Product comparison:

**PROGRES GRYPHAX® RIGEL** vs. **ProgRes® MFcool**

**PROGRES GRYPHAX® RIGEL**

Explore the micro universe
monochrome in low light.

The *premium solution*
for low light research microscope applications

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PROGRES GRYPHAX® – comparison

All camera comparisons are based on results of our JENOPTIK digital image laboratory. The quality of our cameras is proven by spectral measurement at our laboratory and is based on guidelines of EMVA 1288 standard.

Comparison of PROGRES GRYPHAX® RIGEL

Refine every microscope workstation

PROGRES GRYPHAX® RIGEL replaces all monochrome research CCD cameras.

PROGRES GRYPHAX® RIGEL is the premium solution for low light research microscope applications. It is powered by a 1/1.2” back-illuminated CMOS sensor made by SONY.

This camera provides fast live images, with global shutter technology, high dynamic range and non-visible noise. Reach up to 60 fps in full sensor resolution combined with the brilliant Jenoptik image quality. Collect information beyond visible light.

Within this comparison we take a look at the ProgRes® MFcool compared to PROGRES GRYPHAX® RIGEL, the successor of all monochrome research ProgRes® CCD cameras.

<table>
<thead>
<tr>
<th>Sensor/Camera</th>
<th>ProgRes® MFcool with clear glass filter</th>
<th>PROGRES GRYPHAX® RIGEL with clear glass filter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utilized sensor diagonal</td>
<td>10,965 mm</td>
<td>13,268 mm</td>
</tr>
<tr>
<td>FPS</td>
<td>13 (1360 x 1024)</td>
<td>60 (1920 x 1200)</td>
</tr>
<tr>
<td>Quantum Efficiency (\frac{N(e^-)}{N(p)}) @ 532nm (green)</td>
<td>0.54 (\text{QE(}\lambda\text{)}) see spectral data</td>
<td>0.64 (\text{QE(}\lambda\text{)}) see spectral data</td>
</tr>
<tr>
<td>Dark Noise [DN/e-]</td>
<td>7 DN (at 14 bit); 9e-</td>
<td>0.8 DN (at 12 bit); 6e-</td>
</tr>
<tr>
<td>Dynamic Range (DR)</td>
<td>66,0 dB</td>
<td>73,3 dB</td>
</tr>
</tbody>
</table>

By reason on our measurements, done within our laboratory and based on guidelines of EMVA 1288.
Sensor

PROGRES GRYPHAX® RIGEL

is equipped with SONY’s back-illuminated CMOS sensor technology.

With a conventional front-illumination structure, the metal wiring and transistors on the surface of the silicon substrate that form the sensor’s light-sensitive area (photo-diode) impede photon gathering carried out by the on-chip lens, and this has also been an important issue in the miniaturization of pixels and widening optical angle response. A back-illuminated structure minimizes the degradation of sensitivity to optical angle response, while also increasing the amount of light that enters each pixel due to the lack of obstacles such as metal wiring and transistors that have been moved to the reverse of the silicon substrate. However, compared to conventional front-illuminated structures, back-illuminated structures commonly causes problems such as noise, dark current, defective pixels and color mixture that lead to image degradation and also cause a decrease in the signal-to-noise ratio. To overcome this Sony has developed a unique photo-diode structure and on-chip lens optimized for back-illuminated structures, that achieves a higher sensitivity and a lower random noise without light by reducing noise, dark current and defect pixels compared to the conventional front-illuminated structure. Additionally, Sony’s advanced technologies such as high-precision alignment have addressed any color mixture problems.

Quantum efficiency with clear glass
PROGRES GRYPHAX® RIGEL’s quantum efficiency is more than 20 percent higher (at 532 nm) than ProgRes® MFcool

PROGRES GRYPHAX® RIGEL advantages:

☆ Effective photon to electron transformation
☆ No interlace effect & no smear
☆ Low dark noise and low dark current
☆ High input clock frequency
☆ High dynamic range
☆ Secure investment: long-lasting & reliable hardware
## Sensor size and basic TV-adapter 1,0

<table>
<thead>
<tr>
<th><strong>ProgRes® MFcool</strong></th>
<th><strong>PROGRES GRYPHAX® RIGEL</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>CCD 2/3”</td>
<td>CMOS 1/1.2”</td>
</tr>
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</table>

- TV-Adaption Zeiss 1,0x (60N-C 1”)
- TV-Adaption Zeiss 1,0x (60N-C 1”)

<table>
<thead>
<tr>
<th><strong>Equipment:</strong></th>
<th><strong>Sample:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Microscope</td>
<td>Hedera Helix (Gemeiner Efeu) Blattstiel quer &quot;1037&quot;</td>
</tr>
<tr>
<td>Lens</td>
<td>Zeiss AxioScope.A1</td>
</tr>
<tr>
<td>Zeiss 5x EC-Epiplan-NEOFLUAR</td>
<td></td>
</tr>
</tbody>
</table>

