



FUSION SOLO S

BROCHURE

VILBER is pleased to announce the Fusion Solo S.

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Section 1: Product Description

1.1 General Overview

Vilber Lourmat is pleased to announce the release of a new compact personal imager to enhance our current Western Blot documentation and fluorescent product portfolio, Fusion Solo S.

Fusion Solo S is designed to address the constraints of a precious lab commodity, available bench space. While the dimensions are compact, the specifications are not. Solo S boasts unrivalled scientific CCD cameras with our custom made unrivalled F:0.84 lens, 4 position filter wheel, LED EPI white lights, a built-in innovative Applications Pad container which can welcome any kind of illumination from UV to IR.

The Solo S is impressively housed in a design and size that is reminiscent of a high-tech medical design.



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1.2 Key features and benefits

- Compact Design : industry leading dimension, requires minimal bench space
- Aesthetically pleasing. High tech design. Unique look
- Scientific Grade camera. Super sensitivity and extremely high level of resolution
- Large size Scientific CCD camera sensor: extremely high sensitivity with the necessary dynamic range to distinguish between subtle signal variations. Ability to image low intensity samples
- High Dynamic range. Allows for quantitative analysis
- Pre-calibrated focus for all defined sample height. Easy and convenient adjustment of lens settings
- White LED lights / Bright illumination: allows for Western blot molecular weight imaging and other visible samples that require lighting from above
- Intuitive software workflow
- Great system for personal use or a core lab
- 4-position filter wheel: allows for dye flexibility of different fluorescent stains. Easy filter selection
- Light safety switch override for safety and for preparative work when the door is open
- Cost effective: ability to purchase an high end gel and blot imaging system with analysis quality images
- No assembly required : Out of the box, ready to go
- Casing Light-tight high tech design
- Innovative Application Pad container. Allows a wide variety of UV, visible and IR fluorescent imaging capabilities.

