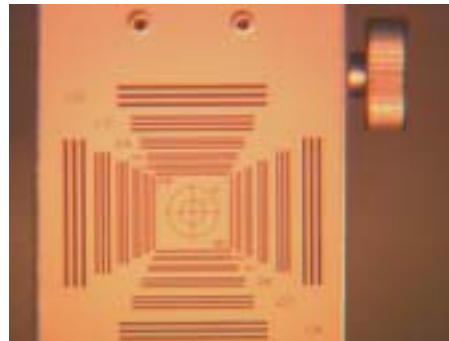


NBS DEFINITION PATTERN TESTING

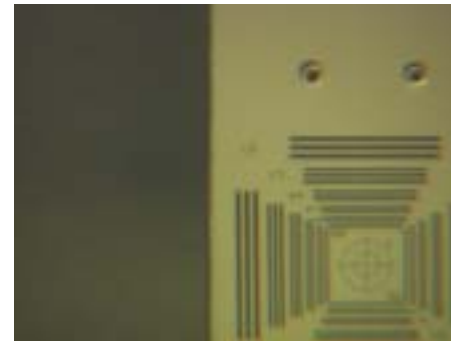
Shown below are actual images captured during "definition" testing, a way to analyze the overall clarity of eyewear lenses. The NBS pattern will appear crisp and clear through a lens with good definition; lenses with poor definition will distort it. Also look at how far the chart image has shifted for each sample. This represents prismatic power—the degree to which inferior lenses shift the apparent position of objects in your field of view. Note: Color of image represents color of lens through which it is viewed.



NBS PATTERN
(NO GLASSES)



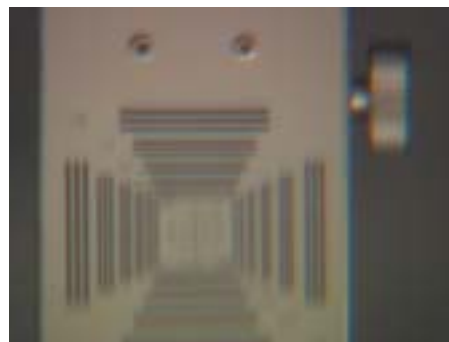
OAKLEY - SQUARE WIRE 2.0
Polarized Sample 21
48 Lines Resolution
.12d Prismatic Power



VAURNET -020
Polarized Sample 4
34 Lines Resolution
.31d Prismatic Power



RAY BAN - 4004
Men's Sport Sample 37
28 Lines Resolution
.22d Prismatic Power



NYX - CLASSIC COMPETITION
Men's Sport Sample 63
24 Lines Resolution
.15d Prismatic Power



DRAGON - LUCY
Women's Sport Sample 31
24 Lines Resolution
.18d Prismatic Power



GIORGIO ARMANI - 1521
Polarized Sample 11
20 Lines Resolution
.41d Prismatic Power



SMITH - FLIPSIDE 1
Polarized Sample 8
20 Lines Resolution
.43d Prismatic Power



MAUI JIM - 126-02
Polarized Sample 3
< 20 Lines Resolution
.35d Prismatic Power

PrivatePilot®

The World's Leading General Aviation Magazine

September 2003

This is the second year that the sunglasses "shoot-out" has appeared in *PRIVATE PILOT*. The optical performance of non-prescription sunglasses—or lack thereof—is a critical issue, so we deemed it worthy of a second look.

The test shows that even ordinary non-prescription sunglasses can change your view. In simple terms, this test was designed to measure how much an inferior lens can blur an image of thin lines drawn close together and viewed at a distance. Do optics really make a difference? To quote from the original shoot-out article, "For the average person they certainly do; for pilots, they're an imperative. Anyone who drives a car or flies a plane should be aware of how ordinary sunglasses can corrupt their view of the world. What you see isn't necessarily what you get, and at 200 knots, that's not a good thing."

Last year, we received some questions about how the results were compiled. Here's a technical brief to help you reach your own conclusions from the data. A random sample of 65 pairs of sunglasses, all considered to be popular models, were purchased on the open market. The samples were sent to ICS Laboratories, Inc. of Brunswick, Ohio. ICS is certified through the American Association for

Laboratory Accreditation. An organization that puts labs through rigorous inspection and analysis, it has certified ICS to perform 37 separate tests. The testing series used for this data was developed by the American National Standards Institute (ANSI) and is collectively called ANSI Z87.1. All 65 samples were tested on the proper head

form for the following ANSI Z87.1 tests: Prismatic Power, Refractive Power, Prismatic Imbalance, Astigmatism, and Definition. The results of these tests are listed herein. While not recommended for flight, some polarized models were tested also, and are listed separately.

