



EVT Eye Vision Technology

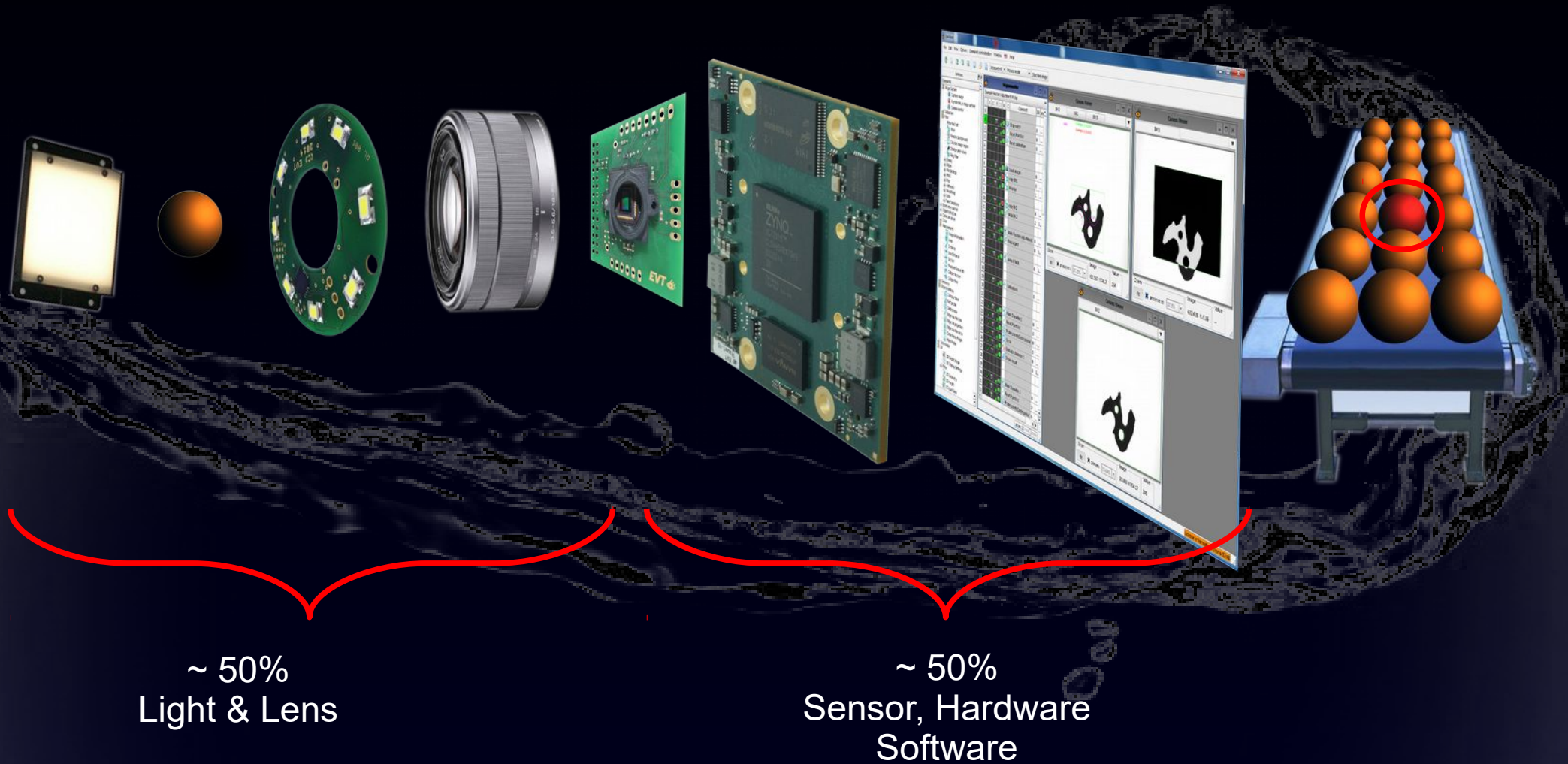
Technology is our passion !



Machine Vision

The path
of the image processing tasks
to the image processing solution!

The Ray of Light





Wrong Lens and Light =
bad machine vision

Good Lens and Light =
good machine vision

Good Light – means generating contrast.

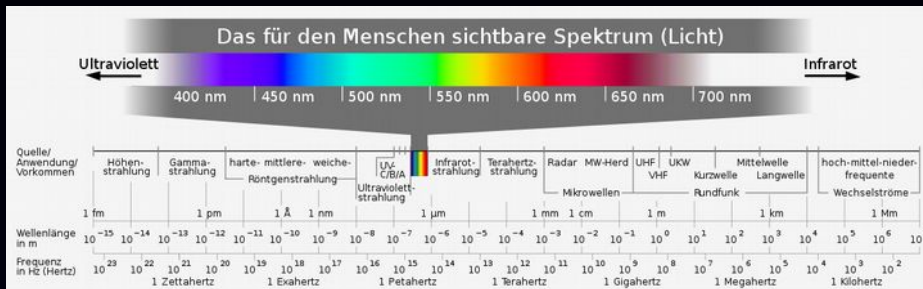


What is Light?





What do we mean with Light



Farbe	Wellenlänge	Frequenzbereich
Violett	380 nm ... 430 nm	790 THz ... 700 THz
Blau	430 nm ... 500 nm	700 THz ... 600 THz
Cyan	500 nm ... 520 nm	600 THz ... 575 THz
Grün	520 nm ... 560 nm	575 THz ... 535 THz
Gelb	560 nm ... 590 nm	535 THz ... 510 THz
Orange	590 nm ... 625 nm	510 THz ... 480 THz
Rot	625 nm ... 780 nm	480 THz ... 385 THz

- X-Ray
- Visible Light
- Thermal-Ray



Illumination for the visible spectrum



What is the right wave length?

Color - or Monochrom-Evaluation?

Thermal – or X-Ray Evaluation?

White Light or Monochrome Light?

Thermal – or X-Ray radiation?



Color Camera with white Light



Daylight > 5300 K, Ra 75



Cold white ~ 4000 K



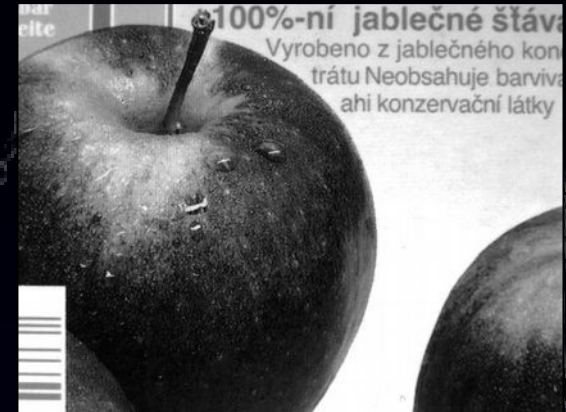
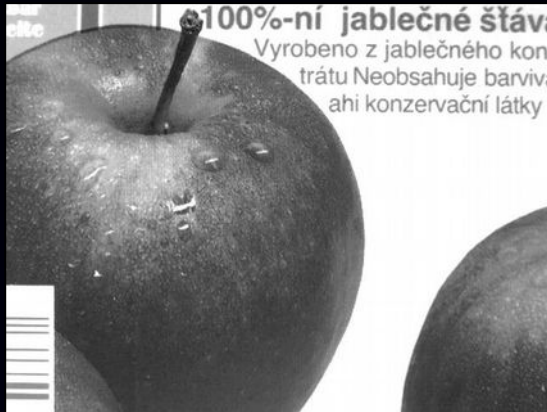
Warm white ~ 3000 K



Na-Vapor high pressure lamp ~ 2200 K



Grey camera with different monochrom light

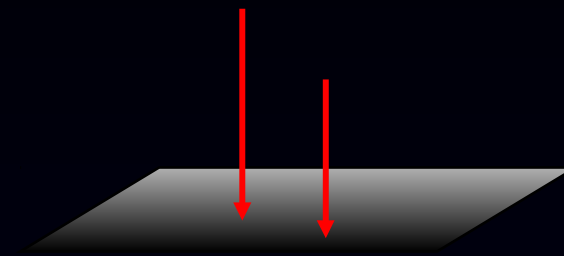




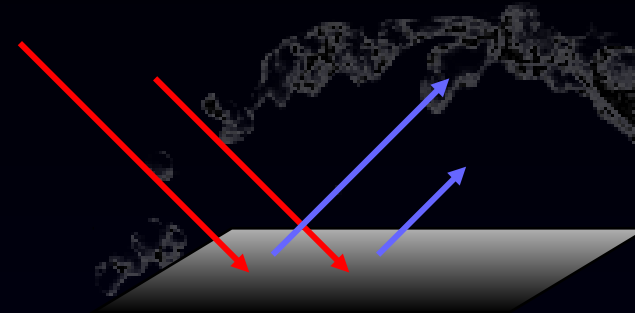
Contrast enhancement by selecting the illumination arrangement