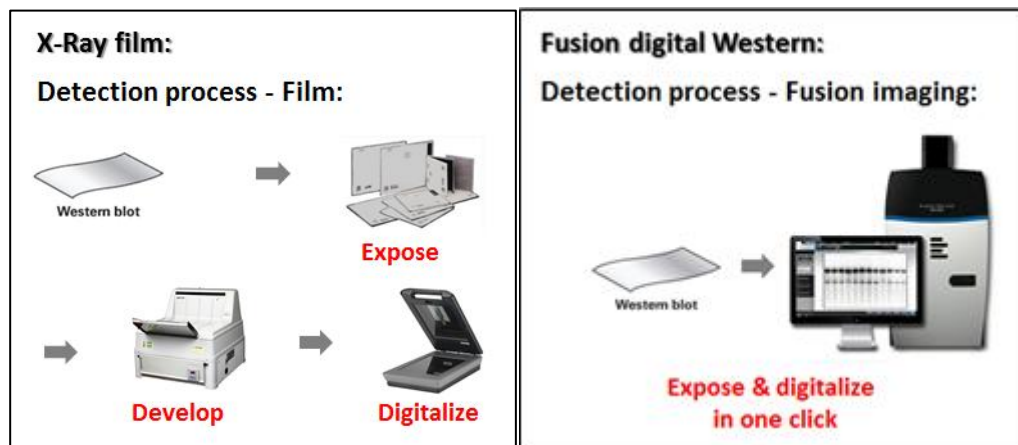


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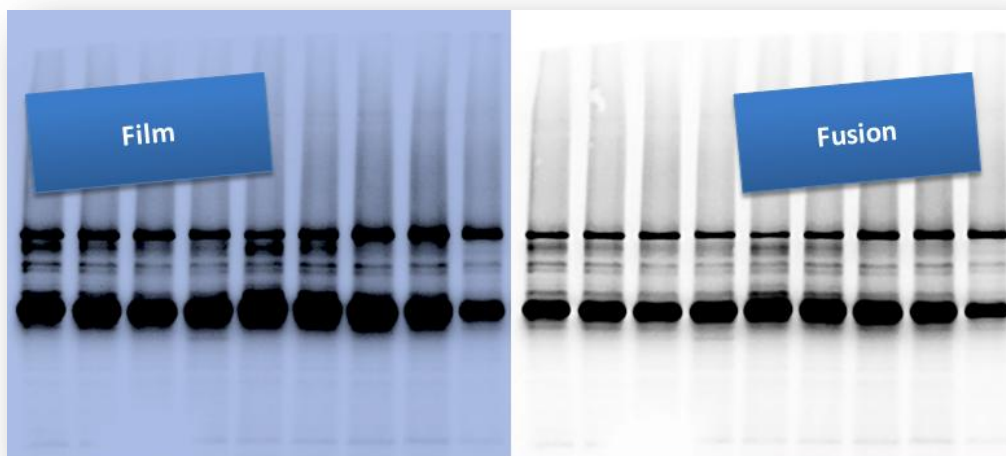
1.3 Performance data – Compared to film

Film is the main Fusion competitor. People like it because of its sensitivity.



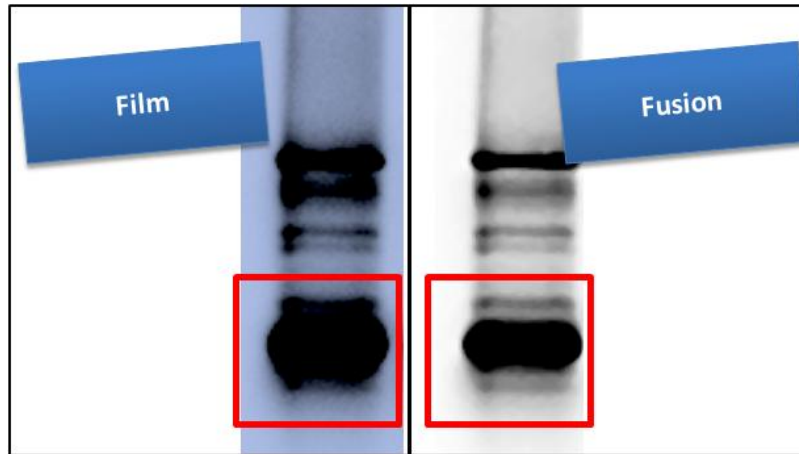
Despite its sensitivity, film has several disadvantages:

- Multiple film exposure could be required to get appropriate signal
- Film dynamic range is not sufficient for quantification
- Film required to be scanned to get a digitalized image ready for quantification software
- Film is a costly consumable
- Film requires a separate dark room and a film developer
- Films requires chemicals for film development that need to be disposed separately and monitored



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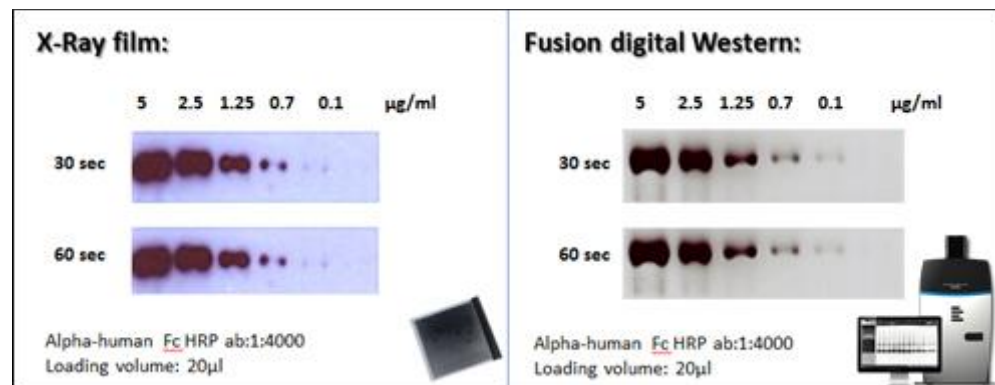
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In comparisons to films, several aspects need to be considered:

- Sensitivity
- Signal to noise ratio
- Linearity
- Dynamic range
- Quantification of the proteins

Sensitivity will affect the amount of light that the system picks up and converts into your photo. Sensitivity is about the quantity of signal that can be collected by the system within a defined period of time.



