



## INTRODUCTION.

**(a) Swarovski:** In 1999 Swarovski introduced a new series of binoculars named Swarovski EL that attracted a lot of international attention because of the combination of its excellent optical performances and its excellent handling comfort due to its open bridge body design. Open bridges were not completely new in binocular history at that time, but the way Swarovski had modelled its EL's was certainly new and was considered a real revolution. The new binocular models: the EL's 8x42,5 and 10x42 became rapidly very popular and in the course of the years both their optical performances as well as their body design were improved further. Other EL models followed like the EL's 8x32 and 10x32, the EL's 10x50 and 12x50 and the EL Range 8x42 and 10x42.

Between 1999 and 2019 further changes- improvements were made to all EL models both optically as well as with regard to handling and body design and the improved EL's were now designated as EL-SV.

In 2020 Swarovski again shocked the binocular world with a completely new and very different binocular design: the NL pure range consisting of the 8x42, 10x42 and 12 x42 NL pure. The NL pure binoculars are characterized by a spectacular new body design and a newly designed optical system. The Schmidt-Pechan roof prism is turned 45 degrees in the binocular body. That allows a body shape with a slightly thinner and a bit curved tube at the eyepiece side and a weight shift which gives the NL pure excellent balance and a very high level of user comfort. It makes that the "old" EL models almost look bulky compared with the new NL pure. Added to that is the very large field of view for all three NL pure models, a convenient small close focus distance and an impressive image brightness. The images of the NL pure are sharp up to the very edge of the FOV and shows a spectacular image clarity, the reason of which is shown by the amount of light transmission in combination with a perfect natural color representation, see the added transmission spectrum.

**(b) Zeiss.** Zeiss-Wetzlar was the birth place of the excellent series of Victory FL binoculars like the Victory FL's: 7x42, 8x42, 10x42, 8x32, 10x32, 8x56 and 10x56 which were as far as the optics is concerned to my knowledge all designed by the late Dr. Walter Besenmatter. The FL's were the successors of the beautiful and very sturdy, strong and very heavy Design Selection – Night Hunter binocular range. But Zeiss also looked for improvements of the FL range and that resulted in a kind of revolutionary design: the Victory SF range with at first the Zeiss Victory SF 8x42 and 10x42 models. Both binoculars were designed by the same men who at Swarovski had designed the Swarovski EL's: optical engineer the late Konrad Seil and Gerald Dobler. At the same time as the SF binoculars were designed another new series of binoculars was born: the Zeiss Victory HT 8x42, 10x42, 8x54 and 10x54. The HT's were equipped with Abbe-König roof prisms which are more effective than Schmidt-Pechan roof prisms and the HT binoculars therefore were among others characterized by high light transmissions. The HT design was the basis for the later made new HT rangefinder binoculars. The excellent 42 mm HT 's lived only a short time in the Zeiss binocular program.

The Zeiss Victory SF was an improved version of the open bridge design as made by Swarovski because it was designed in such a way that a significant part of the optical components was shifted in the direction of the eyepiece and as a result the balance was shifted in the direction of the eyepiece resulting in excellent balance and handling comfort. That in combination with the open bridge design of the Victory SF made the use of the binoculars a real joy. The user gets the feeling that the SF feels lighter than its actual weight because of this rearrangement. It took Zeiss a few years to repeat this design for the 8 and 10x32 Victory SF binoculars. The 8x32 Victory SF is investigated here.

For customers who want to buy a binocular on the used items market I have added information of binoculars that can be a candidate of choice in comparison with the new ones despite different characteristics. Also investigated is a binocular that probably will be unknown to many: the Angénieux 7x30F roof prism binocular. I have given some information about the company Angénieux below.



