

1. **Contrasting methods (summary)**
2. **Microscopes & applications**
3. **Cameras**
4. **Selling arguments**

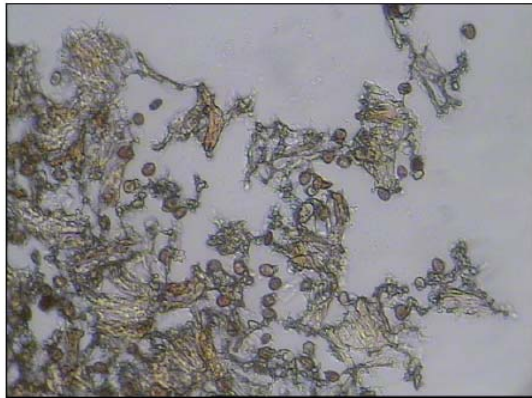
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Contrasting methods transmitted light

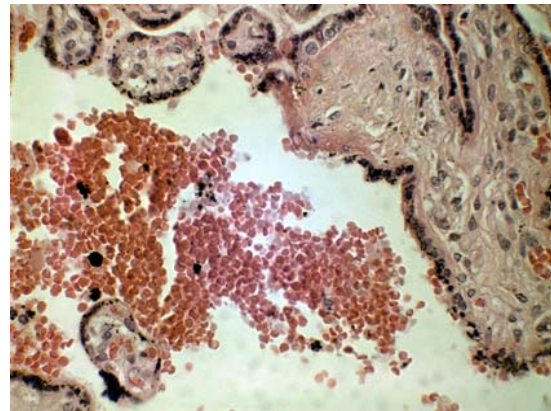
Transmitted light is the classical method for transparent samples in biology and medicine

Brightfield (BF)

- Suitable for stained samples or samples with high contrast
- Staining to increase contrast often necessary
- Applications: Tissue sections, smears



Brightfield Mushroom



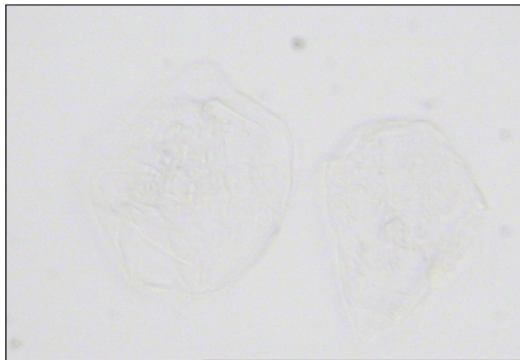
Tissue Section Placenta, Brightfield

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Contrasting methods transmitted light

Phase Contrast (PH)

- Suitable for thin (ca. 5 μm) sample with low contrast e.g. single cells
- Staining not necessary
- Single objects of the sample have different refraction indexes
Through phase shift of the light beam they are visible as intensity differences
- Objective with phase ring and light ring in condenser required
- By using a combination -condenser BF and PH method can be used



Epithel Cells, Brightfield (BF)

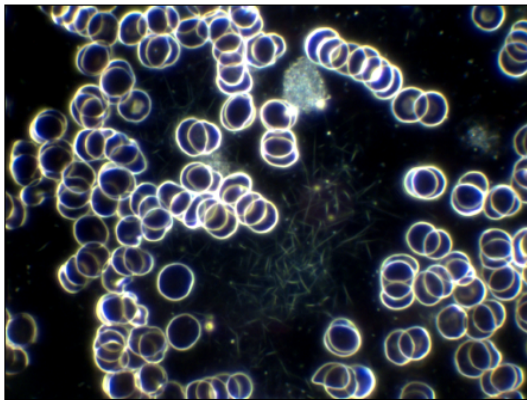


Epithel Cells , Phase Contrast (PH)

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Darkfield (DF)

- Objects are made visible at a dark background
- Dark background is realised by oblique illumination
- Up to 40x objectives DF is possible with diaphragm in condensor
- For higher magnifications a specific condenser is needed
- Applications:
Illustration of small structures, e.g. bacteria (native blood, breweries, activated sludge)