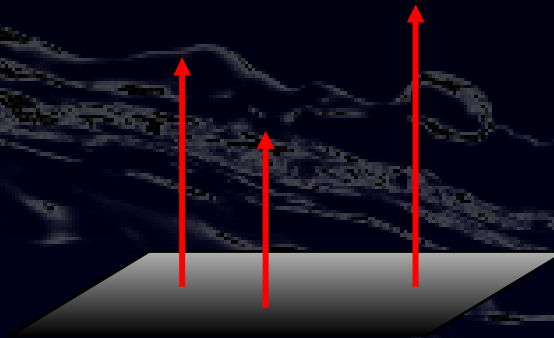
Result of the illumination assembly



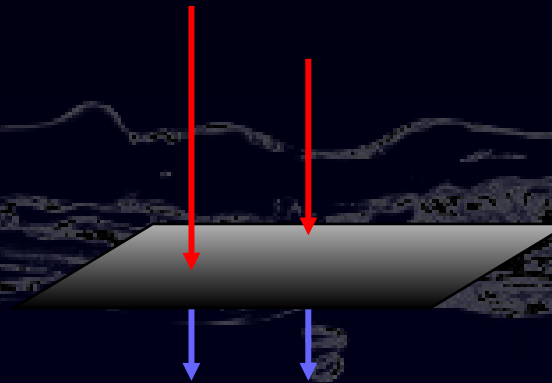
Absorption



Reflexion



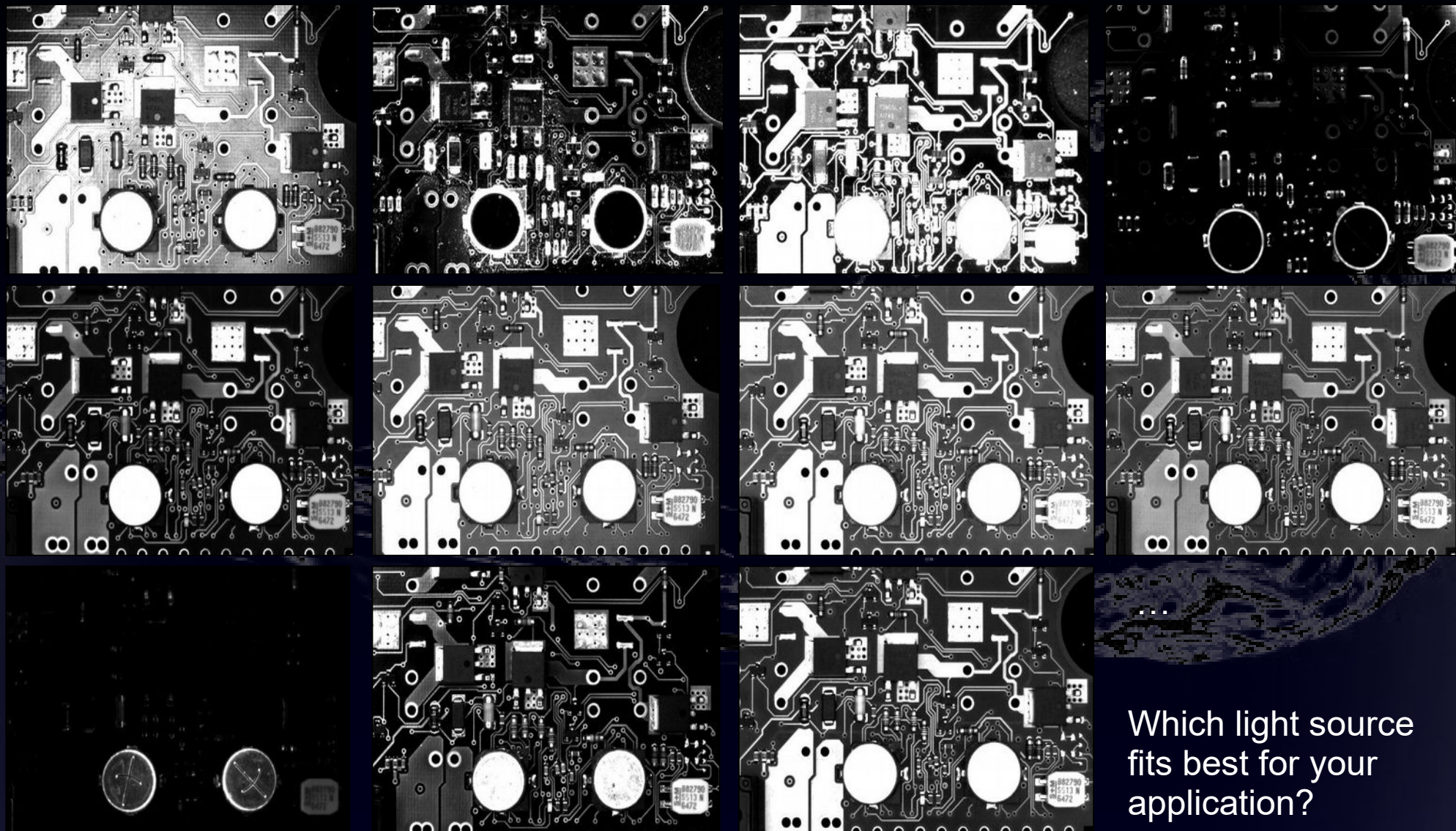
Emission



Transmission



Effects with different light sources



Which light source
fits best for your
application?