*From left to right: Swarovski NL pure 8x42, Swarovski EL-SV 8,5X42, Swarovski EL-SV 8x32, Zeiss Victory SF 8x32, Zeiss Victory FL 8x32 and Angénieux 7x30 F. NB. The Swarovski EL-SV 8x32 is made in 2012, but is completely serviced in 2020, so it may well have the latest optics and coatings.*

### (c) Angénieux 7x30F

In the world of photography and cinematography Angénieux is a highly respected company. That is not the case in the binocular world, because the company has to my knowledge made only two binocular models: a 7x30F roof prism binocular and an 8x24 porro prism binocular. Before describing the 7x30 F roof prism binocular in more detail I will give a short overview of the history of the company.

#### **Angénieux company history:**

In 1935 Pierre Angénieux established in a village in the Loire (France) a company that carries his name. He was a brilliant young engineer with great skills and talents in mechanical precision optics to create new lenses of high quality and reliability and in 1935 he marketed his first lens in the field of photography. Due to WW-2 the production stopped but in 1945 he restarted his activities with a team of 30 persons which grew rapidly to 180 persons. He then undertook the manufacture of a revolutionary new lens type, the retrofocus, which was extremely successful and which allowed considerable developments of single lens mirror reflex camera's. The retrofocus is THE optical formula on which all wide-angles in the world are based.

In 1953 the company employed 280 persons into export markets particularly to the USA and the American company Bell and Howell, a world leader at that time in camera manufacturing, entrusted Angénieux with the manufacture of all fixed focal lenses for its 16 mm movie cameras.

From 1956 to 1962 Pierre Angénieux completed the design and manufacture of the first zoom lenses industrially produced in the world. The zoom lens of 10x was a quality lens capable of handling all requirements from wide-angle to a tele-photo lens. It replaced a whole series of fixed focal length lenses as being the basis system for all zoom lenses now manufactured in the world.

In 1964-1965 and later NASA used Angénieux lenses for photography on its space missions and more high-quality zoom lenses were developed and produced in the years thereafter. Its high-quality research is focused on 3 basis techniques: (a) new optical calculations, (b) high efficiency coating of optical elements and (c) mechanical reliability.

It was around 1990-1991 that Angénieux developed two binocular models: a 7x30F roof prism binocular and an 8x24 F porro prism model. The 7x30F is investigated and described here in more detail. Therefore, some technical details of the 8x24F here: Weight 430 g, FOV 111 m/1000m, close focus 2,75 m. The 7x30 F has foldable rubber eyecups, the 8x24 porro binocular not.

### **TEST RESULTS.**

The measured data are all summarized in tables and graphs of transmission spectra. For convenience I have also tabulated/listed data from previous tests/measurements, so one can compare the data if one wants to buy a used instrument or an older type.



**Photographs of the two Angénieux binoculars. Left 8x24 porro, right 7x30F roof prism binocula**

### **-1- THE SWAROVSKI NL PURE 8X42**

The new Swarovski NL pure Is an excellent instrument with a high level of user comfort due to a well-balanced body design, a smooth turning and well accessible focusing wheel, that needs only 1,9 turns from close focus to infinity. The measured close focus distance of the 8x42 was 1,86 m, close enough to make a butterfly shy. The metal eyecups are well made and have 6 intermediate stops enough choice for many customers. The green body cover feels pleasant and the connectors for the special strap system are well located, far enough away to not be in the way for all size hands. The body feels in the hand as if you are born with it (consider this as a poetic way to describe the feeling). In short: handling comfort is perfect. The turning resistance of the focusing wheel is just right and butter smooth. It takes almost two turns from close focus to infinity. The diopter correction ring is placed at the front side of the focusing wheel of the binocular and can very conveniently be turned while the binocular is used for observing. The turning resistance is exactly right, so it does not move unwanted.

The objective covers are attached to the binocular and they are well designed. I am not a fan of objective covers, but fortunately they can be removed easily. But the attachment system is constructed in such a way that they do not fall off easily, so well designed and well made.

Not long ago, Swarovski came up with the idea to design a completely new attachment system for the body strap. The connection system protrudes from the binocular body and it contains a bayonet connector with a spring inside to prevent the strap connector pin to come loose. In the beginning the system sometimes had birth problems resulting in the surprising event that the binocular would go its own way, not desired by the owner. These problems fortunately seem over now. But if you do not want the strap supplied with the NL pure, you can also use standard straps, since Swarovski supplies adapters, which also can be connected to the binocular body with the stainless steel bayonet pin.

