28.5mm at F11 focus at 2m
Canon 24mm TSE f/3.5L II	24mm	86mm at F11, focus infinity at F11 mark
Canon 35mm f/2	35mm	12.5mm
Canon 35mm f/2	35mm	23mm at F11 and infinity at the red dot
Canon EF 50mm f/1.4	50mm	17.5mm

Canon 50mm f/1.8 II	50mm	23mm
Canon 50mm f/2.5 macro	50mm	21.5mm at F11, focus infinity at red dot mark
Canon 50mm f/2.5 macro	50mm	30mm at F11, focus at aprox 0.56m, 0.5m at left f16 mark.
Canon EF 85mm f/1.8	85mm	39mm
Canon EF 70-200 f/4.0 L USM	70mm	92mm
Canon EF 70-200 f/4.0 L USM	100mm	67mm
Canon EF 70-200 f/4.0 L USM	135mm	53mm
Canon EF 70-200 f/4.0 L USM	200mm	??
Canon EF 70-200 f/2.8 L IS USM	200mm	26mm
Konica Minolta 24 f/2.8	24mm	21mm
Samyang 8mm f3.5 CS Fish-eye (~60°)	8mm	50mm
Samyang 14mm f2.8 ED AS IF UMC	14mm	55mm
Samyang 35mm f1.4 AS UMC	35mm	58mm
Sigma 70-300 (which version?)	70mm	83mm
Sigma 70-300	85mm	70mm
Sigma 70-300	100mm	45mm
Sigma 70-300	135mm	-30mm
Sigma 70-300	200mm	-30mm
Nikkor AF DX 10.5mm f2.8G ED Fisheye	10.5mm	45.5mm to 46mm (Recommended) Varies by 16mm: 41.2 (at 0deg) to 57mm (100deg)
Nikkor AF DX 10.5mm f2.8G ED (Shaved, edge Null)	10.5mm	47.5mm (recommended when used on FX camera)
Nikkor AF-S DX 12-24mm f4G ED	12mm	71.5mm
Nikkor AF 14mm f2.8D ED	14mm	48mm (Varies by angle)
Nikkor AF 16mm f2.8D Fisheye	16mm	48mm. (~ Suggested) Varies by 11mm: 37.9mm (at 0deg) to 48mm (85deg)
Nikkor AF 18mm f2.8D	18mm	34mm
Nikkor AF 20mm f2.8D	20mm	22mm
Nikkor AF 24mm f2.8D	24mm	25mm
Nikkor PC-E 24mm f3.5D ED tilt shift	24mm	85mm (no tilt)
Nikkor AF 28mm f2.8D	28mm	22mm
Nikkor AF-S 17-35mm f2.8D ED	17mm	83mm
Nikkor AF-S DX 18-55mm II	18mm	70mm
Nikkor AF-S DX 18-70mm	18mm	51mm
Nikkor AF-S DX 18-70mm	24mm	44mm
Nikkor AF-S DX 18-70mm	35mm	33.5mm
Nikkor AF-S DX 18-70mm	50mm	24.5mm
Nikkor AF-S DX 18-70mm	70mm	-6.5mm
Nikkor AF 35mm f2.0D	35mm	19.3mm
Nikkor AF-S DX 35mm f1.8G	35mm	18mm
Nikkor AF-S DX Micro 40mm f2.8G	40mm	33mm
Nikkor AF 50mm f1.4D	50mm	6mm
Nikkor AF 50mm f1.8D	50mm	19mm
Nikkor AF-S 50mm f1.8G	50mm	7mm ~
Nikkor AF 60mm f2.8D Micro	60mm	15mm (infinity focus)
Nikkor AF-S 70-200mm f4G ED	70mm	100mm

