

## **\_ref-reviews.xls**

Version 07 .2007-08-09  
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This summary of user reviews and surveys for Canon EF and compatible lenses from PhotoZone and Fred Miranda, plus a few Photodo optical resolution tests and other info, was made for my own use - use it at your own risk. Photozone data is for full frame 35mm bodies only, except that 17mm & shorter zooms are for APS-C bodies.

all primes are updated to 2007-07-18

for primes only, bold font shows Canon lenses, so you can see where Canon "fits" compared to the competition.

for zooms only, bold font are updated to 2007-07-18 (data for all others is from 2005-12-06)

all "Carl Zeiss" lenses are the Contax versions

Major data source url's are defined below, others are noted in the abbreviations section

Fred Miranda [www.fredmiranda.com](http://www.fredmiranda.com)  
Photodo [www.photodo.com](http://www.photodo.com)  
PhotoZone [www.photozone.de/active/survey/querylens.jsp](http://www.photozone.de/active/survey/querylens.jsp)

## **Abbreviations**

a>b rating varies from "a" (closer) to "b" (further) according to distance from subject (e.g. 5>4 d)  
AF pz rating for speed of autofocus (AF)  
Build pz rating for quality of lens build (construction, smoothness of manual controls, mount fit, etc.)  
cdi Chasseur d'Images performance rating (Nstars) Nikkors from <http://members.shaw.ca/nikonfaq/a.html>  
Colour pz colour cast (0 = neutral, +ve = warm, -ve = cool)  
Dist. pz score for problems with distortion for prime lens (100 = none)  
dist.l pz score for problems with distortion for zoom lens at long focal length (100 = none)  
dist.w pz score for problems with distortion for zoom lens at wide focal length (100 = none)  
dr David Ruether Nikkor <http://ferrario.com/ruether/slemn.html#normal>, "perfect" =7, highest any lens =5.2  
f/0 f/0 = lens maximum aperture (e.g. f/2.8)  
flare pz score for problems with flare (100 = none)  
fm average score (out of 10) from Fred Miranda, [www.fredmiranda.com](http://www.fredmiranda.com)  
long pz category for zoom lens at longest focal length  
\_n\_ in rating column: wide variation of scores for a number of tested lenses, n = average score  
N N = n.pz  
n.fm number of people rating this lens for fm score  
n.pz number of people rating this lens for pz score  
\_p optimized for portrait distances (e.g. Nikkor 50/1.2 5\_p is a 5 at 4 to 15 feet, but lower closer & further)  
p'do photodo MTF lens resolution test (see [www.photodo.com](http://www.photodo.com)) highest possible score is 5  
pz PhotoZone, see [www.photozone.de/active/survey/querylens.jsp](http://www.photozone.de/active/survey/querylens.jsp)  
pz.ave pz average score including optical performance, distortion and vignetting  
pz.f/0 pz optical performance for prime lens at widest aperture (100 = perfect)  
pz.f/0.l pz optical performance for zoom lens at widest aperture and longest focal length (100 = perfect)  
pz.f/0.w pz optical performance for zoom lens at widest aperture and widest focal length (100 = perfect)  
pz.f/8 pz optical performance for prime lens at aperture f/8 (100 = perfect)  
pz.f/8.l pz optical performance for zoom lens at aperture f/8 and longest focal length (100 = perfect)  
pz.f/8.w pz optical performance for zoom lens at aperture f/8 and widest focal length (100 = perfect)  
pz.perf pz average score of optical performance, for prime pz.perf = ave(pz.f/0, pz.f/8) (100 = perfect)  
vign. pz score for problems with vignetting for prime lens (100 = none)  
vign.l pz score for problems with vignetting for zoom lens at longest focal length (100 = none)  
vign.w pz score for problems with vignetting for zoom lens at longest focal length (100 = none)  
wide pz category for zoom lens at widest focal length

## **Worksheets**

prime Canon EOS EF prime lenses and selected compatible lenses : all updated to 2007-07-18  
zoom Canon EOS EF zoom lenses and selected compatible lenses: lenses in bold updated to 2007-07-18  
compare a place where you can copy specific data for quick comparisons

pz and fm scores for lenses with input from fewer than 10 people are shown in grey font

Approximate order of lenses in lists is first sort by pz.perf, then by pz.ave, then by fm. Some lenses with very little information are inserted where I thought it might be best.