Native Blood, Darkfield

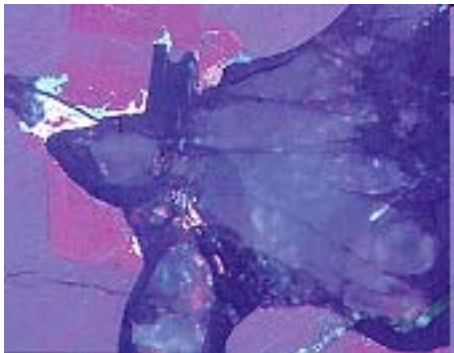


Vorticella, in Activated Sludge

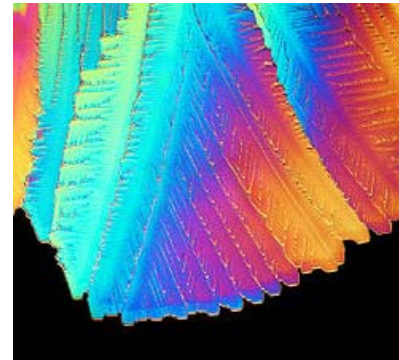
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Contrast Method in Transmitted/Incident Light Polarisation (POL)

- POL contrast enables imaging of birefringent structures
- Applications:
 - Crystals (gout) in biological probes (transmitted light)
 - Metallography (incident light)
 - Crystallography (incident light)
- Requirement: Polariser and Analyser



Iron Ore

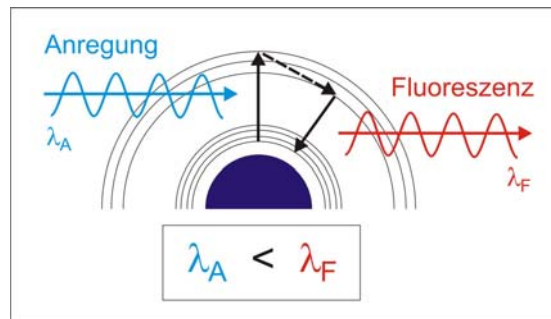


Crystals Citric Acid

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Contrasting Method Incident Light Fluorescence

- Finest structures (tissue, cells) are made visible
- Probe needs to be stained with one of more fluorescence dyes
Dyes dock on specific parts (e.g. cell nucleus, cell membranes, DNA)
- Molecules marked absorb for a short time light and emitting the light afterwards
The emitted light has a higher wavelengths than the excitation light (Stokes shift)
- Each fluorescent dye has a specific absorption spectrum
- Photons of the absorbed light display the structure marked in the microscope

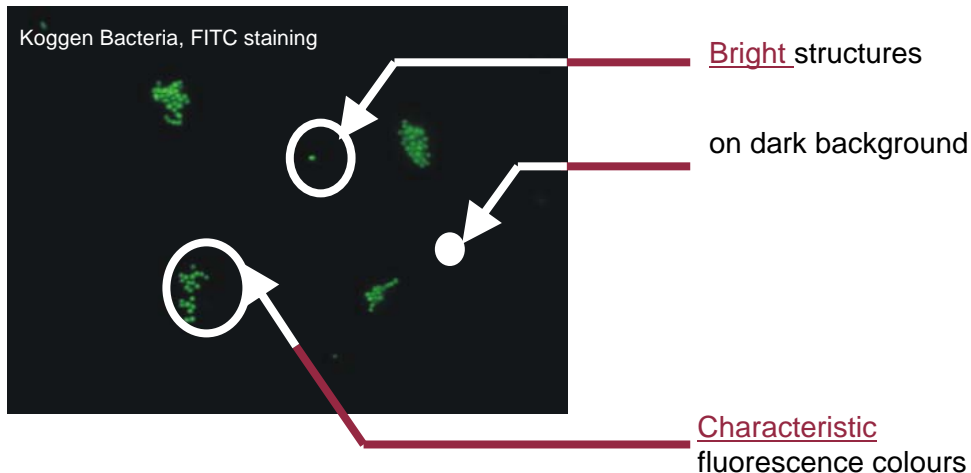


Additional components needed :