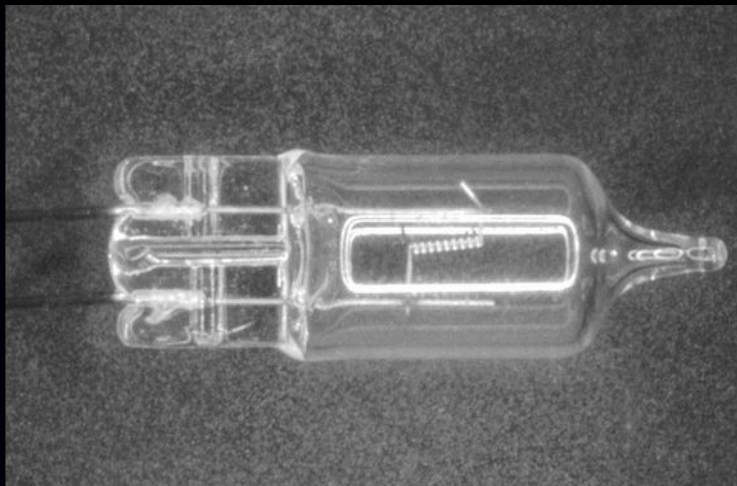


Examples
For
illumination arrangements
and it's effects

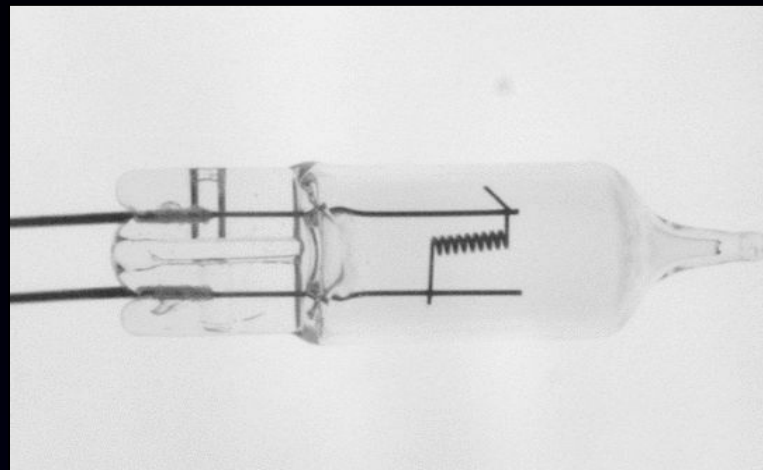




Detect the filament



Ring light



Back light



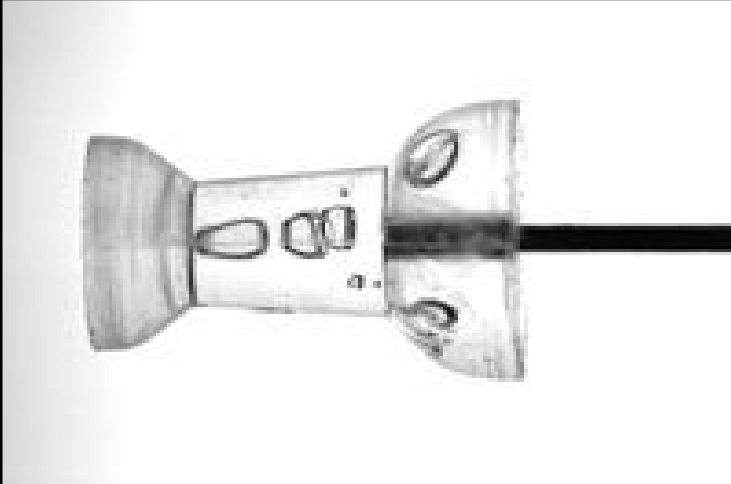
LLA series



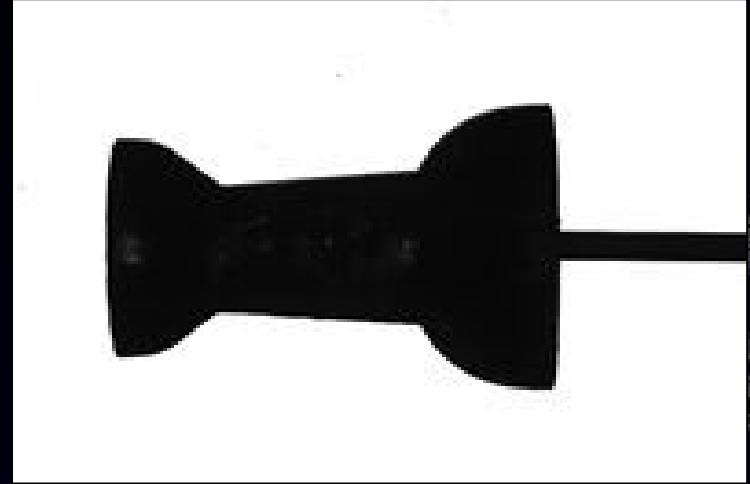
BHS series



Track contour on transparent Part



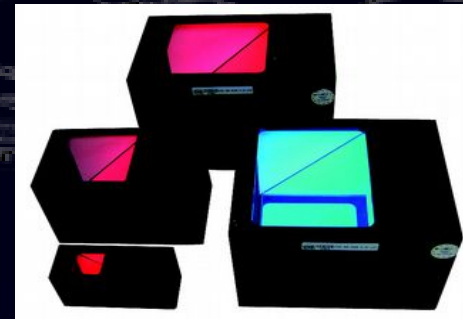
Back light



Collimated light



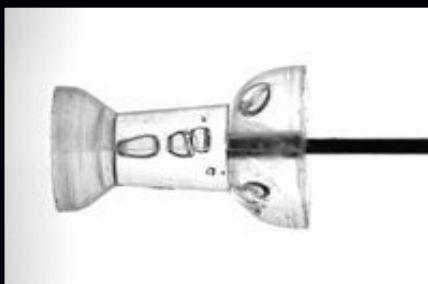
BHLX Serie



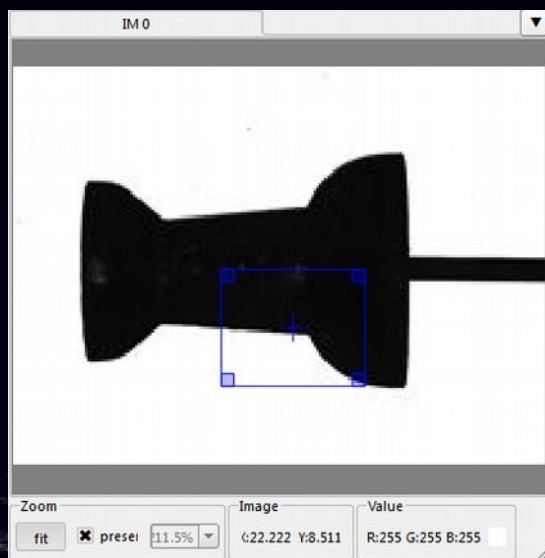
CAS Serie



The Software View of the Image



Original Images



Camera Viewer

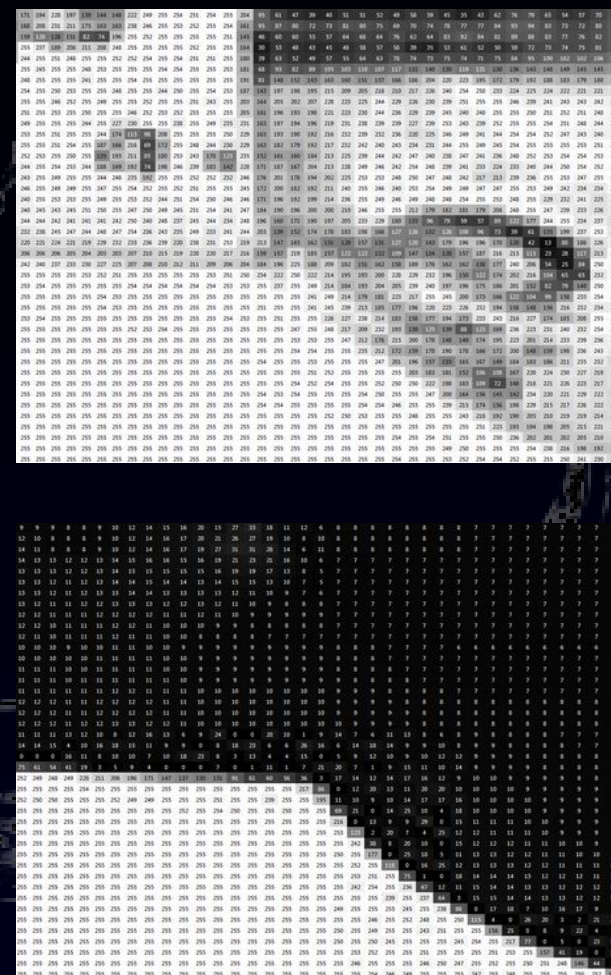
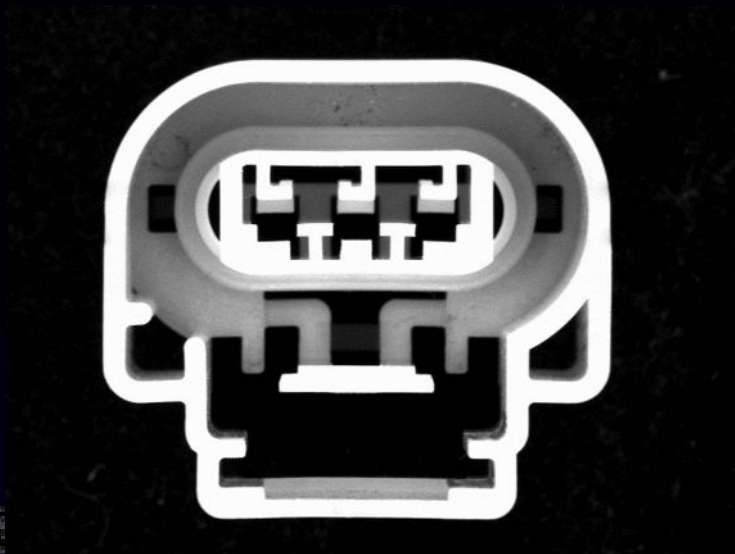