The noise is the background baseline of the image. The imaging system can only collect the signal above this noise base. It should then be maintained to the lowest possible level.

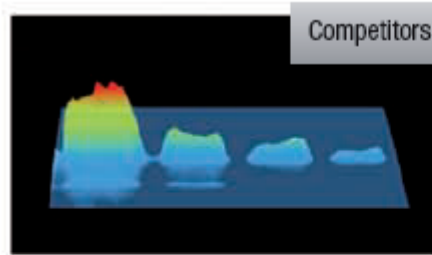


Fig.5: Competitive system.
A two-fold dilution series of transferrin was transferred to a PVDF membrane.
The faint signal cannot stand out from the surrounding noise level

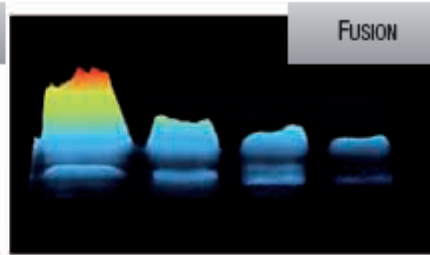
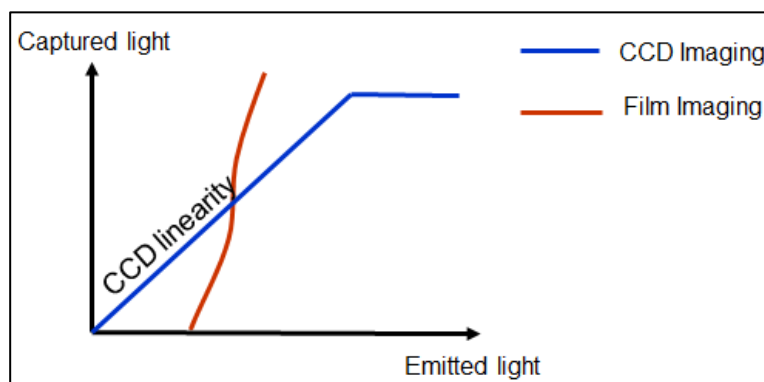


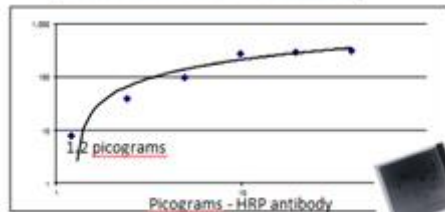
Fig.6: The Fusion combined with the High Sensitivity Reading (HSR) technology provide a better signal to noise and more bands are detected. Fusion FX7, cooling at -42°C.

The linearity describes the relationship between the detected signal and the sample quantity. The film has a reputation not to be linear. As a consequence, signal cannot be measured from a film.



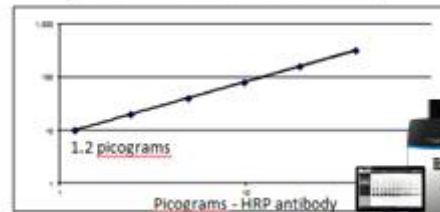
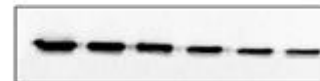
X-Ray film:

- Saturated image - Poor dynamic
- Not appropriate for quantitative analysis



Fusion digital Western:

- Linear, quantitative results

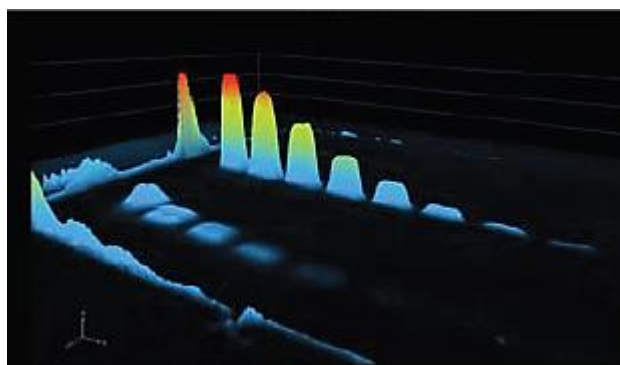
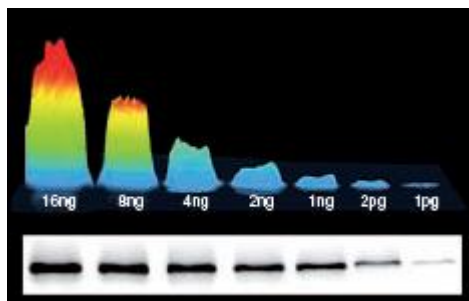


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Dynamic range refers to the possibility to have on the same image both the very faint bands and the very bright band without saturation of the bright bands. If the dynamic is poor, the system cannot detect the faint band without oversaturated the bright bands.



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Performance compared to film: Sensitivity

The Fusion systems sensitivity is at least equal as the sensitivity of film.

	Film	Fusion Solo S
Sensitivity	★★★★★	★★★★★

Performance compared to film: Noise / Signal to noise

The film could be highly noisy. On the opposite, the Fusion has a supreme stable low noise floor level.

	Film	Fusion Solo S
Noise / Signal to noise	★	★★★★★

Performance compared to film: linearity

The Fusion system use a scientific CCD camera designed to provide the best possible linearity.

	Film	Fusion Solo S
Linearity	None	★★★★★

Performance compared to film: Dynamic rane

The Fusion system can easily detect the faintest bands without signal oversaturation of the highest bands.

	Film	Fusion Solo S
Dynamic range	★	★★★★★

Performance compared to film: Ability to produce quantification ready images

	Film	Fusion Solo S
Image quantification	None applicable	★★★★★

1.4 Performance data – Compared to competitors

Main competitors for chemiluminescence imaging are:

- Biorad – ChemiDoc Touch / ChemiDoc MP / ChemiDoc XR systems
- GE – Amersham 600, LAS 500

Outsiders:

- UVP (ChemiDoc-It)
- Alpha Innotech / Protein Simple, now Bio Techne (FluorChem)
- Syngene (Gbox)

Biorad is the first name to come into the mind of the customers regarding Western blot imaging.

The Vilber's Fusion range plays in the high end and high performance part of the market. No other system provides higher performance as the Fusion systems.

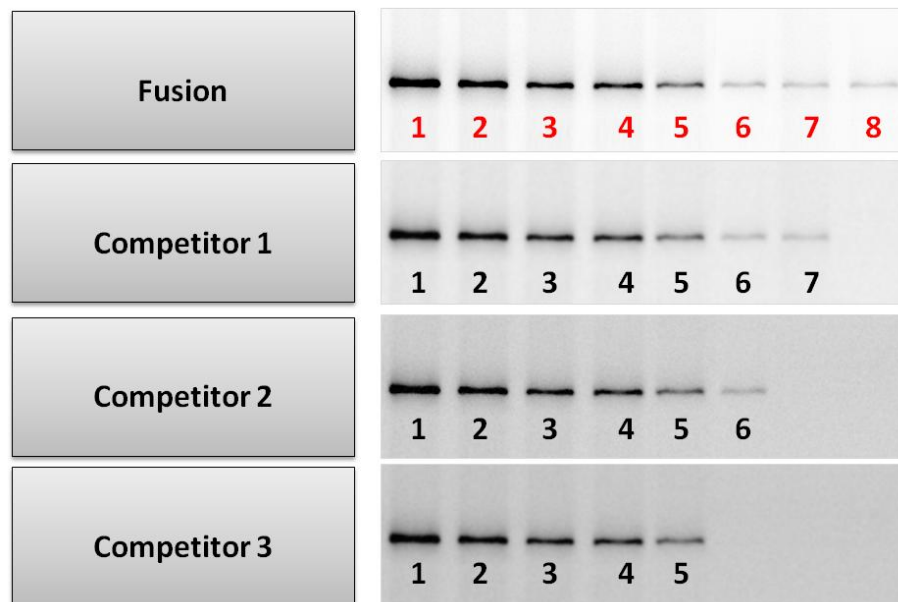


Fig 2: Comparative low light images taken with Fusion versus competitive system with comparable imaging settings. The images are displayed with same relative intensity scaling.