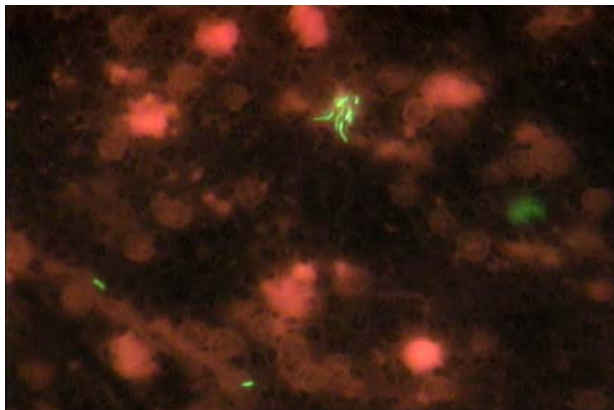
- Illumination for incident light
- Filter for excitation and emission
- Dichroic mirror

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Fluorescence



- Fluorescence has a high specificity
- Detection of germs is unambiguous
- Dye „Mykoval“ (Hund exclusive)
 - Attaches to cellulose and chitin
 - Easy staining of the probe
 - Low bleaching
 - Ideal for staining of fungi and yeast



Myko Bacteria, Auramin + Thiazinrot Staining



Penicillium Fungus, Mykoval Staining

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A comprehensive offering for bio-medical and industrial applications



Laboratory
Medicus



Laboratory & Research
H 600 Upright



Laboratory & Research
Wjlovert Inverted



Stereo
Wjloskop



USB-CCD Colour
Cameras

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Educational Microscopes : „Robust and easy to use“

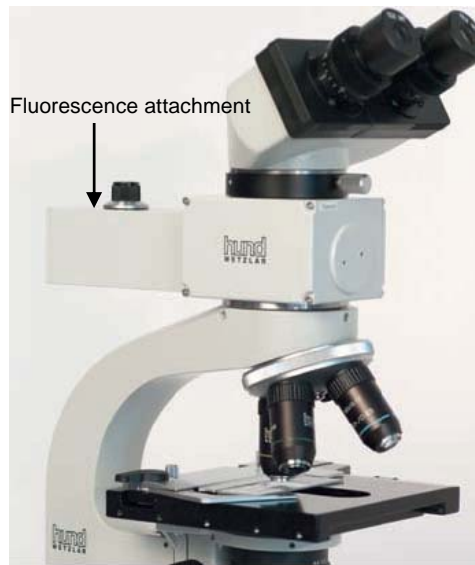


Med Prax

- Ideal for use in rough classroom environment
- Compact and robust design
- Easy to operate
- Optimal image through Köhler illumination
- Configuration dedicated to education
- Attractive price

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Routine Microscopes for Medicine and Biology “Ergonomic and versatile System Microscope”



Medicus with LED-Fluorescence

- Ideal for use in bio-medical routine labs
- Robust and easy to operate
- Available in different contrasting techniques
 - Brightfield
 - Darkfield
 - Phase Contrast
 - Polarisation
- LED fluorescence retrofitable
- Different optical outfits (objectives, condensers)
- Wide range of accessories

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Medicus System Components :



- Objectives 4x, 10x, 20x, 40x, 100x (oil)
Achromates (Achro), Plan-Achromates (Plan), Phase Contrast (Ph)



- Condensers
 - Brightfield condensers NA 0,9 and NA 1,25 (Oil-Immersion)
 - Combination condensers HF, PH, DF NA 0,9 & NA 1,25



- Tubes
 - Binocular observation tubes
 - Photo tubes (Trinocular) 30/70



- Video-adapter for cameras
- LED illuminators for Mykoval, DAPI, FTIC, TRITC
- Polarisation unit WP II

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Laboratory Microscopes for Medicine and Biology “Modular System adopting to Application Needs”