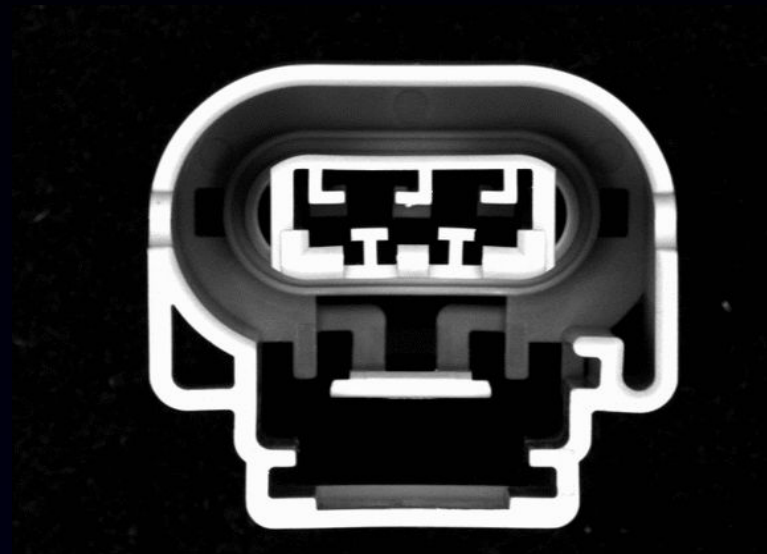
Image Inspector



Detect Connector Controur



Collimated light



Dark field light



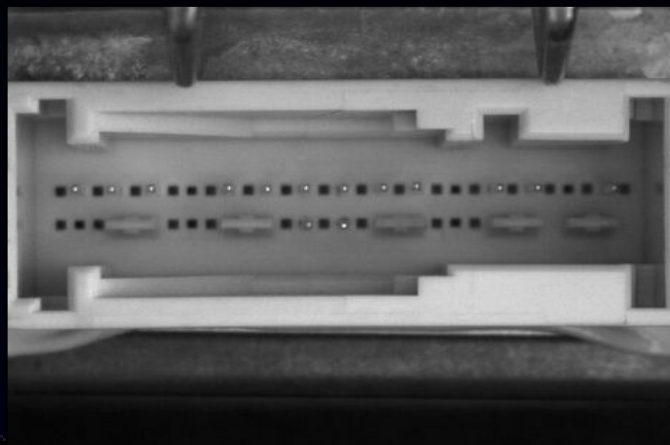
CAS series



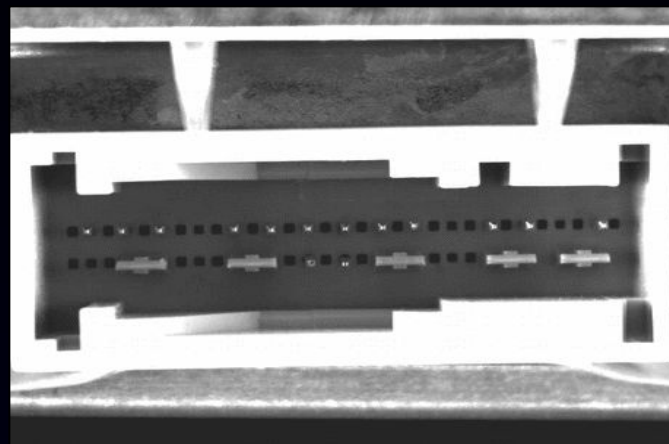
LBQ series



Connector Pin Inspection



Collimated axial light



Dark field light



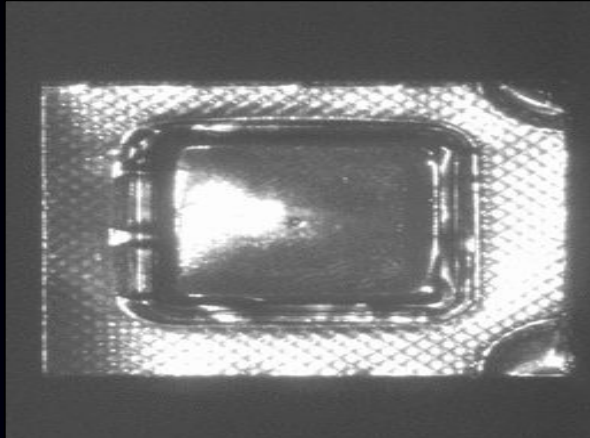
CAS series



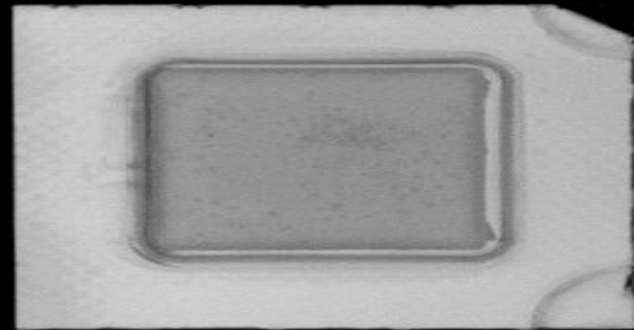
LBQ series



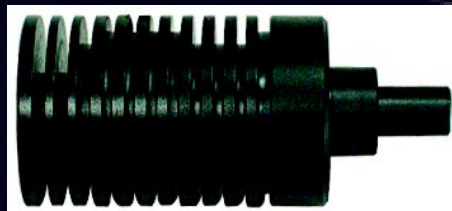
Chewing-gum foil



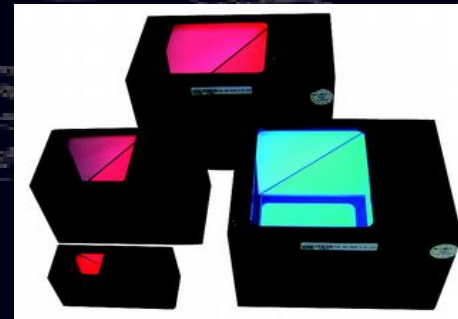
Strahler



Koaxialbeleuchtung



HBF series



CAS series



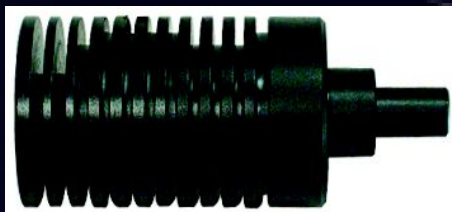
OCR on can



Spot light



Coaxial light



HBF series



CAS series



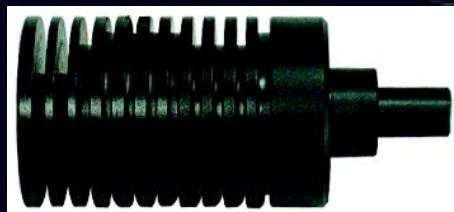
Production code on foil



Spot light



Coaxial light



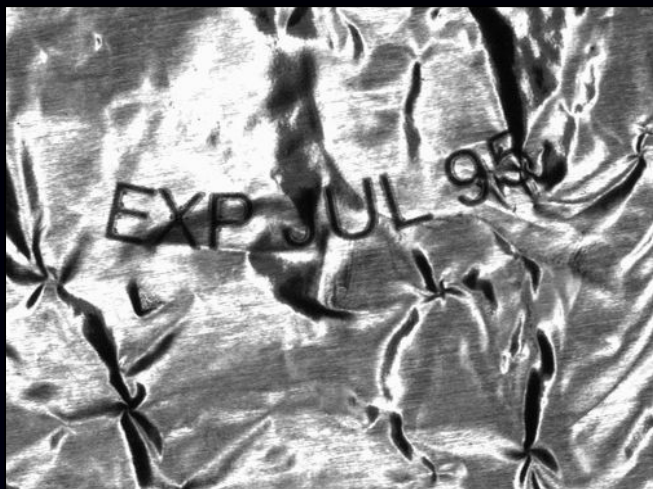
HBF series



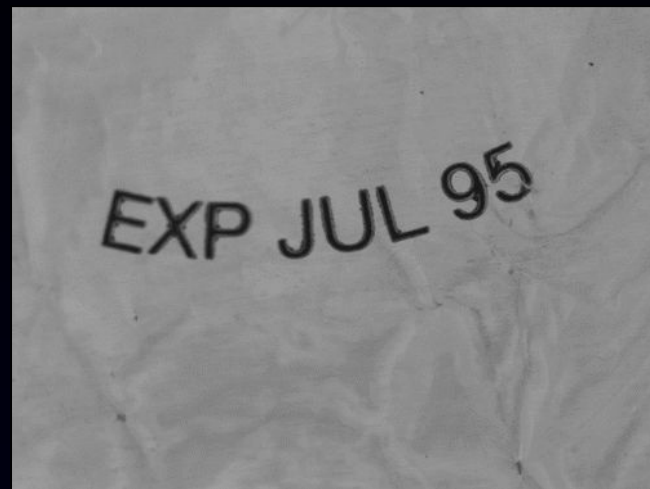
CAS series



OCR on aluminum foil



Ring light



Dom light



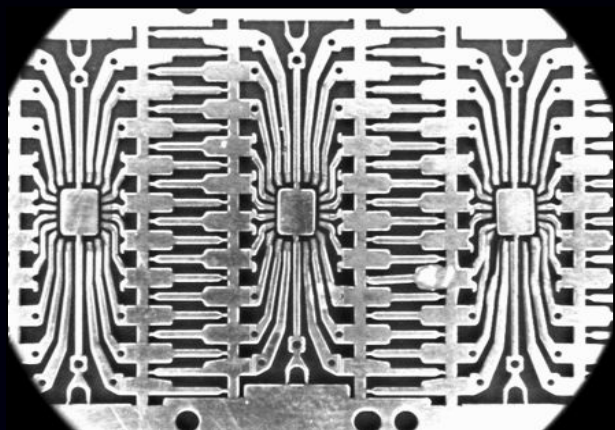
LLA Serie



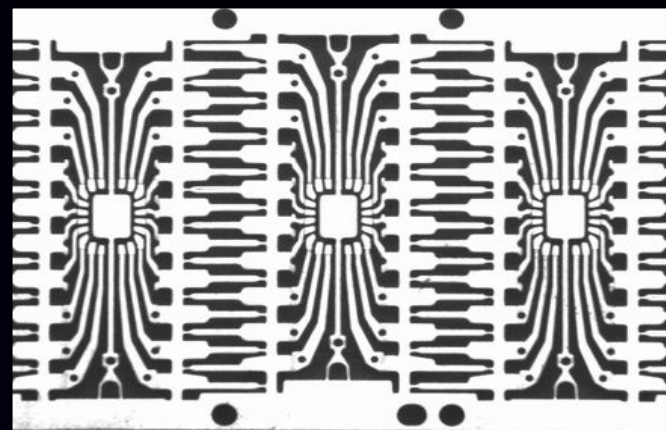
IDQ Serie



Lead frame inspection



Ring light



Axial light



LLA Serie



CAS Serie



Display inspection



Diffus ring light



Coaxial light



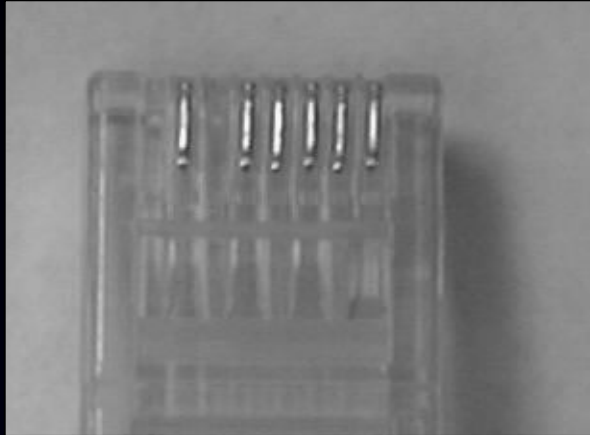