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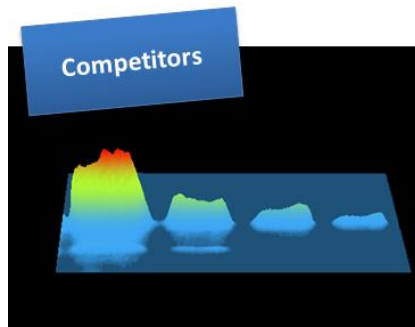


Fig5: Competitive system. The faint signal cannot stand out from the surrounding noise level

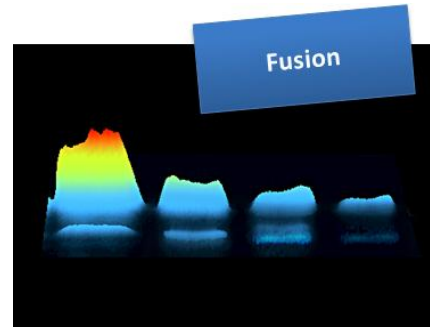


Fig6: The Fusion combined with the High Sensitivity Reading (HSR) technology provide a better signal to noise and more bands are detected. DARQ camera, cooling at -42°C.

Sensitivity / Noise / Image dynamic

	Competitor	Fusion Solo S
Sensitivity	☆☆☆	☆☆☆☆☆
Signal to noise	☆☆☆	☆☆☆☆☆
Dynamic range	☆☆☆	☆☆☆☆☆

Application coverage / Ease of use

	Competitor	Fusion Solo S
Application coverage	☆☆☆	☆☆☆☆☆
Ease of use	☆☆☆	☆☆☆☆☆

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1.7 Applications

- Chemiluminescence
- Bioluminescence
- Visible imaging
- UV fluorescence
- Multiplexing fluorescence

Choice of visible RGB, NIR or IR excitation source

Fluorescent Gels

- Built-in 4 position filter wheel allows for easy changing of filters.
- F590 interferential filter, optimal for Ethidium Bromide
- Additional filters available

Colorimetric Protein Gels

- White-light Pad or White light conversion screen allows for colorimetric samples imaging
- Both UV or white light can be used as light source



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Section 2: Fusion Solo S in details

2.1 Product specifications

Darkroom

SmartCab intelligent darkroom technology:

- Software control of the lighting
- Automatic white light intensity adjustment according to the sample position
- Automatic filter wheel position reconnaissance
- Precalibrated focus for all defined sample height



Fig7: Fusion Solo S cabinet: empty PadBox configuration.

PadBox multimodal container

- Roll-out multimodal pad container
- Could accommodate our UV, blue, white light or Spectra pad or your own hardware such as heater, cooler, electrophoresis tank, special light source etc.
- Power socket inside the darkroom, switched on and off through the software

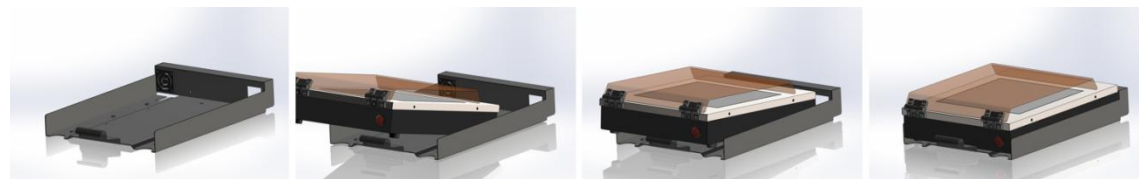


Fig2: The Fusion Solo S PadBox can easily integrate one of the several available Application Pad.