Now everything is ready to use the NL pure and that is an overwhelming surprise for the following reasons: a crystal clear and very bright image with a very large field of view, sharp up to the very edge of the field. The colors are exactly right, so how come? Well the transmission spectrum shows the secret: high light transmission over a wide wavelength range and moreover: the spectrum is almost completely flat over a broad wavelength range, the basis for an excellent color reproduction. At the very edge of the FOV stars are slightly deformed, but that effect is really small.



A new item is the available head rest, that can be connected with two pins to the top of the bridge. It is meant to supply better image stability when the headrest is inserted. It works alright, but the effect will be stronger with higher magnifications as the NL pure 12x42.

Swarovski supplies a solid made strap and a very good bag. The bag may be a surprise since it is designed so that the NL pure is placed sideways in the bag and not upright as is generally the case. In my opinion a clever design, since the optical parts are not in contact with the fabric of the bag avoiding scratches etc.



Photo: Swarovski NL pure 8x42 with head rest

## CONCLUSION.

Swarovski offers with the NL pure an excellent binocular with very good optical performance and a high level of user comfort.

## -2- THE ZEISS VICTORY SF 8X32

The Victory SF has a well-designed and attractive body shape just like the Swarovski 8x32 EL-SV. It is roughly one cm longer than the EL-SV. The body cover consists of black colored hard rubber that feels good in the hands. The eyecups of the 32 mm Zeiss SF and the Swarovski EL-SV can be turned in and out in three steps, so users of spectacles can make a choice for the optimal position. Both binoculars have 19 mm eye relief, sufficient for most spectacle users. The Victory has plastic eyecups, whereas Swarovski use metal ones. Both can be removed to be replaced in case the eyecups are damaged or dirty. The rubber of the Victory SF eyecups is soft, whereas that of the EL-SV is harder.

The space of the open bridge is 5 cm long for the Victory SF and 5,5 cm for the Swarovski EL-SV. That is not a lot of difference but it can play a role in the handling of the binocular. With my hands there is room for only two fingers in the open space of the Victory bridge, leaving my middle finger just under the focusing wheel over the bridge and the index finger can then be used for focusing. With the EL-SV the open space accommodates my three fingers, so my index finger can be used for focusing. That situation is of course different for different hand sizes, so you better find out yourself. Both binoculars work fine for me with these space differences.

The turning resistance of both focusing wheels feels similar to me, but there is a difference in the mechanism to correct for the strength between the two eyes. The Zeiss SF has a small wheel on top of the central axis.

That has to be extracted to turn it to adjust for the difference in eye strength (and then pushed back of course to lock it). That works fine. To make these adjustments with the EL- SV one has to lift the focusing wheel, turn it to the desired position and push it back so it is locked. That works also fine. (Since 1999 a whole generation of users is familiar with this mechanism).

The EL- SV is a tiny bit lighter than the Victory SF, but that will hardly be noticed probably. With the SF-42 one can really feel the shift in weight distribution towards the eyepieces, I could not feel that with the Victory SF 32. Actually, I felt no difference in handling between the EL-SV 8x32 and the SF 8x32. As far as optical performance is concerned there are differences: most obvious is the difference in Field of View:

155m/1000m for the 32 mm Victory SF and 141m/1000m for the 32 mm EL-SV. Other parameters are hardly different as can be seen in table 1. Zeiss gives a very plain black colored bag with the Victory SF that fits tight over the binocular. It is well made, but it looks a bit plain for a binocular in this price range. Looking at different light sources from intense point sources to broader shining light sources I could not detect any sign of glare or internal reflections in the Swarovski NL pure or in the Zeiss Victory SF.

### **3. The Angénieux 7x30F**

This is a 30 year old binocular so we did not perform the full test, but these are the data obtained from a limited investigation: weight 405 g, FOV 126m/1000m, close focus 2,75 m, transmission 500nm = 73%, 550 nm=75%, color reproduction is good.