DLR Serie



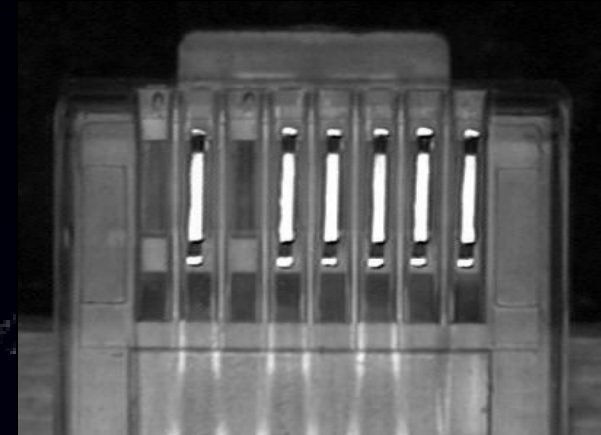
CAS Serie



Display inspection



Diffus ring light



Coaxial light



DLR Serie



CAS Serie



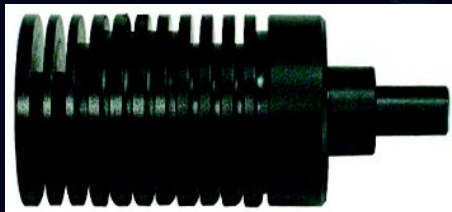
OCR on embossed surface



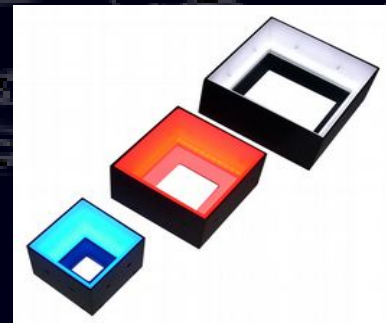
Spot light



Dark field light



HBF Serie



DLS & DLW Serie



Engraving Inspection



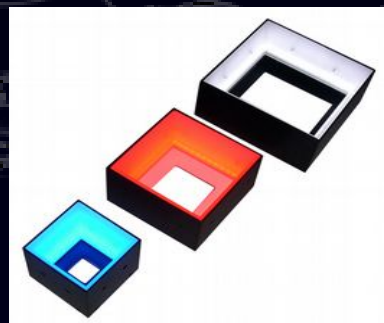
Bright field ring light



Dark field light



LSW Series



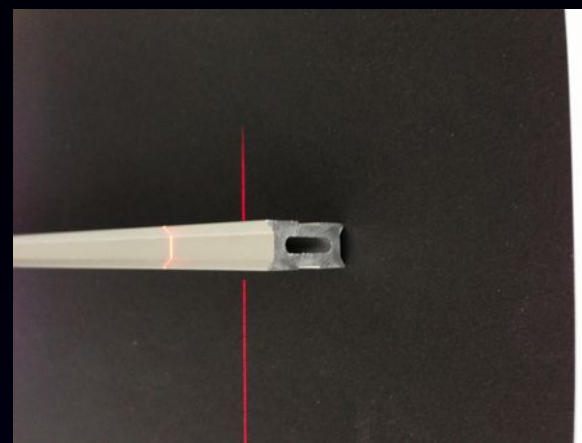
DLS & DLW Series



Contour Inspection



Bright field ring light



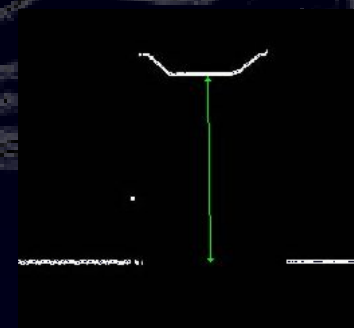
RED Laser Line



LSW Series



Laser line





Temperature Inspection



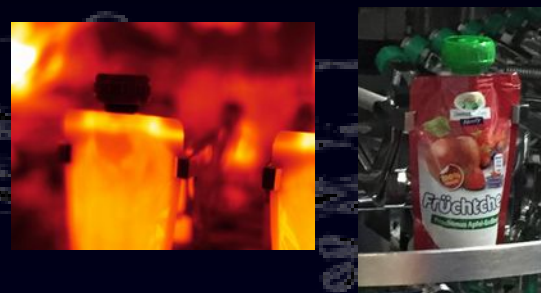
Dom light



Thermal Camera



IDQ Series



Heat Radiator – content is hot



Lens



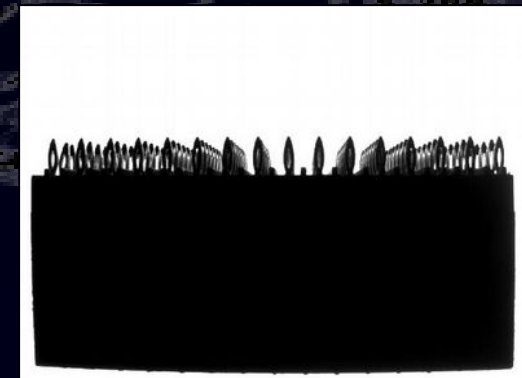
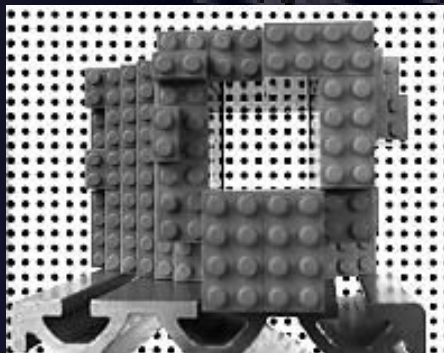
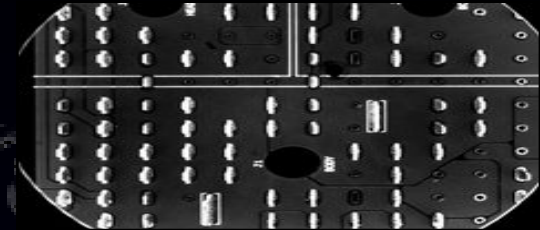
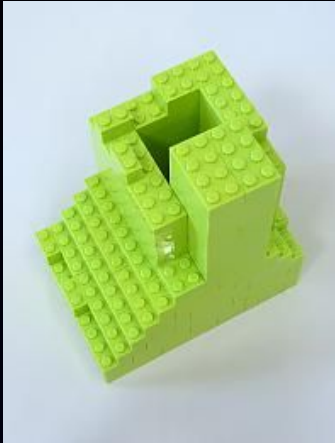


Lens types

- Endocentric
- Telecentric
- Hypercentric
- Scheimpflug
- Endoscope

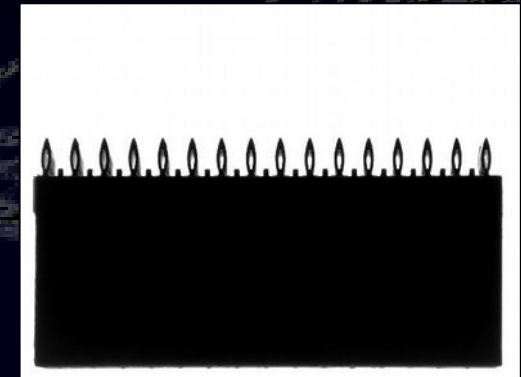
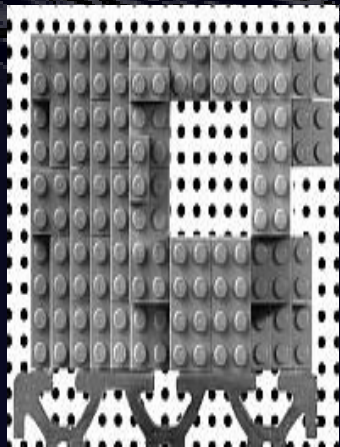
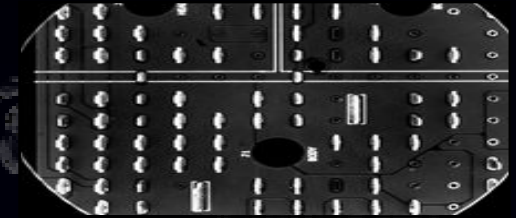
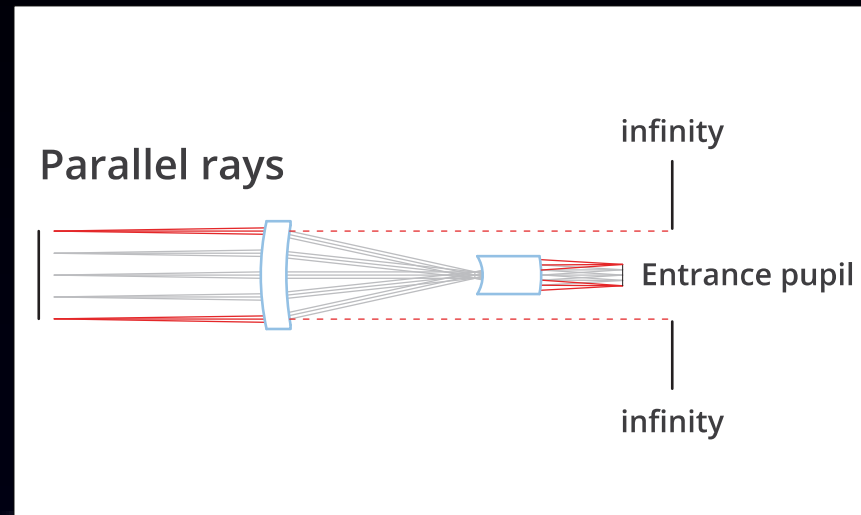
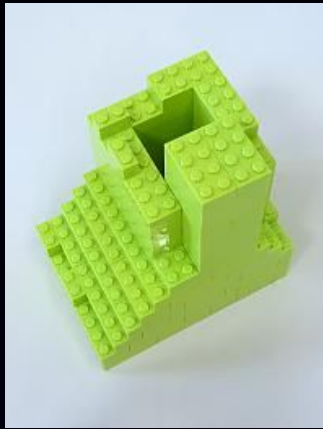