_ref-reviews.xls			Version 07			www.jcolwell.ca		Prime Lenses	Performance									
pz.perf	pz.ave	n.pz	fm	n.fm	p'do	cdi	other	All primes updated to 2007-07-18	pz.f/0	pz.f/8	Dist.	Vign.	Colour	Flare	AF	Build	N	
73	78	12	9.2	21	3.3			<b>Canon EF TS-E 24mm f/3.5 L</b>	64	81	88	80	4	72		92	12	
81	85	4	9.5	9	x			<b>Canon EF TS-E 45mm f/2.8</b>	73	89	92	84	0	78		94	4	
93	97	8	9.8	20	x			<b>Canon EF TS-E 90mm f/2.8</b>	88	98	100	100	0	91		96	8	
91	68	4			x			Carl Zeiss Distagon T* 16mm f/2.8 Fish	85	97	0	88	5	96		88	4	
76	65	22	9.0	34	x			<b>Canon EF 15mm f/2.8 Fisheye</b>	67	84	29	78	2	63	57	86	22	
			9.2	25	x			Sigma AF 15mm f/2.8 EX Fisheye	x									
77	80	3						LeicaR Elmarit-R 16/2,8	x									
76	68	10	9.2	5	2.5			Carl Zeiss Distagon T* 15/3.5	68	86	87	80	0	70		90	3	
75	73	28	6.9	11	x			Tamron AF 14mm f/2.8 SP	65	87	50	68	1	41	64	86	10	
74	71	8			x			<b>Canon EF 14mm f/2.8 L USM</b>	67	82	80	63	2	66	84	88	28	
74	68	11			x			SMC Pentax 15/3.5	63	84	90	46	0	53		97	8	
64	59	26	8.8	18	3.1		4.0 dr	Nikkor 15/3.5 AIS	64	84	73	50	7	30		95	11	
55	61	16			x			Sigma AF 14mm f/2.8 EX HSM	51	77	49	58	6	37	75	84	26	
								Sigma AF 14mm f/3.5	47	62	67	66	0	40	48	66	16	
								LeicaR Super-Elmar-R 15/3,5	x									
97	89	6			x			Leica Elmarit R Super-W 19/2.8	93	100	82	81	18	83		97	6	
94	93	24			x			Carl Zeiss Distagon T* 21/2/8	89	98	94	89	0	79		96	24	
90	84	4			x			Leica R Super Angulon 21mm f/4	87	93	91	65	0	70		85	4	
88	88	14			x			Olympus Zuiko MC 21mm f/3.5	85	90	70	56	14	64		92	7	
					x			SMC Pentax 18/3.5	x									
82	71	21	9.0	4	3.0			Pentax SMC-A/FA 20mm f/2.8	70	93	55	66	1	76	58	75	21	
81	75	34			x		_4.5_ dr	Nikkor 20/2.8 AIS	71	91	69	70	4	72		93	34	
81	73	20			x			Tokina AF 17mm f/3.5 AT-X	74	87	58	73	0	71	57	84	20	
80	76	16			x			Carl Zeiss Distagon T* 18/4	72	88	84	60	8	69		87	16	
79	78	78	7.4	36	3.4			<b>Canon EF 20mm f/2.8 USM</b>	70	87	78	75	2	70	87	83	78	
79	75	6			x		4 4.5 dr	Nikkor 18/3.5 AIS	71	87	88	53	0	68		94	6	
74	74	10			3.0			Olympus Zuiko MC 21mm f/2	63	85	63	59	10	70		91	7	
70	74	44	7.5	53	x			Sigma AF 20mm f/1.8 EX HSM	53	87	77	78	4	68	54	79	44	
71	71	25	9.2	16	3.0			Tokina AF 17mm f/3.5 AT-X Pro	59	83	59	81	2	65	51	86	25	
49	52	14			x			Sigma AF 18mm f/3.5	37	60	58	51	3	45	38	65	14	
81	78	33	9.0	49	x		4.7	<b>Canon EF 24mm f/1.4 L USM</b>	71	91	82	67	5	72	91	87	33	
					4.0			Sigma Super-Wide II 24/2.8 MF										
89	88	44			3.9		_4.5_ dr	Nikkor 24/2.8 AIS	81	97	88	85	3	84	40	95	44	
84	84	63	8.6	45	3.9			<b>Canon EF 24mm f/2.8</b>	76	91	84	84	1	75	64	73	63	
86	84	23			3.6		4.2 dr	Nikkor 24/2.0 AIS	78	94	81	84	2	81		98	23	
83	86	31			3.4			Carl Zeiss Distagon T* 25/2,8	73	92	92	88	0	94		95	31	
81	81	10						Olympus Zuiko MC 24mm f/2	72	89	83	78	17	70		97	10	
77	78	19	7.1	14	x			Sigma AF 24mm f/1.8 EX HSM	63	90	76	82	12	68	55	74	19	
73	78	14						Olympus Zuiko MC 24mm f/2.8	64	82	86	79	7	66		79	14	
71	70	13			3.2			Leica Elmarit R 24/2.8	60	82	63	73	7	64		92	13	



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pz.perf	pz.ave	n.pz	fm	n.fm	p'do	cdi	other		<b>All primes updated to 2007-07-18</b>	pz.f/0	pz.f/8	Dist.	Vign.	Colour	Flare	AF	Build	N	
98	99	14			x				Carl Zeiss S Planar T*60/2.8 Micro [1:2]	96	100	100	100	0	96		100	14	
92	95	30			4.4	5	4.8>4		Nikkor Micro 55/2.8 AIS	87	97	99	98	2	87		90	30	
87	91	39	9.3	51	4.4				<b>Canon EF 50mm f/2.5 macro</b>	80	93	94	95	4	88	36	63	39	
87	86	5			x				LeicaR Macro-Elmar-R 60/2,8	82	92	93	75	12	90		100	5	
86	85	3	9.8	18	x				<b>Canon EF MP-E 65mm f/2.8 Macro</b>	81	90	100	70	20	60	20	70	3	
			9.6	76	x				<b>Canon EF-S 60mm f/2.8 Macro USM</b>	x									
85	89	34	9.1	27	4.2				Sigma AF 50mm f/2.8 macro EX	78	91	96	91	3	79	23	68	34	
94	97	11			x				Voigtlander Heliar 75mm f/2.5	90	98	100	100	-2	95		80	11	
90	88	9			x				Carl Zeiss Planar T* 85mm f/1.2	82	98	88	82	13	80		100	9	
90	93	47			4.6				Carl Zeiss Planar T* 85/1,4	82	98	98	94	2	90		98	47	
					4.6				SMC Pentax-A *ED 85/1.4	x									
90	92	23			4.1				Carl Zeiss Sonnar T* 85mm f/2.8	84	95	92	97	3	96		93	23	
88	92	144	9.4	178	4.1				<b>Canon EF 85mm f/1.8 USM</b>	81	95	97	94	2	85	93	85	144	
86	84	8			x				Leica R Summilux-R 80/1,4	76	95	87	76	0	74		89	8	
82	78	33	9.6	94	4.5				<b>Canon EF 85mm f/1.2 L USM</b>	71	93	77	71	6	71	39	91	33	
		0	9.6	56	x				<b>Canon EF 85mm f/1.2 L II USM</b>	x									
					4.4	3	4.8	dr	Nikkor 85/1.4 AIS	x									
					4.2	3	4.8	dr	Nikkor 85/2.0 AIS	x									
96	98	11			x				Carl Zeiss Planar T* 100mm f/2	94	98	100	98	4	94		100	11	
93	96	26			4.2		4.8	dr	Nikkor 105/2.5 AIS (black front model)	89	97	100	98	2	89		94	26	
91	93	16			4.4		4.6	dr	Nikkor 105/1.8 AIS	84	98	97	93	1	86		97	16	
89	93	67	9.1	52	4.2				<b>Canon EF 100mm f/2 USM</b>	82	96	96	97	10	88	94	83	67	
87	87	5			x				LeicaR Summicron-R 90/2	87	87	94	80	7	91		95	5	
99	99	13			4.6				LeicaR Apo-Macro-Elmarit-R 100/2,8	97	100	100	98	-2	93		100	13	
94	96	21			x				Carl Zeiss Makro-Planar T* 100mm/2.8	90	97	100	96	0	96		98	21	
94	95	91	9.6	119	x				<b>Canon EF 100mm f/2.8 USM macro</b>	90	98	98	95	2	87	91	85	91	
94	94	22	9.5	25	3.9				Tamron AF 90mm f/2.8 SP Di macro	90	97	94	96	-3	80	39	68	22	
91	94	65			x				<b>Canon EF 100mm f/2.8 macro</b>	86	95	96	97	2	89	40	83	65	
89	92	87			x				Tamron AF 90mm f/2.8 SP macro	81	96	95	96	3	85	39	71	87	
87	91	10			4.1		4.5>5	dr	Nikkor Micro 105/2.8 AIS	79	95	97	93	-2	83		89	10	
88	92	79	9.2	51	x				Sigma AF 105mm f/2.8 macro EX	81	95	98	93	1	83	29	84	79	
89	91	4			x				Tokina AF 100mm f/2.8 AT-X Pro D mac	82	96	100	87	0	72	32	95	4	
80	85	13			3.9				Tokina AF 100mm f/2.8 AT-X macro	69	90	91	88	0	75	56	90	13	
74	86	17			x				Sigma AF 90mm f/2.8 macro	67	81	100	94	2	71	32	66	17	

