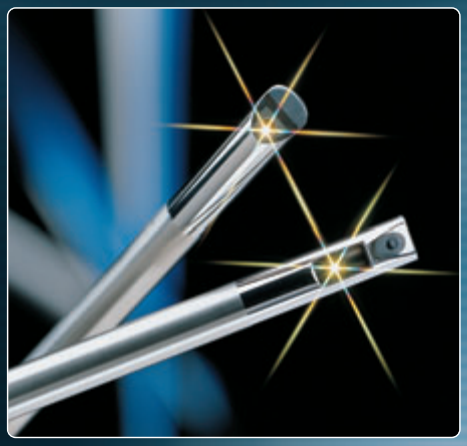
RICHARD WOLF



Rigid Borescopes

- ❑ Industry Borescopes
- ❑ Swivel Prism Borescopes
- ❑ Extendable Borescope
- ❑ Elastoscopes
- ❑ Mirror Tube Adapters

Design, System, Technic

R. WOLF – more than 80 years rigid borescopes with system and quality

Over 100 years WOLF endoscopic family tradition, Georg WOLF, Berlin and Richard WOLF, Knittlingen. Thereof over 80 years industrial Borescopes since 1927.
100 years experience in endoscopes development, material research, manufacturing, sales and service brings 100% quality products and advantages for our customers.
Many patents and awards has been proved our excellent technic, quality and design of industrial borescopes and medical endoscopes.

Process and achievment in industrial inspection equipment

The highest quality without compromise can only be achieved when a company is permanently open to new ideas and innovations.
Richard WOLF has been developed and manufactured a wide range of industrial borescopes with outstanding quality.
Technoscopes, borescopes, endoscopes - manufactured by Richard WOLF - are precision test and inspection tools employed to examine internal structures and cavities in manufacturing processes, quality control inspections, and as an aid in research and development projects.

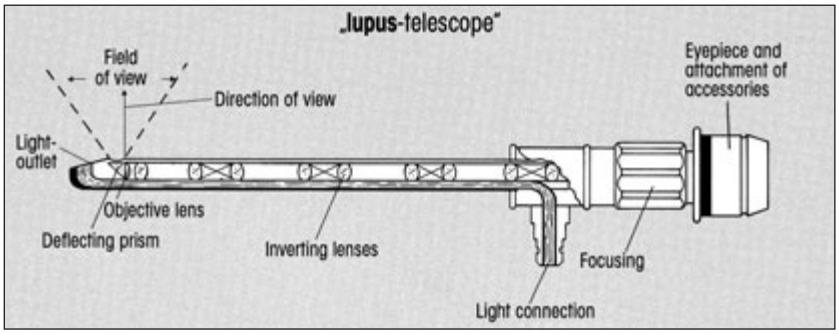
Applications

The most reliable and easiest quality control test requires a visual inspection. A look at hidden critical areas can avoid the need for dismantling equipment and possible damage to parts. The versatility of WOLF borescopes has led to worldwide acceptance and their daily use in a wide range of applications.

- ❑ optical cavity inspection
- ❑ preventative maintenance
- ❑ damage examination
- ❑ cost effective repair of damages
- ❑ quality inspection in production line
- ❑ production monitoring

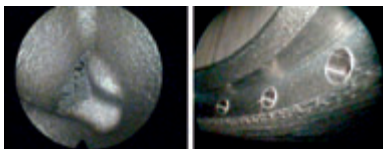
High Quality keeping costs to a minimum

The excellent workmanship that goes into all WOLF borescopes guarantees a long working life and few repairs.
Our superior service completes our commitment to our customers. All our equipment is based on a modular design concept which means that damaged parts can be replaced easy and fast and therefore cost saved.



Notable Advantages

R.WOLF produces a wide range of rigid borescopes with various diameters, working lengths, directions of view and fields of view.
With the unsurpassed brilliance and image quality of R.WOLF borescopes, operators prefer to perform inspections with WOLF borescopes since they can work without eyestrain.
The advantages of the superior image quality and brightness of any WOLF borescopes are evident when video or photo camera systems are used for documentation purposes.



Features of the R.WOLF Borescopes

- ❑ unsurpassable image quality
- ❑ excellent mechanical quality
- ❑ colour true transmitting
- ❑ highest sharpness over the compl. field
- ❑ minimum damage sensitivity
- ❑ fast and cost-effective service
- ❑ eyepiece section is made from metal for optimal robustness and dependability

lupus Telescope

These high performance borescope are equipped with a top-quality lens system - the „**lupus** telescope", an computer calculated optical system developed and produced exclusively by the Richard WOLF company in our own optical workshops.
Permanently our research and development department search for the latest technology and the best material.