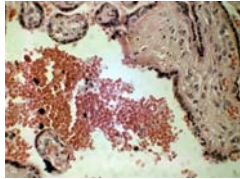
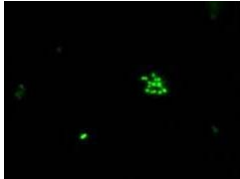

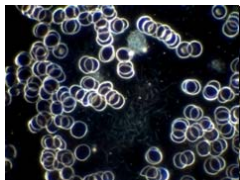


H 600 Fluorescence

- Dedicated to medical & biological research
- Application-specific configurations
- Darkfield version for alternative practitioners
- Available in different contrasting techniques
 - Brightfield
 - Darkfield
 - Phase Contrast
 - Polarisation
 - Fluorescence (HBO and LED illumination)
- Different optical outfits (objectives, condensers)
- Wide range of accessories
- Attractive price

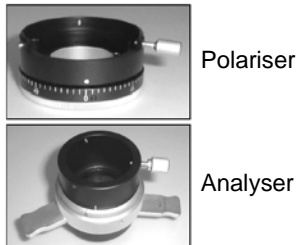
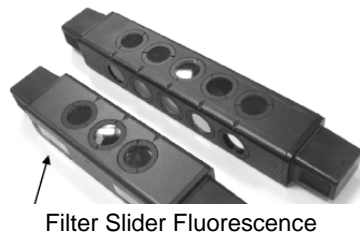
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H 600 application specific configurations

Application	Configuration	Result	
<ul style="list-style-type: none"> ▪ Haematology ▪ Urology ▪ Genecology 	H 600 Wilozyt		
<ul style="list-style-type: none"> ▪ Pathology ▪ Bacteriology 	H 600 Wilo Prax		Placenta Brightfield HE Staining
<ul style="list-style-type: none"> ▪ Breweries 	H 600 Wilo Brau		Koggen Bacteria Fluorescence FITC Staining
<ul style="list-style-type: none"> ▪ Activated Sludge (Sewage Treatment Plants) 	H 600 BS		Activated Sludge Phase Contrast
<ul style="list-style-type: none"> ▪ Native Blood Investigation (Alternative Practitioners) 	H 600 LL HP 100		Native Blood Darkfield

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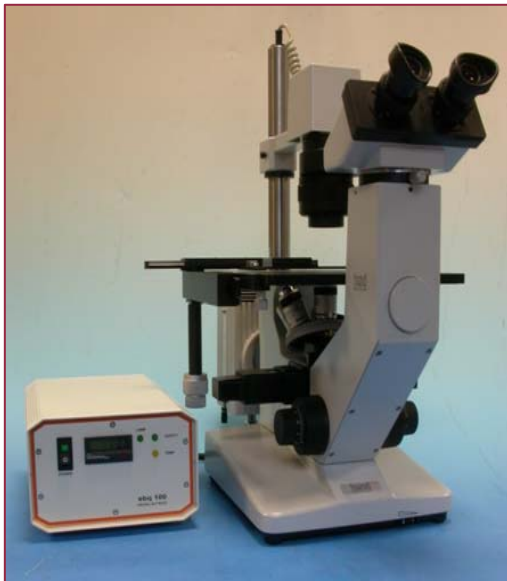
H 600 System Components



- Objectives, condensers, tubes, video-adapters, as Medicus
- Eyepieces
- Fluorescence
 - Illumination 50 W or 100 W
(Lamp house, Hg-high pressure lamp, power supply)
 - Filter sets
 - LED-illumination
 - Filter slider for 2 resp. 4 filter sets
- Discussion bridge for 2 observers
- Polarisation unit HP I
 - Polariser on illumination tube
 - Analyser on filter slider

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Inverted Microscopes for Biology “Best Price/Performance Ratio in its Class”