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pz.perf	pz.ave	n.pz	fm	n.fm	p'do	cdi	other		<b>All primes updated to 2007-07-18</b>	pz.f/0	pz.f/8	Dist.	Vign.	Colour	Flare	AF	Build	N
97	96	81	9.9	208	4.5				<b>Canon EF 135mm f/2 L USM</b>	94	99	98	92	7	88	93	97	81
98	97	4			x				Carl Zeiss Sonnar T* 135mm f/2	96	100	100	93	16	86		100	4
					4.2				SMC Pentax-A*ED 135/1.8	x								
92	94	52			4.1				Carl Zeiss Sonnar T* 135/2,8	87	96	97	97	3	86		90	52
77	83	18	9.2	22	3.9				<b>Canon EF 135mm f/2.8 Softfocus</b>	67	87	86	92	5	61	37	60	18
91	90	7	9.5	54	4.1				Sigma AF 150/2.8 EX DG APO macro	88	94	96	83	0	81	53	91	7
97	99	9			x				SMC Pentax-A*ED 200/4 Macro	94	100	100	100	2	95	20	100	9
95	94	15	9.8	34	3.9				<b>Canon EF 180/3.5 L USM macro</b>	92	98	93	93	6	84	74	95	15
94	94	2	8.4	14	x				Tamron AF 180mm f/3.5 SP LD Di macro	87	100	100	90	12	80	0	100	2
89	91	26	9.3	20	x				Sigma AF 180mm f/3.5 EX macro HSM	83	95	97	87	-2	74	51	84	26
88	93	10			x	3	4.0	dr	Nikkor AI-S 200mm f/4 ED Micro	79	96	100	97	7	93		96	10
96	94	12	10.0	32	4.8				<b>Canon EF 200mm f/1.8 L USM</b>	94	98	95	90	13	91	95	100	12
100	95	6			4.4				LeicaR Apo-Telyt-R 180/3,4	100	100	100	79	3	90		96	6
94	97	1			x				Carl Zeiss Apo-Sonnar T* 200mm f/2	87	100	100	100		100		100	1
93	95	95	9.8	98	4.1				<b>Canon EF 200mm f/2.8 L USM I II</b>	88	97	96	97	2	86	91	95	95
		0			4.1	4	4.8	dr	Nikkor 180mm ED f/2.8 AIS	x								
94	96	4			3.7				SMC Pentax-A* ED 200/2.8	87	100	100	95	0	93		85	4
89	92	13			3.8				Carl Zeiss Sonnar T* 180mm f/2.8	85	92	93	96	0	87		93	13
84	88	6			x				Carl-Zeiss Tessar T* 200mm f/3.5	80	88	100	84	21	80		90	6
					3.6				Nikkor*ED IF 200/2 AIS	x								
					3.6	4	4.5	dr	Tamron SP MF IF 180/2.5	x								
					3.6				Nikkor 200/4 AI, AIS	x								
96	98	19	9.9	61	x				<b>Canon EF 300mm f/2.8 L IS USM</b>	94	98	100	98	1	82	97	96	19
97	97	19			x				<b>Canon EF 300mm f/2.8 L USM</b>	95	99	98	94	3	90	99	98	19
					4.4				LeicaR Apo-Telyt-R 280/2,8	x								
91	95	14	8.8	4	3.8				Tokina AF 300mm f/2.8 AT-X Pro	87	95	100	96	-3	92	80	95	14
90	91	11	9.5	15	x				Sigma AF 300/2.8 APO EX HSM	85	94	92	94	14	73	81	92	11
88	90	13			3.5				Tokina AF 300mm f/2.8 AT-X I II	79	96	94	92	0	86	59	95	13
83	83	9	8.0	1	3.8				Tamron AF 300mm f/2.8 SP LD	78	87	78	89	2	74	65	87	9
80	83	7			3.6				Sigma AF 300mm f/2.8 APO	73	86	90	82	4	70	43	66	7
95	96	44			4.3				<b>Canon EF 300mm f/4 L USM</b>	93	97	98	97	3	93	96	97	44
92	94	58	9.7	115	3.4				<b>Canon EF 300mm f/4 L IS USM</b>	87	96	98	96	3	83	91	94	58
					x				SMC Pentax-M*, -A* 300/4									
89	93	11			3.0				Carl-Zeiss Tessar T* 300mm f/4	85	93	97	98	-3	91		87	11
85	89	20	9.0	3	x				Sigma AF 300/4 APO macro HSM	78	92	93	92	-4	77	54	82	20
63	79	12			x				Tokina AF 300mm f/4 AT-X	51	75	100	89	1	64	30	81	12