Characteristics

R.WOLF **lupus** borescopes are:

- ❑ constructed of stainless steel tubing, some models with stainless steel or chromium-plated eyepiece section
- ❑ equipped with a rod lens (up to Ø 4 mm) or achromatic **lupus** lens system (from Ø 5 mm and upwards)
- ❑ heat-resistent up to +135°C, coldness-resistant till -50°C
- ❑ pressure-resistant up to 4 bar
- ❑ absolutely waterproof in the steel tube section, splashproof in the eyepiece section

Basic Equipment

A basic borescope system consists of:

- ❑ a borescope
- ❑ a light source
- ❑ a light guide

The selection of a borescope and light source is dependant upon the application. You will find all the borescopes in charts on pages 4 and 5.

Documentation

All R.WOLF borescopes are excellent applicative for adapt any documentation equipment (pls. see accessories cat. and special leaflets).

Accessories

Some accessories are available.
For light sources, light guides, adapters for video or photographs, carrying cases etc. please see our accessories catalogue T621.

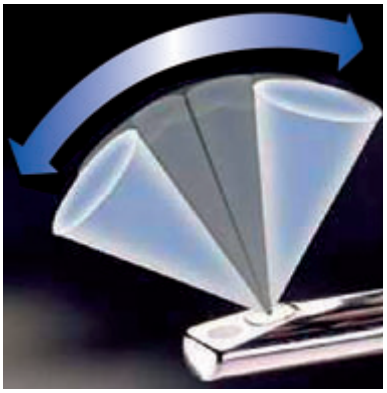
Directions of view

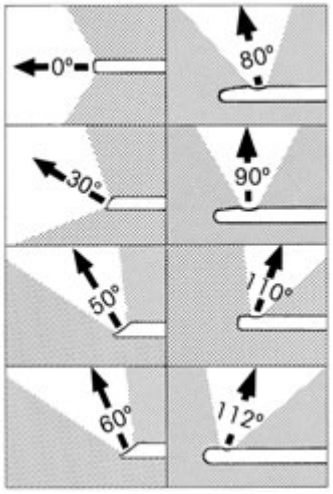
The different directions of view (see pictograms right), fields of view and working lengths available with the various diameters of the borescopes make up a comprehensive range of instruments to meet every requirements.
The swivel prism borescopes have become more and more popular. They replace 2-3 simple borescopes since the swivel prism can be adjusted (see picture below) changing the direction of view. This means, for example, that a larger object can be examined over its entire length using only one borescope without having change to various borescopes with fixed directions of view. (please see page 6)

Image Quality

The multi-coated lenses and computer calculated lens systems produce

- ❑ a brilliant optical resolution with finest detail perceptibility
- ❑ extremely clear and bright image with no loss of colour contrast

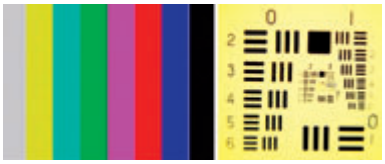




- ❑ optimum flattening of the image field and maximum depth of focus with a sharp image up to the edge of the field
- ❑ correct and differentiated colour reproduction over the entire spectrum
- ❑ magnified visual field for a better view

Ergonomic Design

Designing the instruments according to ergonomic principles, ensures practical and safe single-handed operation. Rigid borescopes (Ø 5 mm and upwards) has a focusing wheel



on the ocular and an eyepiece connector for some accessories, like angled attachments, objective lenses for video and photo for fix and easy connection and disconnection.

Focusing

Borescopes with a diameter 5 mm and upwards are supplied with an eyepiece focusing machanism (except Ø 6.5 mm).
The focus can be adjusted easily, stepless and accurately with a wheel. Borescopes with diameter 4 mm and smaller are supplied with a fix-focus ocular.

Handling

The design of the approved and from R.WOLF engineers invented rotatable light connector (from Ø 5 mm and upwards) allows the best possible positioning of the borescope even when the space is restricted.

The tube of the borescopes can be turned smoothly over 300° without having to turn the light connector or twist the light guide.