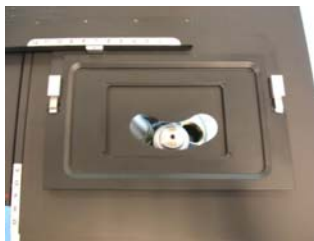


Wilovert Fluorescence

- The ideal instrument for the observation of cell cultures
- Application specific configurations
- Holding frames for culture vessels & Petri dishes
- Available in different contrasting techniques
 - Brightfield
 - Phase Contrast
 - Fluorescence (HBO)
- Different optical outfits (objectives, condensers)
- Wide range of accessories
- Outstanding price/performance ratio

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Wilovert System Components



- Objectives (Achro, Semi-Plan)
- Eyepieces
- Condensers (HF, combination types)
- Holders for culture vessels
 - Multiwell-plates
 - Petri dishes
 - Bottles
- Object guide
- Fluorescence
 - Illumination 100 W
(Lamp house, Hg-high pressure lamp, power supply)
 - Filter sets
 - Filter sliders for 2 resp. 4 filter sets

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Wilovert has an outstanding price/performance ratio

Beispiel:

Hund Wilovert		Zeiss AxioVert	
Configuration	List Price	Configuration	List Price
Wilovert Standard PH 20 HF 4x PH (LD) 10x, 20 Photo tube 30/70	3.060 €	AxioVert 40 C HF 5x PH (LD) 10x, 20x Photo tube	5.010 €
Wilovert Standard PH 40 HF 4x PH (LD) 10x, 20x, 40x Photo tube 30/70	4.220 €	AxioVert 40 C HF 5x PH (LD) 10x, 20x, 32x Photo tube	6.300 €

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Stereo Mikroskope : “Vielseitige Instrumente für Biologie und Industrie”



Wiloskop LED AL/DL
Stand ST

- Versatile microscope for industrial & biological applications
 - Industrial production & quality control
 - Preparation/investigation of large biological samples
- Transmitted & incident light (LED or external illumination)
- Wide zoom range & large field of view
- Wide range of application-specific accessories
- Trinocular tube for camera connection included as standard



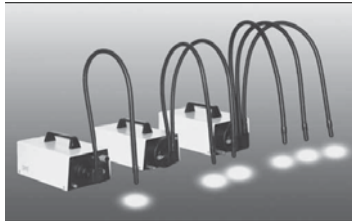
Stand with Swivel Arm

Model Options:

- With stand ST, w/o illumination
- With swivel arm stand
- With stand ST, LED for transmitted & incident light

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Illumination for Stereo Microscopes



- Fibre light source with goose neck 1, 2 or 3 arms



- LED-ring light with control unit, LED spot and foot

Optical Components



- Auxiliary lenses 0,3x, 0,5x, 1,5x , 2,0x
 - Eyepieces 10x (Std.), 15x, 20x
- } For changing the Zoom range

Zoom range w/o auxiliary lens, with standard eyepieces 10x/22 : 6,7-42x

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Microscopes recommended for customer segments

Customer Segments	Products					
	MedPrax	Medicus	H 600	Wiloskop	Wilovert	H 600 AM
Education						
High Schools	X					
Universities	(x)	X				
Medical Labs						
Medical practices	X					
Hospitals		X	X			
Routine Bio Research						
Sample preparation				X		
Cell culture observation					X	
Tissue investigation			X			
Industry						
Micro component assembly				X		
Quality control large samples				X		
Quality control small samples						X

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Cameras

USB Cameras

- Easy connection by USB to computer
- Operation from computer
- Connection via (C-Mount) on photo tube
- CMOS – entry model for documentation
- CCD – models for darkfield & fluorescence
(higher sensitivity, less noise)



Medicus with UI-1465 LE

SLR Cameras

- Connection via photo eyepiece & adapter
- Also usable for other purposes
- Operation less elegant
- In our program : Canon 550 D



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USB Cameras



USB color cameras UI-1465LE-C (left), UI-1240SE-C and UI-22x0SE-C (right)

	UI-1240 SE	UI-1465 LE	UI-2250 SE	UI-2280SE
Chip size	1/1.8"	1/2"	1/1.8"	2/3"
Sensor type	CMOS	CMOS	CCD	CCD
Resolution (MP)	1,3	3,1	2,0	5,0
Frame rate (fps)	25	11	12	6
Interface	USB 2.0			
Software	uEye			
C-Mount Adapter	1x	0,5x	1x	1x
Windows compatibility	7, Vista, XP, 2000			