Endocentric Lens



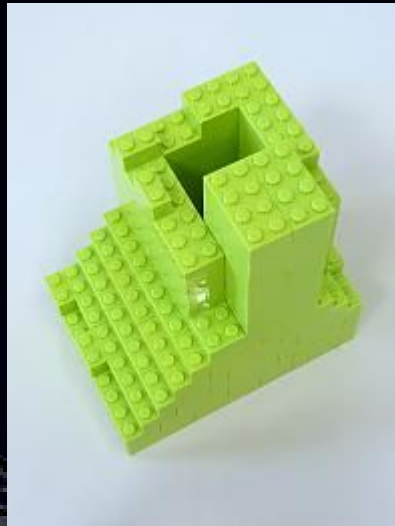


Telecentric Lens

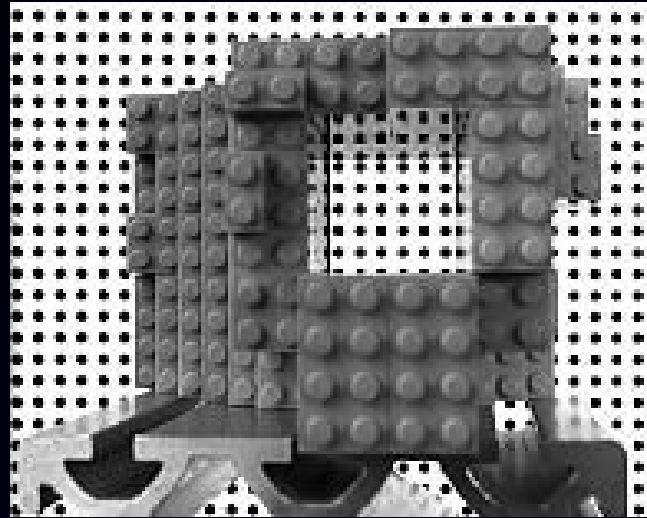




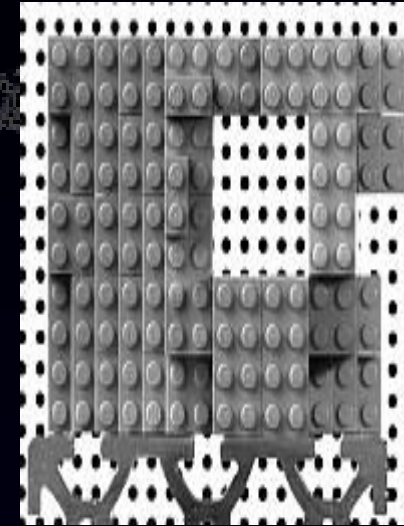
Comparison Endocentric - Telecentric



Image



Endocentric



Telecentric



Endocentric - Telecentric

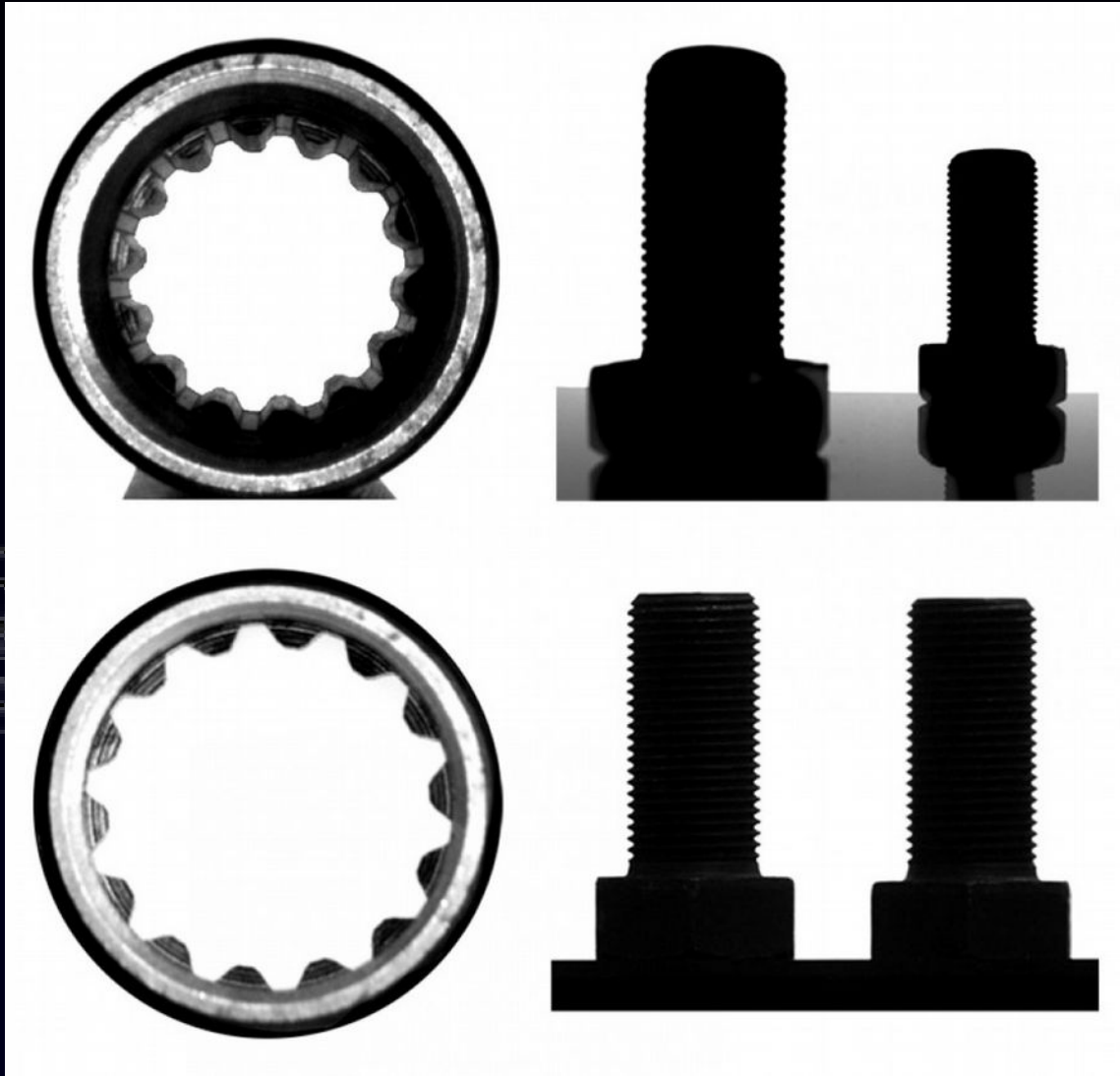


Bild von Opto GmbH * München

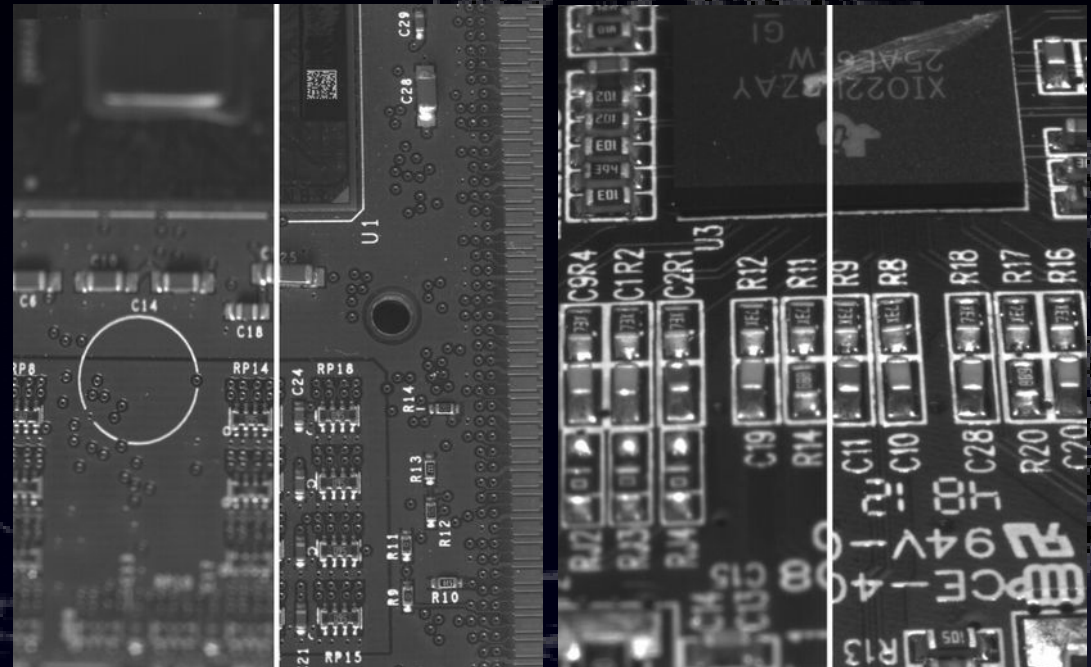


Hypercentric Lens



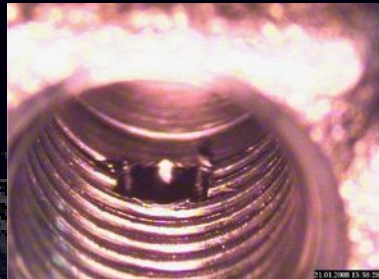


Scheimpflug Lens Setup





Endoscope





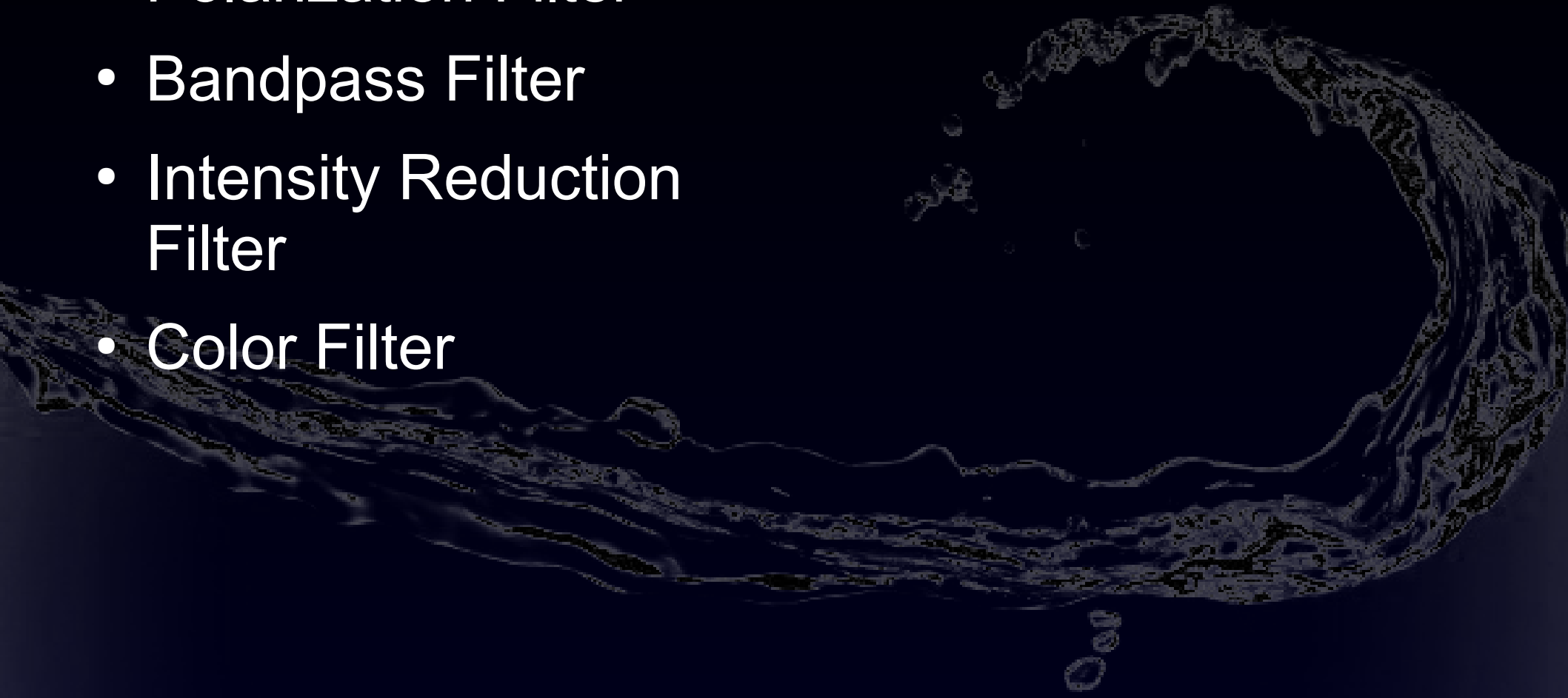
Filter

generate contrast by
eliminating or enhancing
wrong wave length



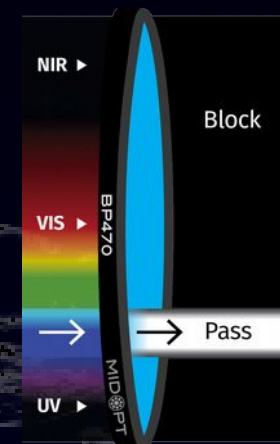
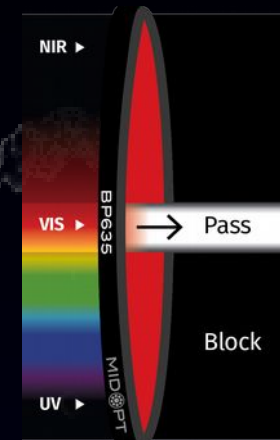
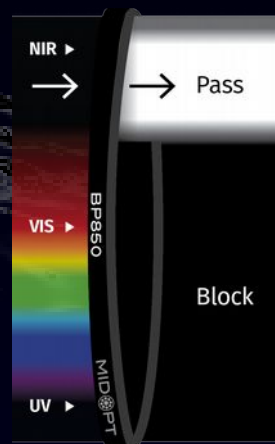
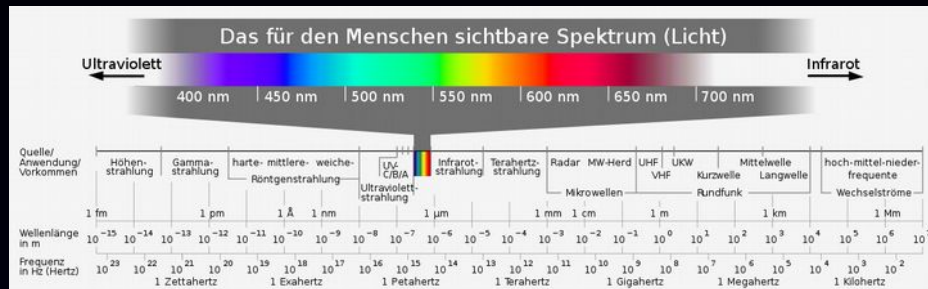
Overview

- Polarization Filter
- Bandpass Filter
- Intensity Reduction Filter