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98	99	6	10.0	16	x			<b>Canon EF 400mm f/2.8 L IS USM</b>	98	98	100	100	15	92	96	100	6	
95	97	5			4.4			<b>Canon EF 400mm f/2.8 L USM I</b>	92	97	100	100	5	92	100	100	5	
91	95	14			4.4			<b>Canon EF 400mm f/2.8 L USM II</b>	89	93	97	100	5	89	96	100	14	
					4.1			Nikkor 400/2.8 ED IF AIS MF	x									
			8.9	17	x			<b>Canon EF 400mm f/4 DO IS USM</b>	x									
					3.6		5.0 dr	Nikkor 400/3.5 ED IF AIS MF	x									
					3.6			Tamron SP 400mm f/4	x									
92	94	30	9.4	63	x			<b>Canon EF 400mm f/5.6 L USM</b>	89	94	97	97	2	89	88	89	30	
82	86	10	7.3	3	3.5			Sigma AF 400/5.6 APO macro HSM	76	87	96	86	6	77	62	79	10	
77	85	17			x			Sigma AF 400/5.6 APO macro	68	86	92	93	6	71	48	73	17	
71	84	28			2.8			Tokina AF 400/5.6 AT-X	62	79	98	95	11	80	41	83	28	
56	67	13			2.5			Sigma AF 400/5.6 APO	47	65	78	76	17	55	27	60	13	
96	97	21	10.0	45	x			<b>Canon EF 500mm f/4 L IS USM</b>	95	97	100	97	3	95	95	100	21	
95	96	16			x			<b>Canon EF 500mm f/4.5 L USM</b>	91	98	100	95	3	92	90	98	16	
95	95	8	9.4	13	x			Sigma AF 500mm f/4.5 APO EX HSM	91	98	100	91	7	89	96	94	8	
100	100	2	10.0	20	x			<b>Canon EF 600mm f/4 L IS USM</b>	100	100	100	100	14	100	88	100	2	
99	99	6			4.0			<b>Canon EF 600mm f/4 L USM II</b>	97	100	100	100	13	97	100	100	6	
94	97	1	8.5	4	x			Sigma AF 800mm f/5.6 APO EX HSM	87	100	100	100	0	80	80	80	1	

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pz.perf	pz.ave	n.pz	fm	n.fm	p'do	<b>bold:</b> updated to 2007-07-18 (others v.02)	pz.f/0w	pz.f/8w	pz.f/0.l	pz.f/8.l	dist.w	dist.l	vign.w	vign.l	Colour	Flare	AF	Build	N
78	76	69	9.0	11	x	<b>Tokina AF 12-24mm f/4 AT-X Pro DX (IF)</b>	69	85	72	86	61	80	71	83	6	53	54	88	69
72	72	53	9.1	146	x	<b>Canon EF-S 10-22mm f/3.5-4.5 USM</b>	63	80	67	78	58	78	65	86	-1	67	84	72	53
67	66	48	8.4	97	x	<b>Sigma AF 10-20mm f/4-5.6 EX DC (HSM)</b>	57	76	59	77	55	77	53	70	7	56	67	80	48
65	71	48	8.4	69	x	<b>Sigma 15-30/3.5-4.5 EX DF</b>	54	75	56	73	69	79	74	86	23	45	46	78	48
59	68	15	8.7	62	x	<b>Sigma 12-24 f4.5-5.6 EX DG Asp USM</b>	48	64	56	68	73	86	65	80	5	44	44	63	15
71	70	4	7.3	3	x	<b>Tamron SP 11-18/4.5-5.6 Di II LD</b>	53	88	59	85	42	62	81	86	16	66	26	60	4
		0	9.6	22	x	<b>Canon EF 16-35mm f/2.8 L II USM</b>	x												
87	83	59	9.3	108	x	<b>Canon EF -S 17-55mm f/2.8 USM IS</b>	83	92	83	91	74	85	68	84	1	62	91	67	59
83	82	140	9.0	356	x	<b>Canon EF 17-40mm f/4 L USM</b>	78	88	79	88	67	85	82	90	2	79	88	91	140
83	83	73	8.3	27	3.2	<b>Canon EF 17-35mm f/2.8 L USM</b>	76	88	79	90	66	88	80	94	3	74	92	93	73
83	78	73	9.0	65	x	<b>Tamron AF 17-50mm f/2.8 SP LD XR Di II</b>	75	90	77	89	61	83	67	85	4	65	58	59	73
81	80	73	8.9	113	x	<b>Canon EF 16-35mm f/2.8 L USM</b>	73	87	76	89	65	86	79	88	5	69	93	95	73
74	75	15	8.7	55	x	<b>Tamron AF 17-35mm f/2.8-4 SP Di</b>	65	82	66	83	63	84	70	88	10	64	51	64	15
70	71	77	8.2	73	x	<b>Sigma AF 18-50mm f/2.8 EX DC</b>	56	79	62	82	61	84	62	85	18	63	54	69	77
66	67	34	8.7	16	x	Tokina AF 19-35mm f/3.5-4.5	55	77	55	76	47	75	65	86	0	47	46	64	34
64	71	44	8.4	38	x	Sigma AF 15-30mm f/3.5-4.5 EX DG DF	53	74	55	72	70	80	75	86	24	46	46	78	44
63	67	5	8.5	6	x	Tamron AF 19-35mm f/3.5-4.5	61	74	50	65	59	71	63	90	5	60	43	61	5
63	66	130	7.6	101	3.1	Canon EF-S 17-85mm f/4-5.6 IS USM	53	66	61	71	52	80	64	84	0	63	75	65	130
57	64	50	4.9	17	3.1	Sigma AF 17-35mm f/2.8-4 EX (HSM)	43	70	47	68	58	78	68	82	17	49	51	67	50
50	56	41	5.0	18	2.9	Sigma AF 18-35mm f/3.5-4.5 Aspherical	44	58	42	56	49	63	57	76	13	41	37	47	41
44	54	90	7.0	37	x	Canon EF -S 18-55mm f/3.5-5.6	36	52	37	51	49	72	62	73	1	45	38	27	90
40	49	19	5.0	18	x	Sigma AF 18-50mm f/3.5-5.6 DC	32	48	35	46	42	63	53	73	-1	43	37	39	19
			8.7	7	x	<b>Tamron AF 18-250/3.5-6.3 LD Asp</b>													
48	52	30	7.1	53	x	<b>Sigma AF 18-125mm f/3.5-5.6 DC Asph. IF</b>	37	58	40	58	46	63	47	66	22	48	31	53	30
45	51	18	7.0	5	x	<b>Tamron AF 18-200/3.5-6.3 XR DiII LD Asp mac</b>	36	52	39	53	46	60	53	68	5	51	39	52	18
42	35	6			x	Sigma AF 18-200mm f/3.5-6.3 DC DG	35	50	35	48	18	27	35	35	14	51	32	45	6