#### **CONCLUSION:**

**-1- THE SWAROVSKI NL pure 8x42 is an exceptional good binocular both optically as well as with regard to handling.**

**-2- THE ZEISS VICTORY SF 8X32 is a also a very good binocular both with regard to handling comfort as well as optical performance and a large FOV, but as far as brightness and color reproduction is concerned it is beaten by the Swarovski NL pure 8x42 and the EL-SV 8x32.**

*Acknowledgments: I am grateful to Ing. Dave van den Heuvel for his efforts to measure the presented transmission spectra.*

**Table 1**

<b>Binocular</b>	<b>Swarovski NL pure 8x42</b>	<b>Swarovski EL-SV 8,5x42 (2009)</b>	<b>Zeiss Victory SF 8x32</b>	<b>Zeiss Victory FL 8x32</b>	<b>Swarovski EL-SV 8x32 (2012) NB serviced in 2020</b>	<b>Leica Ultravid HD-plus 8x32 (2016)</b>
Weight	875 g	870 g	603 g	552 g	583 g	531 g
Objective diameter (mm)	41,96 mm	41,5 mm	31,75 mm	31,9 mm	31,6 mm	32,0 mm
Exit pupil (mm)	5,1 mm	4,9 mm	3,95 mm	4,15 mm	4 mm	4,0 mm
Magnification	8,2x	8,47x	8,03x	7,7x	7,9x	8x
Eyerelief (mm)	18 mm	20 mm	19 mm	15,5 mm	19 mm	13,3 mm
Field of view (m/1000m)	159m/1000 m	133m/1000m	155m/1000m	140m/1000m	141m/1000m	135m/1000m
Close focus (m)	1,86 m	1,35 m	1,84 m	1,8 m	1,76 m	2,1 m
Prism type	Schmidt-Pechan roof	Schmidt-Pechan roof	Schmidt-Pechan roof	Schmidt-Pechan roof	Schmidt-Pechan roof	Schmidt-Pechan roof
Diopter range	+/-4 diopt.	+/- 5 diopt.	+/- 4 diopt.	+/- 4 diopt.	=/- 4 diopt.	+/- 4 diopt.
Range between both eyes	55-74 mm	54-74 mm	53-75 mm	53-74 mm	54-74 mm	52-74 mm
Rev. CF- $\infty$	1,9	2,5	1,75	1,5	2	1,1
Phase correction coating	yes	yes	yes	yes	yes	yes
Light transmission 500 nm	92%	88%	87%	89%	91,6%	86,8%
550 nm	93%	89%	90%	93%	92,9%	89,2%
Body cover	Green hard rubber	Green hard rubber	Black hard rubber	Black hard rubber	Green or beige hard rubber	Black hard rubber
Color reproduction	Excellent	Excellent	Good	Good	Good	Very good
Accessories	Bag, strap, eyepiece cover, objective caps, head rest	Bag, strap, eyepiece cover	Bag, strap, eyepiece cover	Bag, strap, eye piece cover	Bag, strap, eyepiece cover	Bag, strap, eyepiece cover
Waterproof	Yes	Yes	Yes	Yes	Yes	Yes
Handling comfort	Super	Excellent	Excellent	Good	Excellent	Good
Warranty	10 years	10 years	10 years	10 years	10 years	10 years
Price (euro)	2870	2060	2340	2035	1890	1880 (2016)
Final judgment	+++++	+++++	+++++	+++++	+++++	+++++