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USB Cameras

Contrast Method	UI-1240 SE	UI-1465 LE	UI-2250 SE	UI-2280SE
Brightfield (BF)	+	+	o	-
Phase Contrast (PH)	+	+	+	o
Darkfield (DF)	+	+/o	+	+
Fluorescence	o	-	+	+
Polarisation (Pol)	o	o	+	+
Incident Light	+	+	o	o
Stereo	+	+	o	-

- UI-1465 (CMOS) is suitable for BF, PH, incident light & stereo applications
- For fluorescence and darkfield CCD-types are recommended
- For native blood investigation in darkfield UI-1240 is best suited (high frame rate)

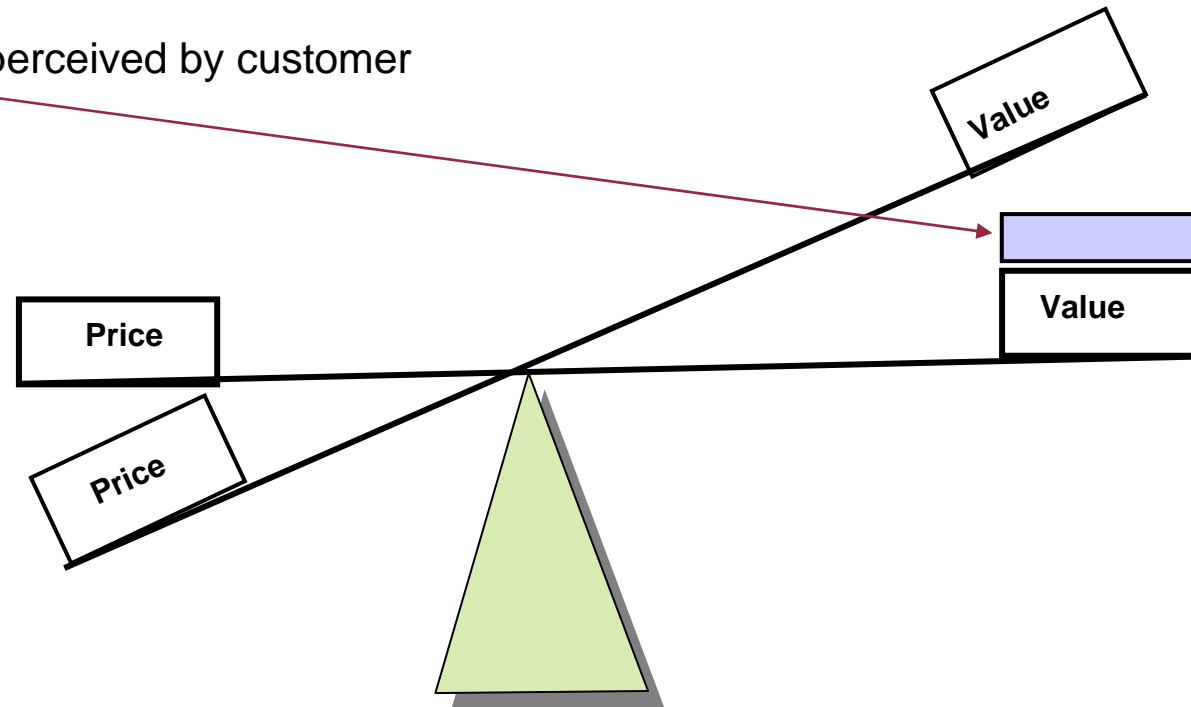
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Price for customer too high. What to do ?