- Color Filter





FILTER





Polarization Filters



Without Polarization-Filter



With Polarization-Filter



Polarization Filter



Without Polarization-Filter



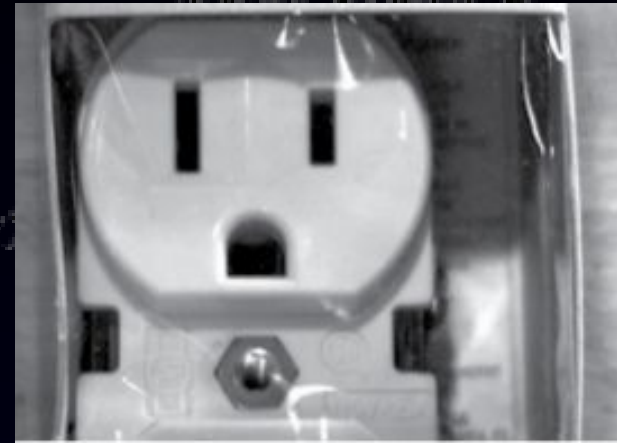
With Polarization-Filter



Polarization Filter



Without Polarization-Filter



With Polarization-Filter



Polarization Filter



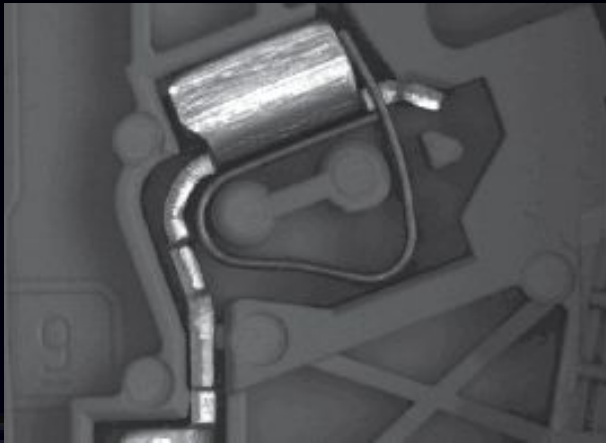
Without Polarization-Filter



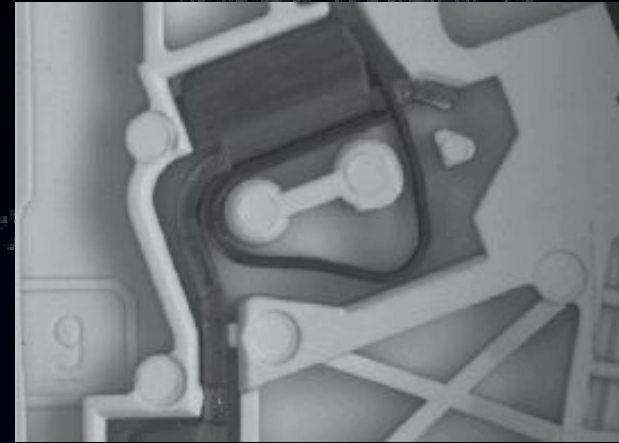
With Polarization-Filter



Polarization Filter



Without Polarization-Filter



Without Polarization-Filter

[illegible]

Image Inspector



Bandpass Filters



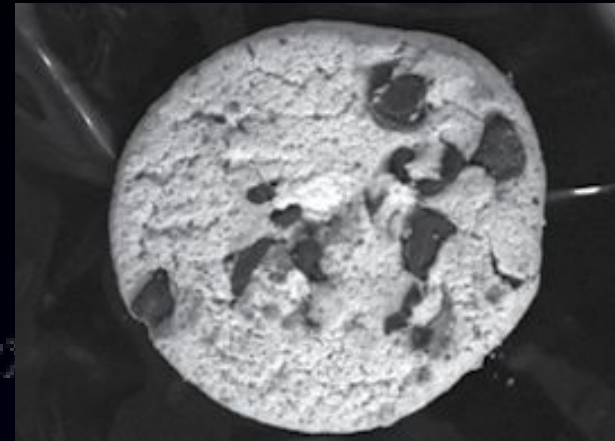
Without Bandpass-Filter



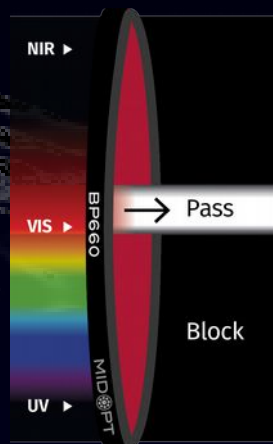
With Bandpass-Filter



Bandpass Filter

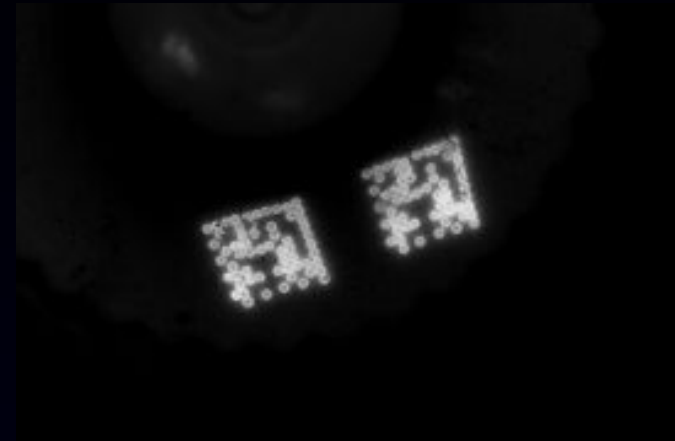
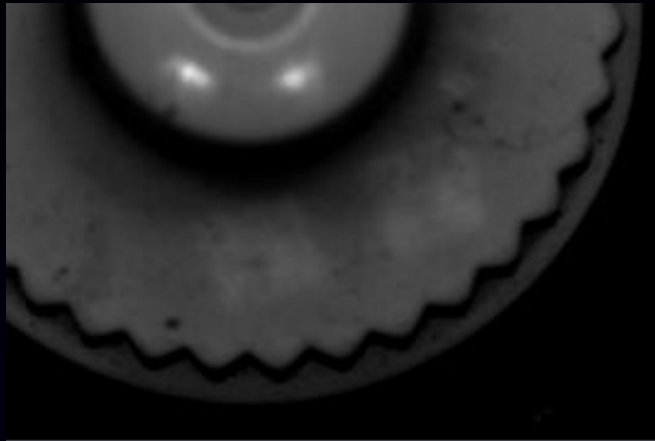