Protecting tubes

Thinn borescopes Ø 1.9 mm, 2.7 mm and 4 mm are all supplied with a high quality rod lens system. These are a little more sensitive against inflections. Therefore we do recommend the use of protecting tubes, as far as the application to allow it. This protecting tubes are to order as option (pls. see chart page 4, features), and will be delivered with a bayonet locking which allows a mounting/dismantling within 1 secound.
The protecting tubes increases the diameter by 0.7 mm. Also the borescopes Ø 6.5 mm can be fitted with protecting tube as option and will be mounted by a thread. Herewith the diameter will be increases to 8 mm.

Adapters

All WOLF borescopes are equipped with a detachable light guide connector adapter. This makes it possible to connect adapters suitable for light sources of other brands.
For connect objective lenses of other brands on the ocular eyepiece of the R.WOLF borescopes special adapters are available.

Technical Data

R. WOLF – more than 80 years rigid borescopes with system and quality

Ø mm	Direction of view	Working length mm	Field of view	Order number	Features
1,9 NEW	0°	120	63°	6.19012.6011	❷,❾ 1.19012.26
		180	38°	6.19018.4011	❷,❾ 1.19018.26
	25°	180	60°	6.19018.6211	❷,❾ 1.19018.26
	30°	120	53°	6.19012.5311	❷,❾ 1.19012.26
	60°	120	53°	6.19012.5611	❷,❾ 1.19012.26
		180	53°	6.19018.5611	❷,❾ 1.19018.26
2,7 NEW	0°	100	83°	6.27010.8011	❷,❾ 1.27010.34
		180	54°	6.27018.5011	❷,❾ 1.27018.34
		310	81°	6.27031.8011	❷,❾ 1.27031.34
	30°	100	83°	6.27010.8311	❷,❾ 1.27010.34
		180	80°	6.27018.8311	❷,❾ 1.27018.34
	70°	100	83°	6.27010.8711	❷,❾ 1.27010.34
		180	80°	6.27018.8711	❷,❾ 1.27018.34
		250	70°	6.27025.8765	❹,❺
		475	70°	6.27047.7765	❹,❺
4,0 NEW	0°	178	98°	6.04018.1011	❷,❾ 1.04018.501
		300	57°	6.04030.6011	❷,❸,❾ on request
	23°	300	60°	6.04030.6211	❷,❾ on request
	30°	170	98°	6.04017.1311	❷,❾ 1.04017.501
	45°	170	98°	6.04017.1511	❷,❾ 1.04017.503
	70°	170	99°	6.04017.1711	❷,❾ 1.04017.502
		300	92°	6.04030.9711	❷,❾ on request
	90°	170	98°	6.04017.1911	❷,❾ 1.04017.504
	110°	300	85°	6.04030.8111	❷
5,0	0°	255	50°	6.05025.00	❸,❹
		455	50°	6.05045.00	❸,❹
		655	50°	6.05065.00	❸,❹
	60°	255	50°	6.05025.063	❹,❻
		455	50°	6.05045.063	❹,❻
		655	50°	6.05065.063	❹,❻
	80°	530	40°	6.05053.38	❹,❽
		530	85°	6.05053.08	❹
	90°	255	75°	6.05025.093	❹,❻,❼
		455	75°	6.05045.093	❹,❻
		655	75°	6.05065.093	❹,❻
	110°	255	50°	6.05025.113	❹,❻
		455	50°	6.05045.113	❹,❻, on request
		655	50°	6.05065.113	❹,❻, on request