Upon completion of testing at ICS Laboratories, the samples that passed the ANSI Z87.1 test for optical definition were taken to Dr. Nelson Jun, O.D. for further definition tests using computerized equipment that was built

specifically for this type of analysis. A prominent California optometrist, Dr. Jun is a graduate of the New England College of Optometry in Massachusetts. He is diagnostic certified and therapeutic pharmaceutical certified. The tables containing Dr. Jun's findings are listed herein.

The next time you select eyewear, remember that the industry emphasis is on fashion, not function. For pilots, optical performance is critical. How you see will always be more important than how you look. *By Robert Cochran*



The opinions expressed are those of the author and the resulting tables derived from independent testing. Y-Visionary publishing and its subsidiaries cannot be held responsible for the opinions or results expressed herein.

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 Page: 2 of 2

Results:

Polarized Lenses:

Sample ID	Manufacturer	Model	Method	Refractive Power (D) & Resolving Power							Prismatic Power & Imbalance										
				Left Ocular				Right Ocular			Left Ocular	Right Ocular	Vertical	Horizontal							
				Meridian 1	Meridian 2	Astigmatism	NBS Pattern 20	Meridian 1	Meridian 2	Astigmatism					NBS Pattern 20						
1	Arnette	Steel Swinger	A	0.07	0.03	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
2	Persol	2076-S	A	0.10	0.05	0.06	YES	0.02	-0.02	0.04	YES	0.35	0.32	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
3	Maui Jim	126-02	A	0.03	-0.03	0.04	NO	0.07	-0.02	0.10	NO	0.24	0.58	0.01	0.50	0.50	0.50	0.50	0.50	0.50	0.50
4	Vaurnet	Wave Killer	A	0.04	-0.07	0.11	YES	0.02	-0.08	0.07	NO	0.45	0.20	0.06	0.28	0.28	0.28	0.28	0.28	0.28	0.28
5	Costa Del Mar	Revo 4004	E	-0.13	-0.01	0.05	NO	0.04	-0.14	0.10	NO	0.43	0.36	0.04	0.98	0.98	0.98	0.98	0.98	0.98	0.98
6	Revo	H85	E	0.03	-0.15	0.09	NO	0.04	-0.04	0.04	YES	0.41	0.38	0.03	0.22	0.22	0.22	0.22	0.22	0.22	0.22
7	Serengeti	Flipside 1	E	-0.20	-0.04	0.04	YES	0.06	-0.18	-0.11	NO	0.25	0.41	0.02	0.13	0.13	0.13	0.13	0.13	0.13	0.13
8	Smith	Sidney	A	0.05	0.01	0.10	NO	0.02	-0.22	-0.13	NO	0.46	0.45	0.06	0.13	0.13	0.13	0.13	0.13	0.13	0.13
9	Bolle	Anchor	A	0.06	-0.04	-0.12	NO	0.02	0.00	0.06	NO	0.51	0.46	0.01	0.34	0.34	0.34	0.34	0.34	0.34	0.34
10	Hobie	1521	A	-0.21	-0.09	-0.12	YES	0.09	0.03	-0.13	NO	0.21	0.21	0.00	0.06	0.06	0.06	0.06	0.06	0.06	0.06
11	Giorgio Armani	RB3147	E	-0.12	-0.02	0.04	NO	-0.11	-0.24	-0.13	YES	0.35	0.39	0.03	0.33	0.33	0.33	0.33	0.33	0.33	0.33
12	Ray Ban	Clint	E	0.06	-0.01	0.05	NO	-0.16	-0.24	-0.24	NO	0.12	0.15	0.02	0.19	0.19	0.19	0.19	0.19	0.19	0.19
13	Spy	All Day	A	0.05	-0.24	-0.08	NO	0.06	-0.22	0.04	YES	0.36	0.38	0.09	0.59	0.59	0.59	0.59	0.59	0.59	0.59
14	Von Zipper	Box	E	-0.12	-0.24	0.03	YES	-0.24	-0.03	0.04	NO	0.21	0.32	0.12	0.59	0.59	0.59	0.59	0.59	0.59	0.59
15	Dragon	Purr	E	-0.16	0.03	0.02	YES	0.01	-0.24	0.04	YES	0.36	0.47	0.12	0.59	0.59	0.59	0.59	0.59	0.59	0.59
16	Black Fly	Mach 2	A	-0.20	-0.22	0.02	NO	-0.16	-0.03	0.04	YES	0.21	0.32	0.12	0.59	0.59	0.59	0.59	0.59	0.59	0.59
17	Angel	Konales	A	0.06	-0.22	0.02	NO	0.01	-0.24	0.04	YES	0.36	0.47	0.12	0.59	0.59	0.59	0.59	0.59	0.59	0.59
18	Tommy Bahama	Square P	E	-0.21	-0.21	0.02	NO	-0.16	-0.03	0.04	YES	0.21	0.32	0.12	0.59	0.59	0.59	0.59	0.59	0.59	0.59
19	Nike	Square Wire 20	A	-0.19	-0.21	0.06	NO	0.03	-0.02	0.05	YES	0.36	0.47	0.12	0.59	0.59	0.59	0.59	0.59	0.59	0.59
20	Oakley	Nexis 2	E	0.07	0.00	0.04	YES	0.04	0.00	0.04	YES	0.36	0.47	0.12	0.59	0.59	0.59	0.59	0.59	0.59	0.59
21	Anarchy	The Bait	A	0.04	0.00	0.04	YES	0.04	0.00	0.04	YES	0.36	0.47	0.12	0.59	0.59	0.59	0.59	0.59	0.59	0.59
22	Killer Loop	Kore	A	0.04	0.00	0.04	YES	0.04	0.00	0.04	YES	0.36	0.47	0.12	0.59	0.59	0.59	0.59	0.59	0.59	0.59
23	Kaenon	Kore	A	0.04	0.00	0.04	YES	0.04	0.00	0.04	YES	0.36	0.47	0.12	0.59	0.59	0.59	0.59	0.59	0.59	0.59
24	64																				