**Table 2**

<b>Binocular</b>	<b>Swarovski NL pure 8x42</b>	<b>Swarovski EL-SV 8,5x42 (2009)</b>	<b>Zeiss Victory SF 8x42</b>	<b>Zeiss Victory FL 8x42</b>	<b>Zeiss Victory HT 8X42</b>	<b>Leica Ultravid HD- plus 8x42 (2016)</b>
Weight	875 g	870 g	787 g	772 g	837 g	766 g
Objective diameter (mm)	41,96 mm	41,5 mm	41,5 mm	31,9 mm	31,6 mm	41,7 mm
Exit pupil (mm)	5,1 mm	4,9 mm	5,1 mm	42 mm	42 mm	5,2 mm
Magnification	8,2x	8,47x	8,1x	7,7x	8x	8x
Eyerelief (mm)	18 mm	20 mm	18 mm	15,5 mm	16 mm	15,5 mm
Field of view (m/1000m)	159m/1000 m	133m/1000m	148m/1000m	135m/1000m	136m/1000m	102m/1000m
Close focus (m)	1,86 m	1,35 m	1,5 m	1,8 m	1,6 m	3 m
Prism type	Schmidt-Pechan roof	Schmidt-Pechan roof	Schmidt-Pechan roof	Abbe-König roof	Abbe-König roof	Schmidt-Pechan roof
Diopter range	+/-4 diopt.	+/- 5 diopt.	+/- 4 diopt,	+/- 4 diopt.	+/- 4 diopt.	+/- 4 diopt.
Range between both eyes	55-74 mm	54-74 mm	54-76 mm	54-76 mm	54-76 mm	52-74 mm
Rev. CF-∞	1,9	2,5	1,1	1,1	1,75	1,3
Phase correction coating	yes	yes	yes	yes	yes	yes
Light transmission 500 nm	92%	88%	88%	88%	92,3%	86,8%
550 nm	93%	89%	92%	92%	95,1%	87,3%
Body cover	Green hard rubber	Green hard rubber	Black hard rubber	Black hard rubber	Black hard rubber	Black hard rubber
Color reproduction	Excellent	Excellent	Good	Good	Good	Very good
Accessories	Bag, strap, eyepiece cover, head rest	Bag, strap, eyepiece cover	Bag, strap, eyepiece cover	Bag, strap, eye piece cover	Bag, strap, eyepiece cover	Bag, strap, eyepiece cover
Waterproof	Yes	Yes	Yes	Yes	Yes	Yes
Handling comfort	Super	Excellent	Excellent	Good	Excellent	Good
Warranty	10 years	10 years	10 years	10 years	10 years	10 years
Price (euro)	2870	2060	2445 (2016)	1879 (2011)	2185 (2016)	1880 (2016)
Final judgment	+++++	+++++	+++++	+++++	+++++	+++++

**Table 3**

<b>Binocular</b>	<b>Swarovski NL pure 8x42</b>	<b>Swarovski EL-SV 8,5x42 (2009)</b>	<b>Zeiss Victory SF 8x32</b>	<b>Zeiss Victory FL 8x32</b>	<b>Swarovski EL-SV 8x32 (2012) NB serviced in 2020</b>	<b>Leica Ultravid HD-plus 8x32 (2016)</b>
Weight	875 g	870 g	603 g	552 g	583 g	531 g
Objective diameter (mm)	41,96 mm	41,5 mm	31,75 mm	31,9 mm	31,6 mm	32,0 mm
Exit pupil (mm)	5,1 mm	4,9 mm	3,95 mm	4,15 mm	4 mm	4,0 mm
Magnification	8,2x	8,47x	8,03x	7,7x	7,9x	8x
Eyerelief (mm)	18 mm	20 mm	19 mm	15,5 mm	19 mm	13,3 mm
Field of view (m/1000m)	159m/1000 m	133m/1000m	155m/1000m	140m/1000m	141m/1000m	135m/1000m
Close focus (m)	1,86 m	1,35 m	1,84 m	1,8 m	1,76 m	2,1 m
Prism type	Schmidt-Pechan roof	Schmidt-Pechan roof	Schmidt-Pechan roof	Schmidt-Pechan roof	Schmidt-Pechan roof	Schmidt-Pechan roof
Diopter range	+/-4 diopt.	+/- 5 diopt.	+/- 4 diopt.	+/- 4 diopt.	+/- 4 diopt.	+/- 4 diopt.
Range between both eyes	55-74 mm	54-74 mm	53-75 mm	53-74 mm	54-74 mm	52-74 mm
Rev. CF-∞	1,9	2,5	1,75	1,5	2	1,1
Phase correction coating	yes	yes	yes	yes	yes	yes
Light transmission 500 nm 550 nm	92% 93%	88% 89%	87% 90%	89% 93%	91,6% 92%	86,8% 89,2%
Body cover	Green hard rubber	Green hard rubber	Black hard rubber	Black hard rubber	Beige or green hard rubber	Black hard rubber
Color reproduction	Excellent	Excellent	Good	Good	Good	Very good
Accessories	Bag, strap, eyepiece cover, head rest	Bag, strap, eyepiece cover	Bag, strap, eyepiece cover	Bag, strap , eye piece cover	Bag, strap, eyepiece cover	Bag, strap, eyepiece cover
Waterproof	Yes	Yes	Yes	Yes	Yes	Yes
Handling comfort	Super	Excellent	Excellent	Good	Excellent	Good
Warranty	10 years	10 years	10 years	10 years	10 years	10 years
Price (euro)	2870	2060	2340	2035	1890 o	1880 (2016)
Final judgment	+++++	+++++	+++++	+++++	+++++	+++++