Ø mm	Direction of view	Working length mm	Field of view	Order number	Features
5,5	50°	380	35°	6.55038.353	❹,❻,❽
	90°	380	35°	6.55038.393	❹,❻,❽
		495	75°	6.55049.09	❹
	110°	380	35°	6.55038.313	❹,❻,❽
6,0	0°	255	50°	6.06025.00	❸,❹
		455	50°	6.06045.00	❸,❹
		655	50°	6.06065.00	❹, on request
	60°	255	50°	6.06025.063	❹,❻
		455	50°	6.06045.063	❹,❻
		655	50°	6.06065.063	❹,❻, on request
	90°	255	75°	6.06025.093	❹,❻,❼
		475	75°	6.06047.093	❹,❻,❼
		655	75°	6.06065.093	❹,❻, on request
	110°	255	50°	6.06025.113	❹,❻, on request
		455	50°	6.06045.113	❹,❻, on request
		655	50°	6.06065.113	❹,❻,❼, on request
6,5	70°	160	85°	9.65016.97	❷,❻,❾, 1.00816.00
		205	85°	9.65020.97	❷,❻,❾, 1.00820.00
		300	85°	9.65030.97	❷,❻,❾, 1.00830.00
		500	85°	9.65050.97	❷,❻,❾, 1.00850.00
	112°	300	67°	9.65030.11	❷,❻,❾, 1.00830.00
6,7	80°	670	60°	6.67070.083	❹,❻
8,0	0°	280	60°	6.08028.00	❸,❹
		490	60°	6.08049.00	❸,❹
		690	60°	6.08069.00	❸,❹
	50°	300	55°	6.08030.053	❹,❻
		500	55°	6.08050.053	❹,❻,❼
		715	55°	6.08071.053	❹,❻
	60°	420	60°	6.08042.663	❹,❻
	80°	500	55°	6.08050.083	❹,❻,❼
	90°	120	60°	6.08012.0913	❹,❻
		190	35°	6.08190.39	❹,❽
		200	60°	6.08020.093	❹,❻
		290	90°	9.08029.99	❷,❻
		300	60°	6.08030.093	❹,❻,❼
		500	60°	6.08050.093	❹,❻,❼
		500	90°	9.08050.99	❷,❻
		715	60°	6.08071.093	❹,❻
		1015	60°	6.08101.093	❹,❻
	110°	300	50°	6.08030.613	❹,❻
		420	60°	6.08042.613	❹,❻

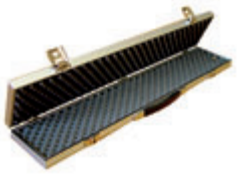
Ø mm	Direction of view	Working length mm	Field of view	Order number	Features
10,0	0°	280	60°	6.10028.00	❸,❹
		490	60°	6.10049.00	❸,❹
		690	60°	6.10069.00	❸,❹
		1290	60°	6.10129.00	❸,❹
	50°	300	55°	6.10030.053	❹,❻
		500	55°	6.10050.053	❹,❻
		715	55°	6.10071.053	❹,❻
		1015	55°	6.10101.053	❹,❻
	80°	290	60°	6.10029.083	❹,❻
		500	60°	6.10050.083	❹,❻
	90°	200	60°	6.10020.093	❹,❻
		220	35°	6.10022.393	❹,❻,❽
		260	35°	6.10026.093	❹,❻,❽
		300	60°	6.10030.093	❹,❻
		410	35°	6.10041.393	❹,❻,❽
		500	60°	6.10050.093	❹,❻
		520	35°	6.10052.093	❹,❻,❽
		670	60°	6.10067.693	❹,❻
		715	60°	6.10071.093	❹,❻
		1015	60°	6.10101.093	❹,❻
	110°	300	55°	6.10029.113	❹,❻

With borescopes longer than 500 mm, we advise you to order an appropriate transport and storage case (see separate brochure "Accessories").

- ● Quick-Zoom-focusing
- ❶ fiber image guide
- ❷ fixed focusing
- ❸ clip -on mirror sleeves available (see on the right)
- ❹ with eyepiece focusing
- ❺ with fixed integral light guide only (40 % more light flux)
- ❻ with rotatable light connector
- ❼ also available with fixed integral light guide (length: 2300 mm, 40 % more light flux)
- ❽ with special magnification
- ❾ optional protecting tubes, order no. (diameter increasing about 0.7 mm)
- ❿ in preparation

Carrying cases

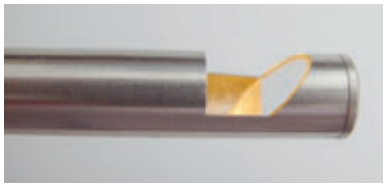
All borescopes with a working length longer than 500 mm are supplied with a small and suitable aluminium case for safe storage and transport (ill. left).
Other carrying cases for transport borescopes, the light sources and accessories are available as option (please see our accessories catalogue T621).
Shorter borescopes are delivered in a carton with foam inside.