Women's Sport:

Sample ID	Manufacturer	Model	Method	Refractive Power (D) & Resolving Power							Prismatic Power & Imbalance										
				Left Ocular				Right Ocular			Left Ocular	Right Ocular	Vertical	Horizontal							
				Meridian 1	Meridian 2	Astigmatism	NBS Pattern 20	Meridian 1	Meridian 2	Astigmatism					NBS Pattern 20						
24	Ralph Lauren	Pallad YB7	A	-0.02	-0.05	0.07	NO	-0.04	-0.10	0.06	NO	0.19	0.17	0.02	0.19	0.19	0.19	0.19	0.19	0.19	0.19
25	Dolce & Gabbana	DG 378 S	A	0.02	-0.09	0.11	NO	0.03	-0.03	0.06	NO	0.22	0.17	0.03	0.37	0.37	0.37	0.37	0.37	0.37	0.37
26	Versace	87MM	A	0.03	-0.02	0.05	NO	0.01	-0.09	0.10	NO	0.33	0.20	0.12	0.14	0.14	0.14	0.14	0.14	0.14	0.14
27	Ray Ban	RB3155	A	0.04	0.00	0.11	NO	0.04	0.00	0.10	NO	0.29	0.20	0.06	0.13	0.13	0.13	0.13	0.13	0.13	0.13
28	Guess	Scandal SS67-F	A	0.07	-0.01	0.06	NO	0.02	-0.10	0.06	NO	0.14	0.18	0.03	0.08	0.08	0.08	0.08	0.08	0.08	0.08
29	Christian Dior	Faster S89YO	E	-0.12	-0.05	0.06	NO	-0.04	-0.02	0.06	YES	0.22	0.18	0.00	0.35	0.35	0.35	0.35	0.35	0.35	0.35
30	Angel	Mystical	A	0.04	-0.02	0.06	NO	0.01	-0.02	0.06	NO	0.98	0.92	0.00	0.30	0.30	0.30	0.30	0.30	0.30	0.30
31	Dragon	Lucy	A	-0.05	-0.11	0.04	NO	0.04	-0.10	0.06	NO	0.19	0.18	0.02	0.26	0.26	0.26	0.26	0.26	0.26	0.26
32	DKNY	7231S	A	0.01	-0.04	0.06	NO	0.01	-0.02	0.06	NO	0.29	0.26	0.32	0.02	0.08	0.08	0.08	0.08	0.08	0.08
33	Chanel	4042	A	0.04	-0.01	0.05	NO	0.04	-0.02	0.06	YES	0.23	0.29	0.07	0.08	0.08	0.08	0.08	0.08	0.08	0.08
34	Dita	Speed	A	0.06	0.02	0.04	YES	0.06	0.02	0.04	YES	0.06	0.06	0.01	0.03	0.03	0.03	0.03	0.03	0.03	0.03
35	Gucci	4120	A	0.06	0.02	0.04	YES	0.06	0.02	0.04	YES	0.06	0.06	0.01	0.03	0.03	0.03	0.03	0.03	0.03	0.03
36	Oakley	Fate	A	0.06	0.02	0.04	YES	0.06	0.02	0.04	YES	0.06	0.06	0.01	0.03	0.03	0.03	0.03	0.03	0.03	0.03

Men's Sport:

Sample ID	Manufacturer	Model	Method	Refractive Power (D) & Resolving Power							Prismatic Power & Imbalance										
				Left Ocular				Right Ocular			Left Ocular	Right Ocular	Vertical	Horizontal							
				Meridian 1	Meridian 2	Astigmatism	NBS Pattern 20	Meridian 1	Meridian 2	Astigmatism					NBS Pattern 20						
37	Ray Ban	RB4004	A	0.03	-0.01	0.12	NO	0.03	-0.01	0.04	YES	0.22	0.18	0.05	0.32	0.32	0.32	0.32	0.32	0.32	0.32
38	Arnette	Catfish	A	0.03	-0.09	0.12	NO	0.02	-0.08	0.10	NO	0.51	0.51	0.02	0.05	0.05	0.05	0.05	0.05	0.05	0.05
39	Killer Loop	Shamblie	A	0.08	-0.04	0.09	NO	0.06	-0.05	0.06	NO	0.46	0.43	0.08	0.22	0.22	0.22	0.22	0.22	0.22	0.22
40	Black Fly	Jimmie	A	0.05	-0.03	0.06	NO	0.03	-0.10	0.07	NO	0.33	0.26	0.02	0.12	0.12	0.12	0.12	0.12	0.12	0.12
41	DSO	Backseat	A	0.03	-0.08	0.03	NO	-0.05	-0.13	0.06	NO	0.55	0.46	0.03	0.32	0.32	0.32	0.32	0.32	0.32	0.32
42	Von Zipper	Hudson	E	-0.09	-0.12	0.07	NO	0.01	-0.07	0.06	NO	0.39	0.35	0.42	0.01	0.40	0.40	0.40	0.40	0.40	0.40
43	Smith	Manta Ray	E	-0.06	-0.08	0.03	YES	0.00	-0.03	0.03	YES	0.41	0.37	0.02	0.46	0.46	0.46	0.46	0.46	0.46	0.46
44	Scott	DXO	A	0.01	-0.02	0.08	NO	0.04	-0.03	0.04	YES	0.47	0.48	0.15	0.03	0.03	0.03	0.03	0.03	0.03	0.03
45	Vaurnet	2021	A	0.01	-0.02	0.08	NO	0.04	-0.02	0.04	NO	0.35	0.56	0.08	0.10	0.10	0.10	0.10	0.10	0.10	0.10
46	Persol	2854	A	0.05	-0.03	0.09	YES	0.05	-0.09	0.08	NO	0.38	0.50	0.05	0.12	0.12	0.12	0.12	0.12	0.12	0.12
47	Dolce & Gabbana	2571	A	0.04	-0.01	0.04	NO	-0.05	-0.03	0.05	NO	0.52	0.47	0.13	0.28	0.28	0.28	0.28	0.28	0.28	0.28
48	Anarchy	Supreme	A	0.03	-0.07	0.07	NO	-0.04	-0.03	0.05	NO	0.16	0.14	0.22	0.35	0.35	0.35	0.35	0.35	0.35	0.35
49	Serengeti	6766	A	0.00	-0.02	0.10	NO	0.02	-0.02	0.10	NO	0.60	0.39	0.10	0.04	0.04	0.04	0.04	0.04	0.04	0.04
50	Giorgio Armani	2507	A	0.03	-0.09	0.14	NO	0.08	-0.04	0.09	NO	0.56	0.56	0.01	0.60	0.60	0.60	0.60	0.60	0.60	0.60
51	Bolle	Downdraft	A	0.01	-0.03	0.05	NO	0.05	-0.08	0.05	NO	0.06	0.06	0.05	0.22	0.22	0.22	0.22	0.22	0.22	0.22
52	Spiz	M2	A	0.02	-0.04	0.06	NO	-0.01	0.01	0.03	YES	0.48	0.48	0.35	0.61	0.61	0.61	0.61	0.61	0.61	0.61
53	Spiz	Demora	A	0.01	0.10	0.00	NO	0.06	0.02	0.06	YES	0.33	0.57	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
54	Gatorz	Electric	A	0.00	-0.07	0.09	YES	0.00	-0.07	0.09	YES	0.32	0.35	0.19	0.02	0.02	0.02	0.02	0.02	0.02	0.02
55	Dragon	Prime	A	0.06	-0.02	0.03	NO	0.05	0.01	0.07	NO	0.15	0.19	0.19	0.02	0.02	0.02	0.02	0.02	0.02	0.02
56	Priorider	V3	A	0.04	-0.04	0.08	YES	0.00	-0.07	0.03	NO	0.17	0.19	0.19	0.02	0.02	0.02	0.02	0.02	0.02	0.02
57	Nike	Splice	A	0.04	0.00	0.05	YES	0.03	0.00	0.05	NO	0.15	0.19	0.19	0.02	0.02	0.02	0.02	0.02	0.02	0.02
58	Oakley	Sonoma L Wrap	A	0.05	-0.03	0.04	YES	0.03	0.01	0.04	NO	0.15	0.19	0.19	0.02	0.02	0.02	0.02	0.02	0.02	0.02
59	Scheyden	Graal Fyol	A	0.03	-0.01	0.05	NO	0.01</													