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PadConnect technology

- Automatic detection of the application-specific pad
- Imaging and software options adjusted accordingly
- Integration with the AppsStudio application library

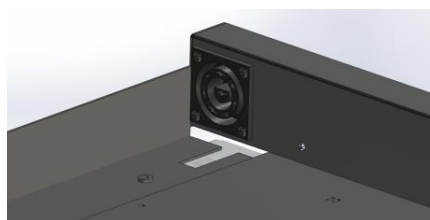


Fig8: The PadConnect technology allows an automatic recognition of the installed Application Pad.

Darkroom features

- 5 trays positions for Western blot samples
- 4 positions filter wheel
- Led based white light EPI
- Aluminum, steel & stainless steel cabinet
- Solid light proof cabinet with security locker
- Light safety switch override for safety and to allow for preparative work when the door is open
- Small size to fit on any bench space

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Detector

Choice between the DARQ 7 and the DARQ 5S camera

DARQ 7

Scientific grade CCD camera
Grade 0, zero defect
KAI4022 sensor
Image resolution: 10 megapixels
Native resolution: 2048x2048
1.3 inch sensor
-67° C maximum cooling differential
from ambient
-42°C absolute and regulated cooling via
four stages Peltier thermoelectric cooler.
High Sensitivity reading (HSR) technology
USB connection

DARQ 5S

Scientific grade CCD camera
Grade 0, zero defect
ICX694 sensor
Image resolution: 9 megapixels
Native resolution: 2100x1548
1 inch sensor
-55° C maximum cooling differential
from ambient
-30°C absolute and regulated cooling via
three stages Peltier thermoelectric cooler.
High Sensitivity reading (HSR) technology
USB connection

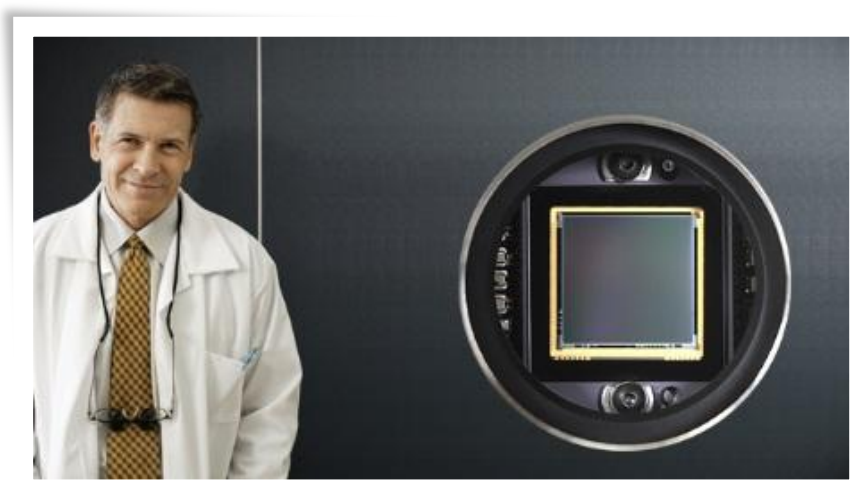


Fig9: The Darq7 sensor has a supersized CCD format which allows extremely dim light collection.

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Optical lens

Proprietary V.084 lens

Aperture F: 0.84

Minimum focusing distance: 24cm

Aspheric elements to deliver consistently sharp images out of the field of view

Manual adjustment

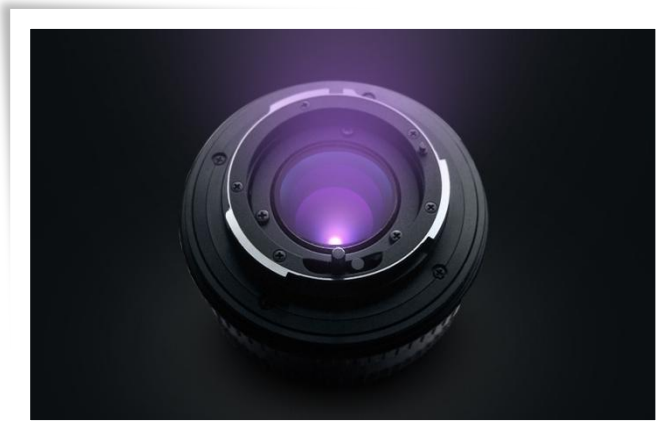


Fig10: Our V.084 lens has unrivalled sensitivity with an aperture of $f/0.84$ and allows the sample to be at 25cm distance from the camera.