Mirror sleeves

Bore-scopes Ø	Borescopes Working length	Mirror sleeve Ø	Mirror sleeve length	Order number
4	300	4,5	290	4.05029.09
5	255	5,6	245	4.06024.09
	455	5,6	445	4.06044.09
	655	5,6	645	4.06064.09
6	255	6,6	245	4.07024.09
	455	6,6	445	4.07044.09
	655	6,6	645	4.07064.09 on request
8	280	8,8	270	4.09027.09
	490	8,8	480	4.09048.09
	690	8,8	680	4.09068.09
10	280	10,8	270	4.11027.09
	490	10,8	480	4.11048.09
	690	10,8	680	4.11068.09
	1290	10,8	1280	4.11128.09

The mirror sleeves are used to change the direction of view of 0° borescopes to 90°. This produces an inversion of the image.
By redirecting the light and image via the same mirror, even small rivets are illuminated without shadows.



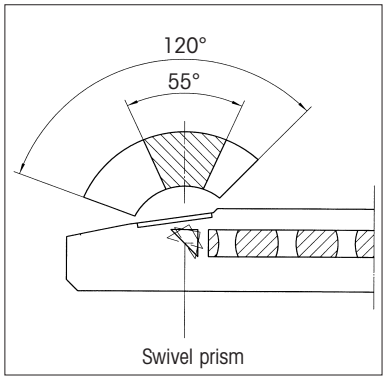
Swivel Prism Borescopes

R. WOLF – more than 80 years rigid borescopes with system and quality

If an inspection requires more than one direction of view (55°, 70°, 90°, 110°), a swivel prism borescope may be just the answer. Today, industrial inspection is hard to imagine without this versatile instrument which originally has been invented by a Richard WOLF engineer.

Due to the swivel prism mechanism, the direction of view can be smoothly varied during inspection from forward oblique to backward oblique. This is done remotely by means of a steering wheel at the eyepiece section. With a 55° field of view front lens, a total 120° field of view can be scanned.

Another WOLF invention has been introduced only recently: the **QUICK-ZOOM eyepiece.**
This novelty allows to focus and to zoom the image to double magnification simultaneously by one turn. The enervating "search-for-the-right wheel" for focus, zoom and prism adjustment now belongs to history. The new QUICK-ZOOM system will be implemented step by step for most of the WOLF swivel prism borescopes.



The Wolf product range of swivel prism borescope has now been extended to the **world's smallest diameter of 5.5 mm** (by Jan. 2009).

The prism of the WOLF swivel prism borescopes is adjusted by a rack and pinion which is controlled by a steering wheel. This design is superior to the standard wheel and gear mechanism in terms of easy and precise adjustment and of ruggedness which extends its life time virtually to infinity.
The integrated glass fiber illumination is specially designed to ensure optimum illumination for the whole visual field.

The swivel prism borescopes with Ø 16 mm are extremely bright and therefore ideally suited for e.g. the inspection of large Diesel engines and other large objects.

Ø mm	Direction of view	Working length mm	Field of view	Order number	Features
5,5	45°-110°	260	50°	8.55026.5973	●,❻,❼
		460		8.55046.5973	
		260	35°	8.55026.3973	●,❻,❽
		460		8.55046.3973	
8	45°-110°	240	55°	8.08240.09	❹
		260	50°	8.08026.5973	●,❻
		460		8.08046.5973	
		260	25°	8.08026.2973	●,❻,❽
		460		8.08046.2973	
9,4	40°-120°	350	35°	8.94035.093	❹,❻,❽
		490		8.94050.09	❹,❺,❻,❽
		760		8.94076.093	❹,❻,❽
10	55°-120°	260	55°	8.10026.093	❹,❻,❼
		460		8.10046.093	
16	45°-115°	800	45°	8.16080.593	❹,❺,❻,❽
		1190		8.16119.593	
		1590		8.16159.593	

Swivel prism borescopes with a working length longer than 500 mm are supplied with an aluminium carrying case. For shorter swivel prism borescopes we do recommend to order an optional carrying case (please see our catalogue „Accessories" T621).

Extendable Borescope Ø 15 mm

The extendable borescope is a variable system of combinable endoscope components. The minimal configuration of an eyepiece tube ① and a objective head ② has a working length of 37 cm and can be increased by optical extension tubes ③ up to about 10 m. Different objective heads allow for directions of view between 0° and 110°. Illimination is achieved by a halogen lamp on the tip (12V, 20 W).