VR	70mm	100mm
Nikkor AF-S 70-200mm f4G ED VR	200mm	-5mm
Nikkor AF 80-200mm f2.8D ED	80mm	81.2mm
Nikkor AF 80-200mm f2.8D ED	135mm	6mm
Nikkor AF 80-200mm f2.8D ED	200mm	-90mm
Nikkor AF 85mm f1.8D	85mm	10mm
Nikkor PC 85mm f2.8D micro tilt shift	85mm	39mm (infinity focus, no tilt)
Nikkor PC 85mm f2.8D micro tilt shift	85mm	74mm (1:1)
Nikkor AF 105mm f2.8D Micro	105mm	32mm (infinity focus)
Nikkor AF 105mm f2.8G VR Micro	105mm	30mm (~, at infinity focus)
Nikkor AF 105mm f2.8G VR Micro	105mm	-50mm (~, at 1:1)
Nikkor AF 135mm f2D DC	135mm	42mm
Nikkor AF 180mm f2.8D ED	180mm	-45mm
Nikkor AF 200mm f4D ED Micro	200mm	96mm (infinity focus)
Sigma 10mm f/2.8 EX DC HSM Fisheye (60° stops)	10mm	50mm
Sigma 8mm F4.0 EX	8mm	47.5mm / 49mm / 51mm - which one is it?
Sigma 8mm F3.5 EX	8mm	49.5mm
Nikon C8800 at Wide inf. (is this at the widest setting ?)	8.9mm ??	75mm center of tripod mtg screw to Ent Pupil
Panasonic Lumix DMC-LX3	5.1mm	28.5mm (but what constitutes the lens base?)
Peleng-N 8mm F3.5	8mm	44mm
Opteka 0.22X UHD II FishEye	8mm (0.22X)	35.75mm
Tamron 90mm F2.8 Di2 Macro	90mm	34mm
Sigma 35mm F1.4 A HSM	35mm	62mm
Sigma 8-16mm F4.5-5.6 DC HSM	8mm	73mm
Sigma 8-16mm F4.5-5.6 DC HSM	12mm	67mm
Sigma 8-16mm F4.5-5.6 DC HSM	16mm	66.5mm
Sigma 10-20mm F4-5.6 EX DC	10mm	62mm
Sigma 10-20mm F4-5.6 EX DC	14mm	64mm
Sigma 10-20mm F4-5.6 EX DC	20mm	68mm
Sigma 17-70mm F2.8-4.5 DC macro	17mm	58mm
Sigma 30mm F1.4 EX DC	30mm	26.5mm
Sigma APO 50-150 2.8 II EX DC HSM	50mm	60mm
Sigma APO 50-150 2.8 II EX DC HSM	70mm	30mm
Sigma APO 50-150 2.8 II EX DC HSM	100mm	-10mm
Sony 18-55mm E-mount	18mm	15.5mm
Sony 18-55mm E-mount	24mm	12.5mm
Sony 18-55mm E-mount	35mm	-23.5mm
Tamron 11-18mm F4.5-5.6	11mm	58.5mm
Tamron 11-18mm F4.5-5.6	14mm	59.5mm

Tamron 11-18mm F4.5-5.6	18mm	62.5mm
Tamron 17-50mm F2.8 XR DI II LD ASP	17mm	56.5mm
Tamron 17-50mm F2.8 XR DI II LD ASP	24mm	48mm
Tamron 17-50mm F2.8 XR DI II LD ASP	35mm	40.5mm
Tamron 17-50mm F2.8 XR DI II LD ASP	50mm	31.5mm
Tamron 28-75mm F2.8 XR DI	28-75mm	58.8mm
Tokina 10-17mm f3.5 DX	10mm	58.2mm (~ consider also the gap between L1 and L2 for some cameras)
Tokina 11-16mm f2.8 DX	11mm	65.6mm
Tokina 11-16mm f2.8 DX	16mm	67.6mm
Tokina 12-24mm f4 DX	12mm	60mm
Tokina 12-24mm f4 DX	18mm	64mm ~
Tokina 12-24mm f4 DX	24mm	59mm
Carl Zeiss Jena Flektogon 20mm f/4	20mm	17.5mm
Raynox DCR-CF185PRO	Conversion lens	80mm
Canon PowerShot A630	35mm (wide open)	31mm
Canon PowerShot A710 IS	35mm (wide open)	32mm
Canon G9	7.4mm (wide)	33.7mm from tripod screw
Canon G9	44.4mm (tight)	-10mm from tripod screw
Zenitar 2,8/16	16mm	36mm
Pentax smc DA 10-17mm F3.5-4.5 Fisheye zoom	10mm	57.8mm
<Manufacturer / Lens>	<Focal Length>	<Entrance Pupil Length>