Estimated field of view

DARQ 7 (mm)

Tray 1: 100x100

Tray 2: 110x110

Tray 3: 140x140

Tray 4: 160x160

Pad level: 190x190

PadBox level: 210x210

DARQ 5S (mm)

Tray 1: 85x70

Tray 2: 100x80

Tray 3: 120x95

Tray 4: 135x110

Pad level: 160x120

PadBox level: 180x140

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Software

Fusion-Capt v16.10 software for image acquisition and image analysis for the Solo 4S:

- Autoexposure
- Apps Studio
- 3D Dynamic scan

Vision-Capt v16.10 software for image acquisition and image analysis for the Solo 3S:

- Autoexposure
- Apps Studio
- 3D Dynamic scan



Fig11: The Apps Studio contains more than 40 different imaging protocols for your blot, gel and other bioluminescence sample.

2.2 Options and accessories

Application-Pad

- UV-Pad
- Super-Bright-Pad
- Sky-Pad: LED blue light transilluminator, 470nm
- White-Light- Pad: LED white light transilluminator
- Spectra-Pad RGB: Red, Green and blue EPI light module
- Spectra-Pad IR-RG: IR, NIR and Green EPI light module [To be confirmed]

All Application Pad except Spectra Pad can be used as a standalone illumination device outside the Fusion Solo S system, with an optional plug adaptor.

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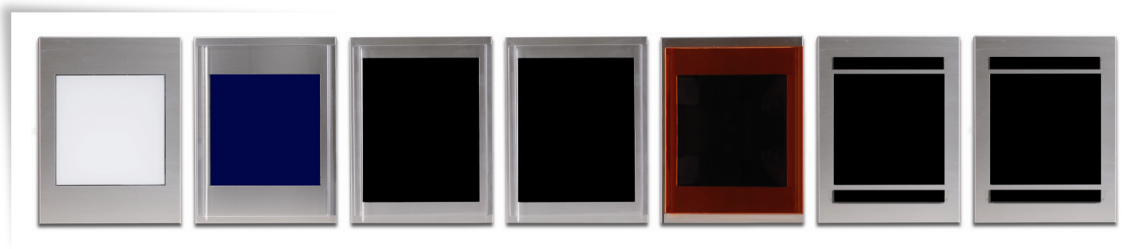


Fig12: Several different Application-Pad can be easily inserted or removed inside the Fusion Solo S

Filters

- F-590 interference filter, suitable for documentation of Ethidium Bromide and most stained DNA/RNA agarose and acrylamide gels
- F-535 Y
- F-565
- F595 Y
- F655
- F695
- F740 Y
- F820

Conversion screen

- FC-26WL
- FC-26Blue

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About VILBER LOURMAT

Founded in 1954 and with over 20,000 systems sold worldwide, Vilber Lourmat is the leading European provider of molecular imaging system, analysis software and UV fluorescence equipment for the life science research and the drug discovery sector.

VILBER has pioneered the post electrophoresis market and introduced breakthrough products such as stand-alone gel-documentation, Bio-1D imaging software, Super-Bright UV technology, dedicated chemiluminescence imaging system and 3D approach to 1D gel analysis.

Through a network of owned subsidiary offices and local distributors located in over 60 countries around the world, VILBER offers a broad range of imaging products for the research.

Our customers include pharmaceutical and biotechnology companies as well as universities, medical centers, government research institutes and agencies worldwide.



Max-Planck-Institut



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