_ref-reviews.xls			Version 07			Zoom Lenses	Performance				Distortion		Vignetting						
pz.perf	pz.ave	n.pz	fm	n.fm	p'do	<b>bold:</b> updated to 2007-07-18 (others v.02)	pz.f/0w	pz.f/8w	pz.f/0.l	pz.f/8.l	dist.w	dist.l	vign.w	vign.l	Colour	Flare	AF	Build	N
89	89	37	8.6	19	3.5	<b>Canon EF 20-35mm f/2.8 L</b>	84	93	86	93	80	88	90	96	3	78	66	91	37
84	85	55	8.2	11	2.5	<b>Tokina AF 20-35mm f/2.8 AT-X Pro</b>	79	89	78	88	78	88	84	92	1	76	64	94	55
84	83	27	6.8	20	x	<b>Sigma AF 20-40mm f/2.8 EX DG DF</b>	77	87	81	91	65	85	79	97	27	70	31	84	27
80	81	16			3.4	<b>Tokina AF 20-35mm f/3.5-4.5 I</b>	73	85	75	85	68	82	85	95	-1	65	62	72	16
79	78	28			3.7	<b>Tamron AF 20-40/2.7-3.5 SP Aspherical IF</b>	72	86	72	86	63	71	84	89	14	47	50	76	28
77	80	14			3.5	Sigma AF 21-35mm f/3.5-4.2	71	84	68	84	76	85	82	87	8	59	39	71	14
77	76	34			3.3	Tokina AF 20-35mm f/3.5-4.5 II	71	83	71	82	58	78	77	86	1	70	56	84	34
71	74	61	7.8	15	x	Canon EF 20-35mm f/3.5-4.5 USM	62	80	61	79	60	79	81	88	1	64	82	71	61
58	59	29	4.9	8	2.8	Canon EF 22-55mm f/4-5.6 USM	51	66	51	62	46	62	57	73	1	47	66	30	29
89	89	72	9.0	304	x	<b>Canon EF 24-70mm f/2.8 L USM</b>	83	94	85	94	81	92	90	96	5	81	91	92	72
84	78	43	8.7	300	x	<b>Canon EF 24-105mm f/4 L IS USM</b>	79	90	77	88	63	78	66	85	0	75	81	89	43
70	73	61	8.3	108	x	<b>Sigma AF 24-70mm f/2.8 EX DF</b>	62	79	62	75	74	63	84	88	8	57	53	72	61
67	75	4	8.9	31	x	<b>Sigma AF 24-60mm f/2.8 Aspherical HF</b>	62	77	50	77	82	82	82	91	14	40	60	77	4
67	70	99	7.5	28	3.1	Canon EF 24-85mm f/3.5-4.5 USM	60	74	59	73	58	75	75	82	2	62	79	67	99
66	73	5			x	Tokina AF 24-40mm f/2.8 AT-X	57	75	59	73	60	79	87	91	0	65	56	80	5
65	68	47	9.3	14	x	Tamron AF 24-135/3.5-5.6 SP Aspherical IF	55	77	54	74	60	61	77	85	1	66	44	76	47
63	69	14			x	Tamron AF 24-70mm f/3.3-5.6 Aspherical	51	73	55	71	70	85	64	79	5	52	43	54	14
63	68	11	9.1	8	2.2	Sigma AF 24-70mm f/3.5-5.6 Aspherical HF	59	68	57	66	66	78	70	77	3	62	55	56	11
60	61	6	6.8	8	x	Sigma AF 24-135mm f/2.8-4.5 Aspherical IF	50	67	55	66	33	70	66	80	0	50	48	60	6
53	62	33			x	Sigma AF 24-70mm f/3.5-5.6 Aspherical	45	61	45	60	56	77	68	86	4	51	39	49	33