- To calculate the Entrance pupil distance add the Tripod Mount Length (L1) from the camera and the Entrance Pupil Length (L2) from the lens. So for example for a Canon 300d and a 10-22mm at 10mm, the total Entrance pupil distance from the tripod mount is 40mm + 66mm = 106mm
- For these **Focal Length** values the actual focus is set to infinity (∞)

Number of pics for 360°

Focal Length Lens Type	crop factor 1.5/1.6				Full Frame			
	Portrait		Landscape		Portrait		Landscape	
	pics/360°	rotate	pics/360°	rotate	pics/360°	rotate	pics/360°	rotate
8mm fisheye	4	90°			3	120°	3	120°
10.5mm fisheye	6	60°			3	120°		
16mm fisheye					6	60°	4	90°
10mm rectilinear	6	60°	4	90°				
14mm rectilinear	8	45°	6	60°				

18mm rectilinear	10	36°	8	45°				
24mm rectilinear	12	30°	8	45°	8	45°	6	60°
28mm rectilinear	15	24°	10	36°	12-8	30°-40°	8-6	40°-60°
35mm rectilinear	18	20°	12	30°	18-12	20°-30°	12-8	30°-40°
50mm rectilinear	24	15°	18	20°	18	20°	12	30°
70mm rectilinear	36	10°	24	15°	24	15°	15	24°

Focal Length	(Micro-) Four Thirds (crop factor 2.0)			
	Portrait		Landscape	
	pics/360°	rotate	pics/360°	rotate
8mm fisheye	4	90°	3	120°
7mm rectilinear	5	72°	4	90°
9mm rectilinear	6	60°	5	72°
11mm rectilinear	7	51,5°	6	60°
12mm rectilinear	8	45°	6	60°
14mm rectilinear	9	40°	7	51,5°
17mm rectilinear	11	33°	8	45°
18mm rectilinear	11	33°	9	40°
25mm rectilinear	15	24°	12	30°
35mm rectilinear	21	17°	16	22,5°
40mm rectilinear	24	15°	18	20°

Related Resources

- VRwave lens database - <http://www.vrwave.com/panoramic-lens-database>
- Camera and lens settings for Nodal Ninja tripod heads - <http://www.nodalninja.com/support/camerasettings.html>
- Panoramic Resolution by Ken Turkowski - <http://www.worldserver.com/turk/quicktimevr/panores.html>
- Panoramic Calculator by Frank van der Pol - http://www.frankvanderpol.nl/fov_pan_calc.htm
- Panoramic calculator by Sean T. McHugh (at the very bottom) <http://www.cambridgeincolour.com/tutorials/image-projections.htm>
- Olympus E-System specific data (german)
 - http://olypedia.de/Nodalpunkte_E_System tripod mount and entrance pupil measurements
 - http://olypedia.de/Nodalpunkte_E-300/_E-500 entrance pupil measurements with different lenses
 - http://olypedia.de/Nodalpunkte_E-1 entrance pupil measurements for E-1 with different lenses
- See <http://www.hugha.co.uk/NodalPoint/Index.htm> for detailed analyses of
 - Sigma 10-20mm f4-5.6 EX DC HSM,
 - Nikon 28mm f2.8 D AF,
 - Nikon 18-200mm f3.5-5.6 G AF-S VR,
 - Sigma 8mm f/3.5 EX DG,
 - Nikon 10.5mm f2.8 G ED,

- Samyang 8mm f3.5 FISH-EYE CD.
- Joseph Wisniewski's 2003 bumper list of lens data :
http://www.swissarmyfork.com/lens_table_1.htm and tripod pin offset data :
http://www.swissarmyfork.com/mount_table_1.htm
- Pierre Toscani's ray-tracing calculations and entrance pupil animations:
http://www.pierretoscani.com/echo_fisheyes_english.html of the
 - Nikon 10.5mm f2.8 G ED
 - Nikon 16mm f2.8 D
 - Nikon 28mm f2.8 D

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This page was last modified on 26 March 2013, at 02:06.

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