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*This page contains images and a table comparing different camera adaptations and equipment.*
Sensor size and best fitting TV-adaptor 0.63

**ProgRes® MFcool**
CCD 2/3”

**PROGRES GRYPHAX® RIGEL**
CMOS 1/1.2”

TV-Adaption Zeiss 0.63x (60N-C 2/3“)

**PROGRES GRYPHAX® RIGEL** has a more than 37 % larger sensor field than ProgRes® MFcool

**PROGRES GRYPHAX® RIGEL** advantages:
- ★ Microscopy-optimized field of view
- ★ Cost-efficient TV adaption 1x are suitable

Equipment:
- Microscope: Zeiss AxioScope.A1
- Lens: Zeiss 5x EC-Epiplan-NEOFLUAR

Sample: Hedera Helix (Gemeiner Efeu) Blattstiel quer “1037”
Fluorescence

**ProRes® MFcool**
CCD 2/3"

**PROGRES GRYPHAX® RIGEL**
CMOS 1/1.2"

**TV-Adaption Zeiss 1,0x (60-C 1”)**

**Equipment:**
- Microscope: Zeiss AxioScope 40
- Lens: Zeiss Plan-NEOFLUAR 40x

**Sample:**
- Bovine pulmonary artery endothelia (BPAE)

**PROGRES GRYPHAX® RIGEL** provides the same sensitivity with a back illuminated CMOS sensor. Fast live images are possible with increased gain because of the very low dark noise.

**PROGRES GRYPHAX® RIGEL advantages:**
- Using increased Gain to get a fast live image for easy focusing

**Live image**

**PROGRES GRYPHAX® RIGEL** is equipped with an all pixel scan and global shutter sensor. It provides 60 fps at 2.3 MPix live image speed, perfect for video recording. This is four times faster compared to MFcool.

Main features of PROGRES GRYPHAX software take advantage of the modern camera characteristics.

**Video**

**PROGRES GRYPHAX® RIGEL advantages:**
- Video speed at live image: “You get what you see”
- Video recording of living or to be moved specimen at brilliant image quality, without interlace effect.
EDF / Z-stacking

**PROGRES GRYPHAX® RIGEL advantage:**

🌟 Real-time appearance of EDF/ Z-stacking images (no interlace effect, no distorted images) saves time.

Panorama

**PROGRES GRYPHAX® RIGEL advantage:**

🌟 Real-time appearance of panorama (no interlace effect, no distorted images) saves time.

Captured Image

**PROGRES GRYPHAX® RIGEL advantage:**

🌟 This camera provides 60 % more resolution and therefore more details.

Software

PROGRES GYPHAX software is workflow optimized capture software. It is created to help users intuitive getting the perfect live and captured image and saving time.

**PROGRES GRYPHAX® Software advantage:**

🌟 Cross-platform compatible WIN, MAC and LINUX
🌟 Identical GUI across WIN, MAC and LINUX platform

Weight and dimension

<table>
<thead>
<tr>
<th>ProgRes® MFcool</th>
<th>PROGRES GRYPHAX® RIGEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight: ~ 800 gr</td>
<td>Weight: ~ 400 gr</td>
</tr>
<tr>
<td>Dimension: L x W x H in mm</td>
<td>Dimension: L x W x H in mm</td>
</tr>
<tr>
<td>89 x 84 x 93</td>
<td>85 x 75 x 50,2</td>
</tr>
</tbody>
</table>

**PROGRES GRYPHAX® Packaging advantage:**

🌟 Lower transport costs due to less weight and dimension of housing and camera packaging.
Summary

PROGRES GRYPHAX® RIGEL advantages at a glance:

- Effective photon to electron transformation
- No interlace effect & no smear
- Low dark noise and low dark current
- High input clock frequency
- High dynamic range
- Secure investment: long-lasting & reliable hardware
- 37% larger field of view
- Microscopy-optimized field of view
- Cost-efficient TV adaption 1x are suitable
- Using increased Gain to get a fast live image for easy focusing
- Video speed at live image: “You get what you see”
- Real-time appearance of EDF/ Z-stacking images saves time
- Real-time appearance of panorama saves time
- Cross-platform compatible WIN, MAC and LINUX
- Identical GUI across WIN, MAC and LINUX platform
- Low transport costs due to less weight and dimension

Refine every microscope workstation with PROGRES GRYPHAX® RIGEL

The premium solution for low light research microscope applications
Focus your activities on our new product portfolio PROGRES GRYPHAX®.

**PROGRES GRYPHAX® RIGEL**

Explore the micro universe monochrome in low light.

The **premium solution** for low light research microscope applications