_ref-reviews.xls			Version 07			Zoom Lenses	Performance				Distortion		Vignetting						
pz.perf	pz.ave	n.pz	fm	n.fm	p'do	<b>bold:</b> updated to 2007-07-18 (others v.02)	pz.f/0w	pz.f/8w	pz.f/0.l	pz.f/8.l	dist.w	dist.l	vign.w	vign.l	Colour	Flare	AF	Build	N
90	90	135	9.7	46	3.9	<b>Canon EF 28-70mm f/2.8 L USM</b>	85	93	86	94	87	93	89	94	6	82	91	89	135
89	86	15			4	<b>Carl Zeiss Vario-Sonnar T* 28-85/3,3-4</b>	86	93	85	93	79	86	81	87	-3	80		92	15
85	83	9			3.8	<b>Carl Zeiss Vario-Sonnar T* 35-70mm f/3.4</b>	78	94	73	94	79	83	77	85	6	84		92	9
84	78	32			3.8	<b>Canon EF 28-80mm f/2.8-4 L USM</b>	80	87	80	88	67	80	67	76	0	66	62	83	32
80	83	32			x	<b>Tokina AF 28-70mm f/2.8 AT-X</b>	74	87	73	87	79	88	83	90	-1	73	53	85	32
79	82	145			3.1	<b>Tokina AF 28-70mm f/2.6-2.8 AT-X Pro II</b>	71	85	74	86	79	86	82	89	0	71	59	90	145
78	81	122	8.6	242	x	<b>Tamron AF 28-75mm f/2.8 SP XR Di</b>	69	85	72	86	76	85	84	88	14	73	54	66	122
78	81	25	7.5	23	x	<b>Tokina AF 28-70mm f/2.8 AT-X Pro SV</b>	64	90	68	89	74	86	85	93	4	73	55	90	25
78	81	68			x	Tokina AF 28-70mm f/2.6-2.8 AT-X Pro	71	84	72	85	77	86	79	90	0	71	60	88	68
79	79	9			2.8	Carl Zeiss Vario-Sonnar T* 28-70mm f/3.5-4.5	75	85	75	81	76	77	70	95	10	73		78	9
77	81	96			x	Sigma AF 28-70mm f/2.8	72	82	72	81	79	87	84	91	3	66	42	60	96
75	75	110	7.5	11	3.5	Sigma AF 28-70mm f/2.8 EX	69	83	67	80	72	69	76	83	2	66	53	70	110
74	78	58	8.0	7	x	Tokina AF 28-80mm f/2.8 AT-X Pro	64	87	60	84	75	79	82	90	3	62	63	94	58
74	73	43	8.6	13	x	Sigma AF 28-70mm f/2.8 EX DF	65	85	62	82	65	68	73	83	5	62	46	74	43
74	72	47			x	Canon EF 28-70mm f/3.5-4.5 I II	67	82	65	80	62	80	62	77	1	68	50	59	47
57	68	38	7.3	4	x	Tamron AF 28-80mm f/4-5.6 Aspherical	49	63	51	63	71	85	77	82	0	53	34	40	38
57	65	29			3.2	Canon EF 28-80mm f/3.5-5.6 USM I	52	65	49	61	62	78	67	85	2	62	73	59	29
56	65	43			2.7	Sigma AF 28-80/3.5-5.6 Aspherical macro	45	60	54	63	67	81	66	87	-2	54	42	45	43
53	56	46	4.4	7	3.1	Canon EF 28-80mm f/3.5-5.6 USM II III	48	60	44	58	53	55	61	66	-1	54	53	41	46
48	56	62			2.2	Canon EF 28-80mm f/3.5-5.6 USM IV V	41	52	42	56	54	63	65	74	-3	51	59	40	62
33	41	32	4.2	13	x	Canon EF 28-90mm f/4-5.6 USM I II	27	39	25	40	31	51	53	63	0	34	46	26	32

_ref-reviews.xls			Version 07			Zoom Lenses	Performance				Distortion		Vignetting						
pz.perf	pz.ave	n.pz	fm	n.fm	p'do	<b>bold:</b> updated to 2007-07-18 (others v.02)	pz.f/0w	pz.f/8w	pz.f/0.l	pz.f/8.l	dist.w	dist.l	vign.w	vign.l	Colour	Flare	AF	Build	N
90	89	9			3.7	<b>Carl Zeiss vSonnarT* 35-135mm f/3.3-4.5</b>	84	95	86	95	80	93	85	97	6	83		100	9
75	76	5			3.6	<b>Tamron AF 35-105mm f/2.8 SP IF</b>	66	77	67	89	55	77	86	93	16	51	46	71	5
72	75	43	7.0	16	2.4	<b>Tamron AF 28-105/2.8 SP LD Aspherical IF</b>	66	79	64	78	66	70	83	91	5	67	47	71	43
66	70	243	7.8	136	3.5	<b>Canon EF 28-135mm f/3.5-5.6 IS USM</b>	58	73	59	72	62	76	78	85	1	60	72	65	243
65	71	39			x	<b>Tokina AF 28-105mm f/3.5-4.5</b>	58	72	58	71	67	81	71	88	-1	63	47	76	39
62	68	338	8.6	92	3.3	<b>Canon EF 28-105mm f/3.5-4.5 USM I II</b>	53	71	53	69	63	77	74	86	2	60	81	67	338
62	64	51	7.6	38	x	<b>Tokina AF 24-200mm f/3.5-5.6 AT-X</b>	56	72	53	68	64	65	61	75	7	58	61	81	51
57	62	82			2.4	Sigma AF 28-105mm f/2.8-4 Aspherical	51	62	53	63	57	65	68	78	0	58	44	58	82
57	61	30			x	Sigma AF 28-135mm f/3.8-5.6 Aspherical macro	48	66	48	65	49	66	67	80	-9	59	38	61	30
56	65	14	6.0	1	2.3	Tamron AF 28-105mm f/4-5.6 IF	45	64	49	64	57	72	77	91	-1	56	40	46	14
54	61	8	5.0	5	x	Canon EF 28-105mm f/4-5.6 USM	51	61	42	61	51	78	64	82	14	56	72	49	8
48	57	13	5.7	7	x	Canon EF 28-200mm f/3.5-5.6 USM	43	57	41	51	68	64	63	68	11	55	62	48	13
46	56	16	8.0	2	x	Tamron AF 28-200mm f/3.8-5.6 XR macro	18	65	40	60	65	64	60	75	2	54	32	62	16
45	50	13			x	Sigma AF 28-105mm f/3.8-5.6 UC III	37	55	38	49	46	54	53	71	1	37	29	45	13
44	55	18			x	Tamron AF 28-200mm f/3.8-5.6 SLDA IF II	39	55	33	47	60	73	62	67	6	46	33	46	18
44	52	63			2.7	Tamron AF 28-200mm f/3.8-5.6 LD IF	39	53	35	48	48	59	63	73	0	44	36	50	63
42	51	23			2.7	Sigma AF 28-200mm f/3.5-5.6 DL	37	47	37	47	48	57	63	71	-3	53	28	48	23
92	89	3	8.8	29	x	<b>Canon EF 28-300mm f/3.5-5.6 L IS USM</b>	88	96	88	96	77	92	76	100	15	94	94	100	3
84	84	41	8.1	14	3.3	<b>Canon EF 35-350mm f/3.5-5.6 L USM</b>	79	90	78	90	75	86	82	90	0	80	91	98	41
52	52	2	6.8	17	x	Tamron AF 28-300mm f/3.5-6.3 XR LD macro	45	50	54	58	50	100	20	40	16	53	46	53	2
44	50	25			2.6	Tamron AF 28-300mm f/3.5-6.3 LD IF	39	50	39	49	52	58	52	59	-2	48	36	46	25
42	48	19	4.9	13	2.7	Sigma AF 28-300mm f/3.5-6.3 Asph. DL	35	48	38	48	46	48	58	64	0	45	37	52	19
94	88	14			3.7	<b>Canon EF 50-200mm f/3.5-4.5 L</b>	91	96	93	97	84	76	88	79	17	78	48	69	14
71	75	27	8.8	54	x	Sigma AF 50-500mm f/4-6.3 APO EX (HSM)	67	77	64	76	80	83	81	75	16	72	57	84	27
60	67	8			x	Sigma AF 55-200mm f/4-5.6 DC	55	67	50	66	80	80	66	74	14	68	25	50	8
57	67	9			3	Canon EF 55-200mm f/4.5-5.6 USM	54	60	55	58	67	78	82	84	-5	60	41	45	9