- Dark Red

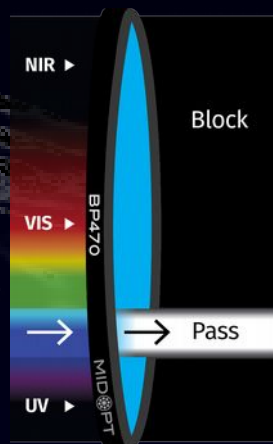




Bandpass Filter

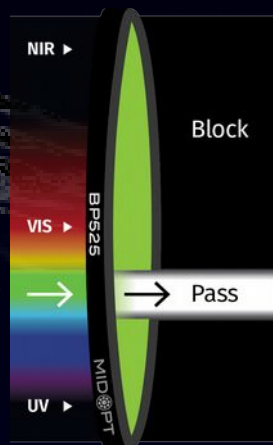
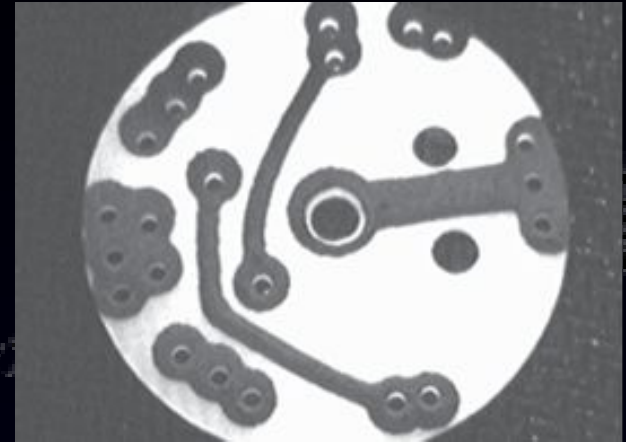
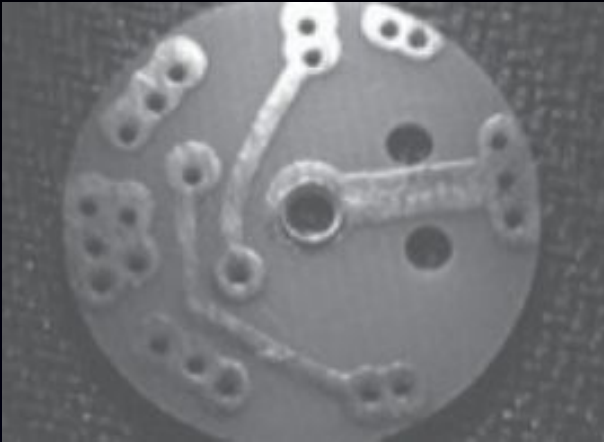


- Blue





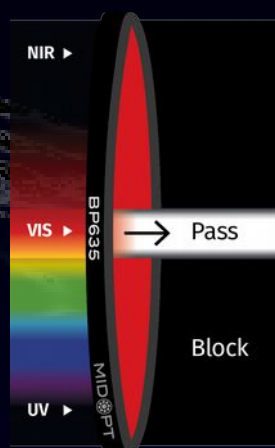
Bandpass Filter



- Light Green

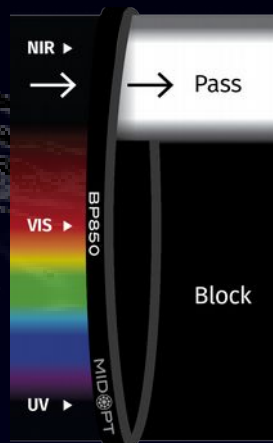


Bandpass Filter





Bandpass Filter



- Near IR

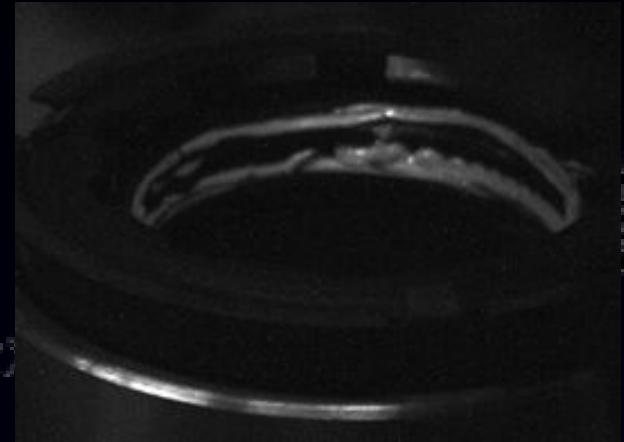


Bandpass Filter - Fluorescence



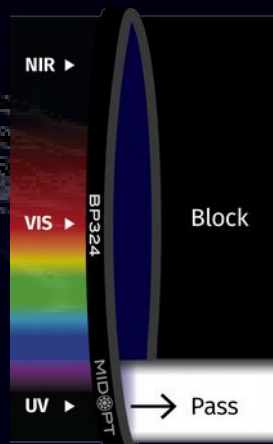
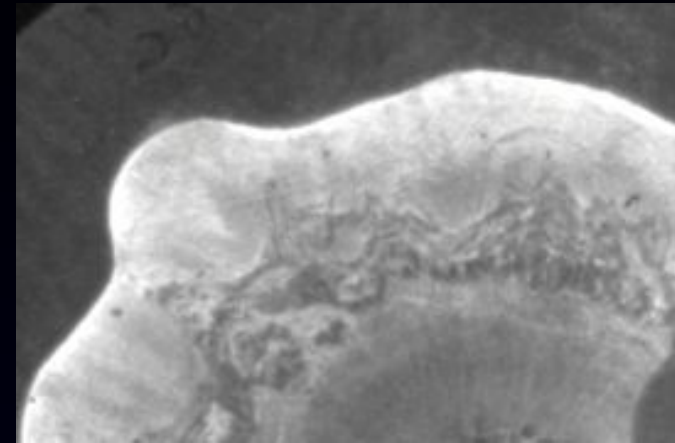
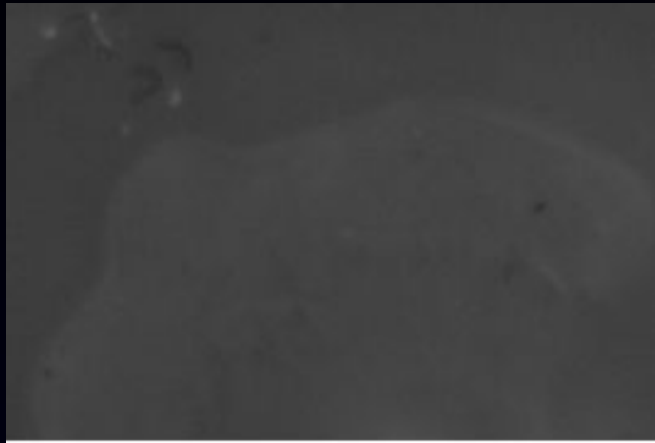


Bandpass Filter - Fluorescence



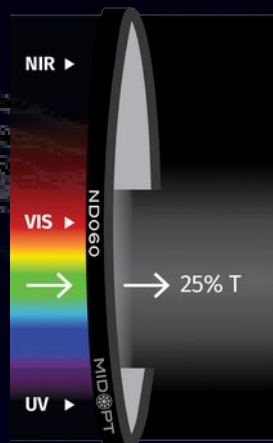


Bandpass Filter Ultraviolet



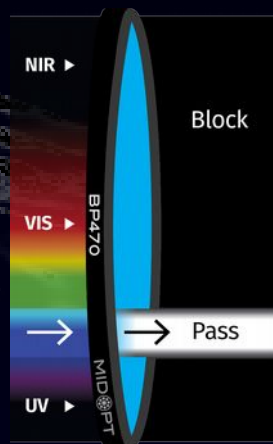
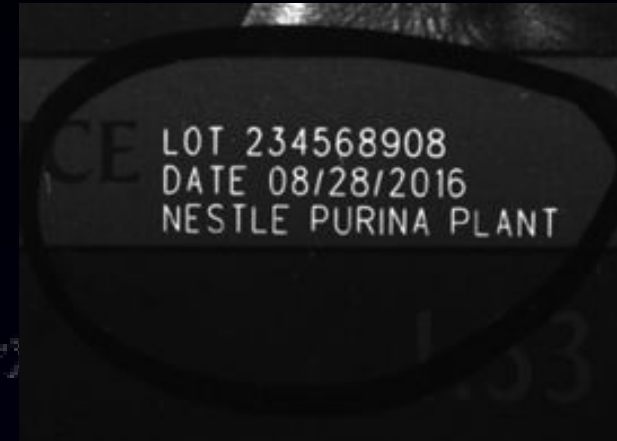
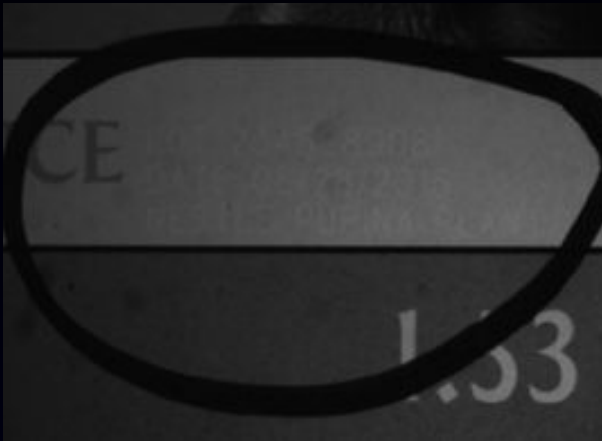


Filter Intensity Reduction





Color Separation Filter





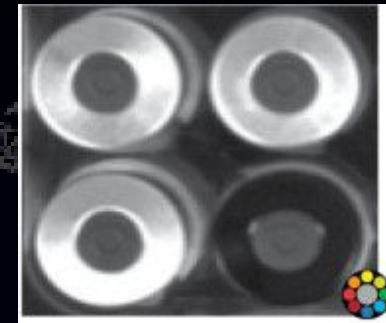
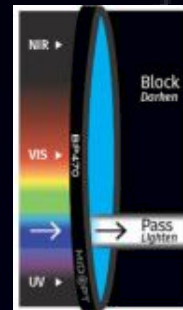
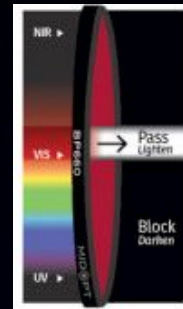
Color Separation Filters



Color Camera



Grey Camera



Grey Camera with blue or red Filter



Thank you



EVT Eye Vision Technology
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