Components:

① **Eyepiece tube , Ø 15 mm,**
rotatable plug-in connector and focusing
Order no. 2.15023.00

② **Objective heads Ø 15 mm**

Direction of view	Field of view	Order number
0°	90°	2.15013.001
60°	60°	2.15013.061
90°	60°	2.15013.091*
110	60°	2.15013.111

* this Objective head can also be fitted with below mentioned deflection prisms:

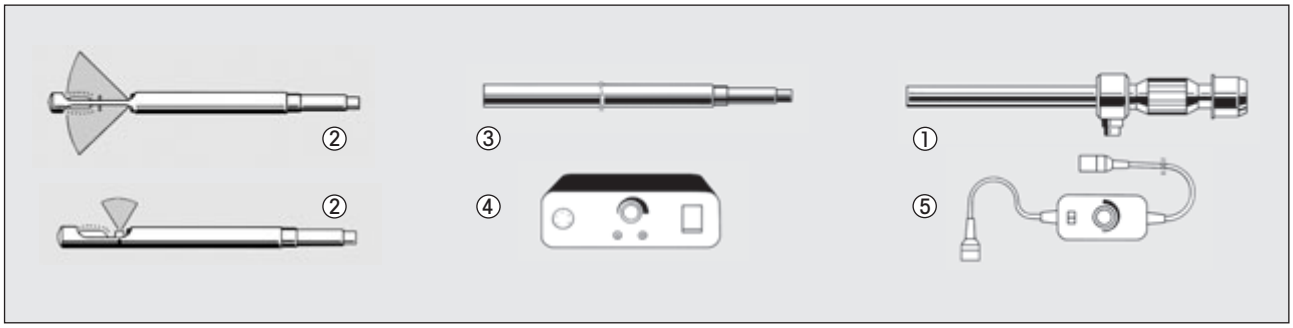
Direction of view 60°
Order no. 2.15000.06
Direction of view 110°
Order no. 2.15000.11

③ **Extension tube, Ø 15 mm**
working length 800 mm
Order no. 2.15080.00

④ **Transformer 230 V/50 Hz,**
12 V output
Order no. 2.15000.20

⑤ **Connecting cable with brightness control**
and on/off switch
Order no. 2.15230.30

⑥ **no illustr.: Transport case**
(900 x 300 x 120 mm) for complete set
Order no. 3.13000.10



Elastoscopes TES

Thinn, rigid, but bendable

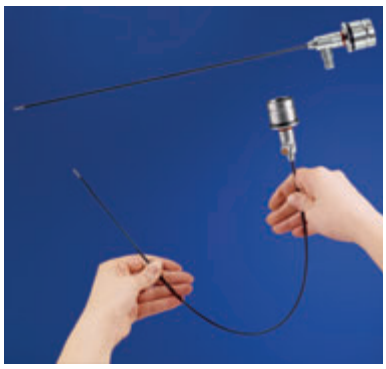
Elasticity and Robustness

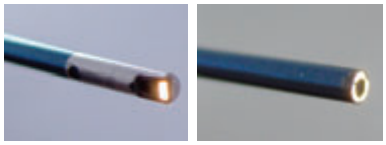
Elastoscopes are a new generation of industrial borescopes, which are characterized by a number of revolutionary properties.
This patented Elastoscope system is invented and developed from engineers of R.WOLF. The shaft can be bent easily and then returns to the original straight position. R.WOLF Elastoscopes are vestly superior to conventional rigid borescopes as regards breaking strength. Broken lenses or endoscope shafts are things of the past.
The shaft material of a special titanium alloy is extremely tough and resistent to abrasion.

Resolution

The ultra high-resolution optical fibres of R.WOLF Elastoscopes surpass the resolution of comparable flexible endoscopes by a few orders magnitute.
This features make R.WOLF Elastoscopes perfectly suited for use with video and photo documentation equipment.
This Elastoscopes are liquid-tight.
All couplings and connections for light guides and lense adapters meet the WOLF standard.

new Ø 1.8 mm





Shaft-Ø	Working lenth	Direction of view	Field of view	Order no.
NEW 1,8 mm	120 mm	0° direct view	87°	**6.18012.9081**
	180 mm			**6.18018.9081**
	300 mm			**6.18030.9081**
2,4 mm	270 mm	0° direct view	80°	**6.24027.8081**
	580 mm			**6.24058.8081**
	350 mm	80° side view	60°	**6.24035.6881**
	580 mm			**6.24058.6881**

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RICHARD WOLF GmbH
Product Group Technoscopes
Pforzheimer Straße 32
D-75438 Knittlingen
Tel.: +49 - 70 43 - 35 222
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riwotech@richard-wolf.com
www.richard-wolf.com

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