_ref-reviews.xls			Version 07			Zoom Lenses	Performance				Distortion		Vignetting						
pz.perf	pz.ave	n.pz	fm	n.fm	p'do	<b>bold:</b> updated to 2007-07-18 (others v.02)	pz.f/0w	pz.f/8w	pz.f/0.l	pz.f/8.l	dist.w	dist.l	vign.w	vign.l	Colour	Flare	AF	Build	N
95	95	54	9.5	238	x	<b>Canon EF 70-200mm f/2.8 L IS USM</b>	91	97	92	98	96	97	95	95	7	86	92	99	54
93	94	160	9.8	122	4.1	<b>Canon EF 70-200mm f/2.8 L USM</b>	90	95	91	95	95	95	96	97	3	87	96	97	160
			9.7	103	x	<b>Canon EF 70-200mm f/4 L IS USM</b>	x												
91	92	174	9.5	307	4.1	<b>Canon EF 70-200mm f/4 L USM</b>	87	95	87	94	92	91	94	94	2	83	92	93	174
90	91	54			4.2	<b>Canon EF 80-200mm f/2.8 L</b>	86	94	87	94	94	93	88	88	14	78	70	94	54
87	87	1			4.2	<b>LeicaR Vario-Elmar 80-200/4</b>	87	87	87	87					0	80		100	1
87	90	22			3.4	<b>Tamron AF 70-210mm f/2.8 SP LD</b>	85	91	81	89	93	93	95	94	-1	76	68	85	22
84	88	123	9.1	137	3.9	<b>Sigma AF 70-200mm f/2.8 APO EX (HSM)</b>	77	89	79	90	89	91	91	94	3	80	79	88	123
83	89	17			3.4	<b>Tokina AF 80-200mm f/2.8 AT-X</b>	77	87	79	90	92	91	95	97	7	83	56	87	17
83	83	14			3.8	<b>Carl Zeiss T* 80-200mm f/4</b>	79	89	77	86	93	85	87	70	13	75		93	14
81	86	60	7.8	8	x	<b>Tokina AF 80-200mm f/2.8 AT-X Pro</b>	77	88	72	86	92	92	91	91	-1	76	56	92	60
81	85	51			x	<b>Sigma AF 70-210mm f/2.8 APO</b>	76	87	74	86	88	93	86	86	5	76	48	80	51
76	82	29			x	Canon EF 70-200mm f/2.8 L USM + EF 2.0x	73	81	73	78	86	87	86	88	4	78	63	94	29
71	78	32			x	Sigma AF 70-210mm f/3.5-4.5 APO macro	64	82	61	78	83	80	84	88	0	65	43	57	32
66	79	5			x	Tokina AF 80-200mm f/2.8 AT-X Pro + 2xTC	72	72	54	66	89	89	93	93	8	66	40	93	5
63	69	41			3.1	Canon EF 70-210mm f/3.5-4.5 USM	60	73	51	68	74	72	77	75	4	65	78	58	41
54	67	9			x	Tamron AF 80-200mm f/4.5-5.6	48	61	48	57	76	80	73	90	5	66	36	55	9
94	94	8			3.8	<b>Carl Zeiss Vario-Sonnar T* 100-300/4,5-5,6</b>	93	97	88	97	94	95	95	95	15	91		90	8
91	91	14	9.2	59	x	<b>Sigma AF 120-300mm f/2.8 APO EX (HSM)</b>	89	94	89	93	88	90	90	93	6	88	84	94	14
87	91	85	9.1	151	3.6	<b>Canon EF 100-400mm f/4.5-5.6 L IS USM</b>	83	92	82	91	94	95	94	94	5	81	83	93	85
87	86	22			3.1	<b>Tokina AF 100-300mm f/4 AT-X I II</b>	84	93	81	90	85	85	85	84	-1	72	50	86	22
86	90	39	9.5	68	x	<b>Sigma AF 100-300mm f/4 APO EX (HSM)</b>	82	92	80	91	92	95	94	95	3	85	82	91	39
83	82	41			x	<b>Canon EF 100-300mm f/5.6 L</b>	80	89	76	86	79	79	85	85	7	74	61	67	41
78	83	12	8.9	16	x	<b>Tamron AF 200-500mm f/5.6 Di LD IF</b>	78	87	67	81	97	82	89	85	0	77	46	75	12
73	81	17	8.8	151	x	<b>Canon EF 70-300mm f/4-5.6 USM IS</b>	68	82	63	77	83	88	96	94	7	68	56	51	17
73	79	44	7.3	19	2.6	<b>Sigma AF 135-400mm f/4.5-5.6 APO Aspherical</b>	74	85	60	74	86	82	86	81	6	71	33	73	44
71	81	5	8.4	35	x	<b>Sigma AF 80-400mm f/4.5-5.6 EX OS APO</b>	66	74	66	78	100	85	92	88	9	80	52	85	5
65	77	12	7.9	89	x	<b>Canon EF 70-300mm f/4-5.6 USM DO IS</b>	57	78	53	71	86	90	87	94	-2	53	83	75	12