**Table 4**

<b>Binocular</b>	<b>Swarovski NL pure 8x42</b>	<b>Meopta Meostar B1 8x32 (2016)</b>	<b>Zeiss Victory SF 8x32</b>	<b>Zeiss Victory FL 8x32</b>	<b>Swarovski EL-SV 8x32 (2012) NB serviced in 2020</b>	<b>Leica Ultravid HD-plus 8x32 (2016)</b>
Weight	875 g	588 g	603 g	552 g	583 g	531 g
Objective diameter (mm)	41,96 mm	31,92 mm	31,75 mm	31,9 mm	31,6 mm	32,0 mm
Exit pupil (mm)	5,1 mm	4,1 mm	3,95 mm	4,15 mm	4 mm	4,0 mm
Magnification	8,2x	7,8x	8,03x	7,7x	7,9x	8x
Eyerelief (mm)	18 mm	15,5 mm	19 mm	15,5 mm	19 mm	13,3 mm
Field of view (m/1000m)	159m/1000 m	139m/1000m	155m/1000m	140m/1000m	141m/1000m	135m/1000m
Close focus (m)	1,86 m	1,6 m	1,84 m	1,8 m	1,76 m	2,1 m
Prism type	Schmidt-Pechan roof	Schmidt-Pechan roof	Schmidt-Pechan roof	Schmidt-Pechan roof	Schmidt-Pechan roof	Schmidt-Pechan roof
Diopter range	+/-4 diopt.	+/- 3 diopt.	+/- 4 diopt.	+/- 4 diopt.	+/- 4 diopt.	+/- 4 diopt.
Range between both eyes	55-74 mm	53-73 mm	53-75 mm	53-74 mm	54-74 mm	52-74 mm
<b>Rev. CF-∞</b>	1,9	1,75	1,75	1,5	2	1,1
<b>Phase correction coating</b>	yes	yes	yes	yes	yes	yes
<b>Light transmission</b> <b>500 nm</b> <b>550 nm</b>	92% 93%	86,1% 89,9%	87% 90%	89% 93%	91,6% 92%	86,8% 89,2%
<b>Body cover</b>	Green hard rubber	Green hard rubber	Black hard rubber	Black hard rubber	Beige or green hard rubber	Black hard rubber
Color reproduction	Excellent	Vey good	Good	Good	Good	Very good
Accessories	Bag, strap, eyepiece cover, head rest	Bag, strap, eyepiece cover	Bag, strap, eyepiece cover	Bag, strap, eye piece cover	Bag, strap, eyepiece cover	Bag, strap, eyepiece cover
Waterproof	Yes	yes	Yes	Yes	Yes	Yes
Handling comfort	Super	good	Excellent	Good	Excellent	Good
Warranty	10 years	10 years	10 years	10 years	10 years	10 years
Price (euro)	2870	879 (2016)	2340	2035	1890	1880 (2016)
Final judgment	+++++	++++	+++++	+++++	+++++	+++++