Increase value perceived by customer



Value and price need to be in balance




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Strengths of Product and Service Offering

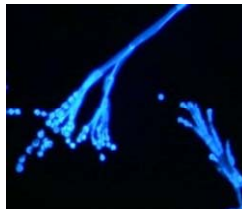
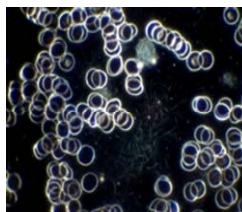

„Hund microscopes have a high quality standard, good functionality and are significantly lower in price compared to premium brands“

- Competent consultancy of customers and distribution partners
 - Technical aspects
 - Applications
- Stable microscopic results
 - High mechanical stability of stands
- High and constant quality „Made in Germany“
 - Complete manufacturing of H 600 and Wilovert series
 - Final assembly and test of other series
- Highest safety
 - All products fulfil “Medical Device Law”
 - Save investment through long lasting products
 - Repair service up to 20 years

Save investment: products “Made in Germany” and expert consultancy

Feature	Customer Benefit		Economic Value
High quality materials used <ul style="list-style-type: none"> - Stable metal cast stand - No plastic parts used - Rack & pinion made of metal - Guides made of aluminium - Classic German industry design 	Stability and durability <ul style="list-style-type: none"> - Stable microscopic results - No need to repeat the investigation/experiment - Long lasting products 	 <p>Wilovert inverted microscope</p>	Time saving High return on investment <ul style="list-style-type: none"> - Time saving through fast results - No new investment for the coming decades necessary
High quality manufacturing “Made in Germany” <ul style="list-style-type: none"> - Assembly and inspection at Hund factory in Germany - ISO certified, products CE marked 	Very low failure rate of products <ul style="list-style-type: none"> - Excellent workmanship - Safe products - High level of quality control 	 <p>Precise objective nosepiece</p>	Low cost of ownership (follow up cost) <ul style="list-style-type: none"> - No down time of products - Low maintenance cost - No danger for the health of the operator
LED fluorescence retrofitable <ul style="list-style-type: none"> - Medicus/H600 upgradable to fluorescence (Mykonal, FITC, TRITC, DAPI) 	Easy upgrade of brightfield to fluorescence <ul style="list-style-type: none"> - Flexibility for later fluorescence imaging option 	 <p>Medicus LED Fluorescence</p>	Low basic investment <ul style="list-style-type: none"> - Inexpensive solution for fluorescence microscopy - Allows to start with limited budget & later upgrade

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Feature	Customer Benefit		Economic Value
Fluorescence kit microscope/marker <ul style="list-style-type: none"> - Application kit for Dermatology (Medicus microscope & Mykoval fluorescence marker) 	Fast and safe results <ul style="list-style-type: none"> - Easy & safe detection of mycoses - No time consuming cultivation steps needed 	 <p>Penicillium fungus, Mykoval</p>	Higher throughput <ul style="list-style-type: none"> - Saves time and cost - Differentiation of labs to competitor labs
High Performance Darkfield <p>Ideal for native blood investigation</p> <ul style="list-style-type: none"> - Specific optics with high NA 1,4 (100x iris objective, cardiod condenser) 	High content of information for diagnosis <ul style="list-style-type: none"> - Best image quality through highest resolution, contrast & magnification 	 <p>Darkfield image H 600 LL 100</p>	Higher throughput <ul style="list-style-type: none"> - Fast diagnosis due to optimal image information - Safe diagnosis, no repetitive investigation needed
Microscope for waste water investigation <ul style="list-style-type: none"> - Optimal for investigating activated sludge - Suitable for brightfield, phase contrast & darkfield imaging 	High content of information for diagnosis <ul style="list-style-type: none"> - Best image quality for the investigation of microorganism - Suitable for stained & unstained specimen 	 <p>Bacteria Neisser stained</p>	High throughput <ul style="list-style-type: none"> - Fast diagnosis due to optimal image information - Safe diagnosis, no repetitive investigation needed
Repair warranty up to 20 years <ul style="list-style-type: none"> - Repairs for a long time period - Spare parts availability 	Extreme long product life time <ul style="list-style-type: none"> - No need to buy a new microscope - Fast & high quality repair service 		Long lasting investment <ul style="list-style-type: none"> - High up time of the system - High return on investments

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