PhotoZone						dSLR updated 2007-08-09	Image Noise (@ ISO)			arti-				AF Speed		AF Accuracy		metering		
pz.ave	noise	AF	n.pz	fm	n.fm		100	400	800+	AWB	facts	dust	edge	norm	low light	norm	low light	matrix	exp	flash
8.6	7.6	7.5	164	8.9	78		Canon EOS 10D	9.5	7.7	5.6	7.1	8.9	7.8	3	8.5	6.5	8.4	6.6	7.9	0.1
9.0	7.6	9.0	34	9.7	55	Canon EOS 1D	9.4	7.7	5.7	7.8	8.7	6.2	2.6	9.7	8.6	9.5	8.1	8.7	0.1	7.2
9.2	8.2	8.7	45	9.3	75	Canon EOS 1D II	9.7	8.3	6.7	8.1	9.2	6	2.7	9.6	8	9.3	7.9	8.4	0.2	7.3
				9.5	66	Canon EOS 1D II N														
8.9	6.7	8.8	18	9.5	29	Canon EOS 1Ds	9.5	6.7	4	7.6	9.4	4.8	2.3	9.4	8.2	9.6	8	8.6	0.2	6.9
9.3	8.5	8.5	16	9.7	41	Canon EOS 1Ds II	10	8.7	6.8	8.1	9.3	6.7	2.4	9.6	7.9	8.8	7.5	9.3	0.7	8
8.8	8.0	7.8	250	9.2	185	Canon EOS 20D	9.6	8.1	6.2	7.1	9	6.4	3	8.8	7	8.5	6.8	7.9	0	7.1
8.2	7.2	6.8	160	8.9	69	Canon EOS 300D / dRebel	9.4	7.3	4.8	6.4	8.6	7.5	3.1	8	5.5	7.9	5.6	7	-0.3	5.6
8.9	8.1	8.0	102	9.5	115	Canon EOS 30D	9.5	8.2	6.6	7.6	9.2	6.8	3.1	8.8	7.3	8.7	7.1	8.2	0.2	7.2
8.5	7.5	7.2	274	8.9	52	Canon EOS 350D / dRebel XT	9.4	7.6	5.5	6.9	8.7	7.1	3.4	8.4	6.2	8.2	6	7.7	0.3	7.1
8.7	7.5	7.7	65	8.8	71	Canon EOS 400D / dRebel Xti	9.4	7.6	5.4	7	9	9.2	3.4	8.8	6.7	8.6	6.8	7.5	-0.3	7.2
9.0	8.4	8.3	54	9.4	148	Canon EOS 5D	9.8	8.4	7	7.1	8.9	6.6	2.6	9	7.6	9	7.5	7.8	0.4	7.8

(data continued from above)	Handling		proc	Mirror	shutter	finder	display	build	batt	value	sat	skill	N
	photo	dgi		vibrn	noise	bright							
Canon EOS 10D	8.4	8.3	6.9	8.2	8.1	7.3	7.4	8.8	100-200	8.3	8.6	2.9	164
Canon EOS 1D	9.1	8.1	9.2	8.4	6.1	9.2	6.9	9.7	100-200	7.9	9.2	3.2	34
Canon EOS 1D II	8.7	8.4	9.4	8.4	6.2	8.8	7.7	9.5	400-500	8.1	9.3	3.3	45
Canon EOS 1D II N													
Canon EOS 1Ds	9.1	9.1	7.4	8.7	6.6	9.3	6.5	9.8	100-200	6.6	8.7	3.3	18
Canon EOS 1Ds II	8.6	8.7	8.9	8.3	7.8	8.7	7.5	9.8	300-400	6.1	8.5	3.4	16
Canon EOS 20D	8.4	8.2	8.8	7.1	5.4	6.8	6.3	8.3	200-300	8	8.6	2.8	250
Canon EOS 300D / dRebel	6.9	7	5.6	6.2	6.4	5.6	6.5	6.1	100-200	8.3	7.7	2.6	160
Canon EOS 30D	8.7	8.5	8.9	7.8	7	7.7	8.1	8.6	300-400	8.1	9	2.7	102
Canon EOS 350D / dRebel XT	7.1	7.2	8.6	7.5	7.5	5.4	5.7	6.7	100-200	8.6	8.4	2.4	274
Canon EOS 400D / dRebel Xti	7.9	7.9	8.1	8	7.7	6	8.5	7.1	100-200	8.9	8.7	2.5	65
Canon EOS 5D	8.1	7.7	8.4	8.1	7.5	8.8	7.8	8.2	200-300	7.7	9	3	54

data source: PhotoZone D-SLR Performance Survey, <http://www.photozone.de/active/survey/dslrsurveyform.jsp>

pz.ave . = AVERAGE(noise(100),noise(400),atrif,AFspeed(norm),AFacc(norm)) . = AVERAGE(F4:G4,J4,M4,O4)  
noise . = AVERAGE(noise(100),noise(400),noise(800+)) . = AVERAGE(F4:H4)  
AF . = AVERAGE(AFspeed(norm),AFspeed(low light),AFacc(norm),AFacc(low light)) . = AVERAGE(M4:P4)

_ref-reviews.xls			Version 07				Comparison Page	
pz.perf	pz.ave	n.pz	fm	n.fm	p'do	cdi	other	
87	85	62			4.3			Carl Zeiss Distagon T* 28/2,8
89	86	15			4.0			Carl Zeiss Vario-Sonnar T* 28-85/3,3-4
89	90	29			4.0			Carl Zeiss Distagon T* 35/2,8
84	83	49	9.6	104	4.0			Canon EF 35mm f/1.4 L USM
85	83	9			3.8			Carl Zeiss Vario-Sonnar T* 35-70mm f/3.4
87	89	40			4.6			Carl Zeiss Planar T*50/1.7
82	85	241	9	246	4.4			Canon EF 50mm f/1.4 USM
75	76	5			3.6			Tamron AF 35-105mm f/2.8 SP IF
90	89	9			3.7			Carl Zeiss vSonnarT* 35-135mm f/3.3-4.5
94	88	14			3.7			Canon EF 50-200mm f/3.5-4.5 L
			8.7	7	x			Tamron AF 18-250/3.5-6.3 LD Asp
48	52	30	7.1	53	x			Sigma AF 18-125mm f/3.5-5.6 DC Asph. IF
45	51	18	7	5	x			Tamron AF 18-200/3.5-6.3 XR DiII LD Asp mac
42	35	6			x			Sigma AF 18-200mm f/3.5-6.3 DC DG
62	64	51	7.6	38	x			Tokina AF 24-200mm f/3.5-5.6 AT-X
42	48	19	4.9	13	2.7			Sigma AF 28-300mm f/3.5-6.3 Asph. DL
51	61	35			2.9			Sigma AF 70-300/4-5.6 APO macro Super