

TRUMPF | iLED

The new era of LED surgical lights



INNOVATIONS FOR PATIENT CARE

TRUMPF



iLED from TRUMPF: State-of-the-art technology for the operating room

High-performance LEDs set new standards

Thanks to innovative lighting technology, LEDs (light-emitting diodes) can now be used to illuminate demanding environments. One example is in the operating room. Light-emitting diodes have numerous technical advantages over conventional halogen and gas discharge lamps, which include adjustable light characteristics, low heat generation, and a nearly unlimited life cycle. The adaptive light of the TRUMPF iLED surgical light makes it possible to adapt to individual surgical situations – a feature that is unique worldwide and revolutionises the work of the surgeon. The functional design emphasises the futuristic technology of the iLED.

Nearly unlimited life cycle

minimises outages and provides long-term protection of investments

Variably adjustable colour temperature

for outstanding contrast in every surgical situation

Shadow correction

for optimal illumination on the surface and at depth

Ergonomic, sterile operational concept

guarantees control of all functions by the sterile surgical team

Infrared-free light

almost completely avoids heat generation in the head area

Integrated camera systems

for digital video transmission in accordance with the SDI standard





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Impressive light characteristics thanks to LED technology

Nature as a model

The iLED has a completely new kind of design, one taken from nature. The domed compound eyes of insects are comprised of countless individual eyes. Each individual eye has its own optical lens system. The design of the multi-lens matrix of the iLED is based on the same principle. It distributes the emitted light volume uniformly in the room.

High-performance LED – the light technology of the future

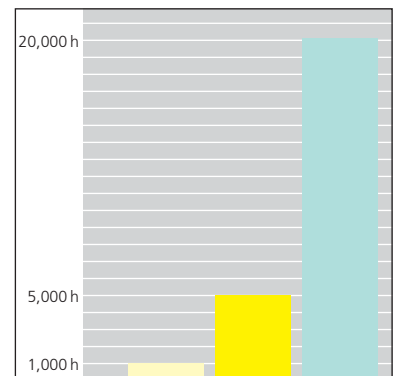
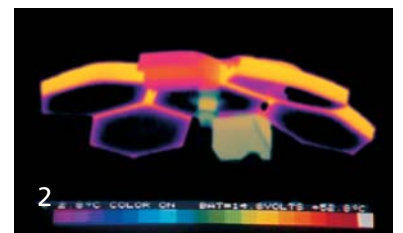
The iLED from TRUMPF brings the advantages of an LED light source to the operating room: high light output, extremely long life cycle and IR-free light to reduce heat.

A cool head thanks to cold light

The thermographic images of the LED light show the low heat generation beneath the body of the lamp; in comparison to conventional halogen and gas discharge lamps, the “cold” IR-free light of the LEDs practically avoids temperature increases in the area of the head.

Long-lasting light sources

With a life cycle of at least 20,000 operational hours, an LED provides illumination many times longer than conventional lighting. Each LED can be replaced individually at the installation site. Ergonomics, economy and optimal performance through innovative technology – that is the iLED from TRUMPF.



- Halogen bulb
- Gas discharge bulb
- High-performance LED

1 High-performance LED

2 Thermographic image

6 iLED 5 with 184 high-performance LEDs

7 Large working area and homogeneous light field

8 Multi-lens matrix



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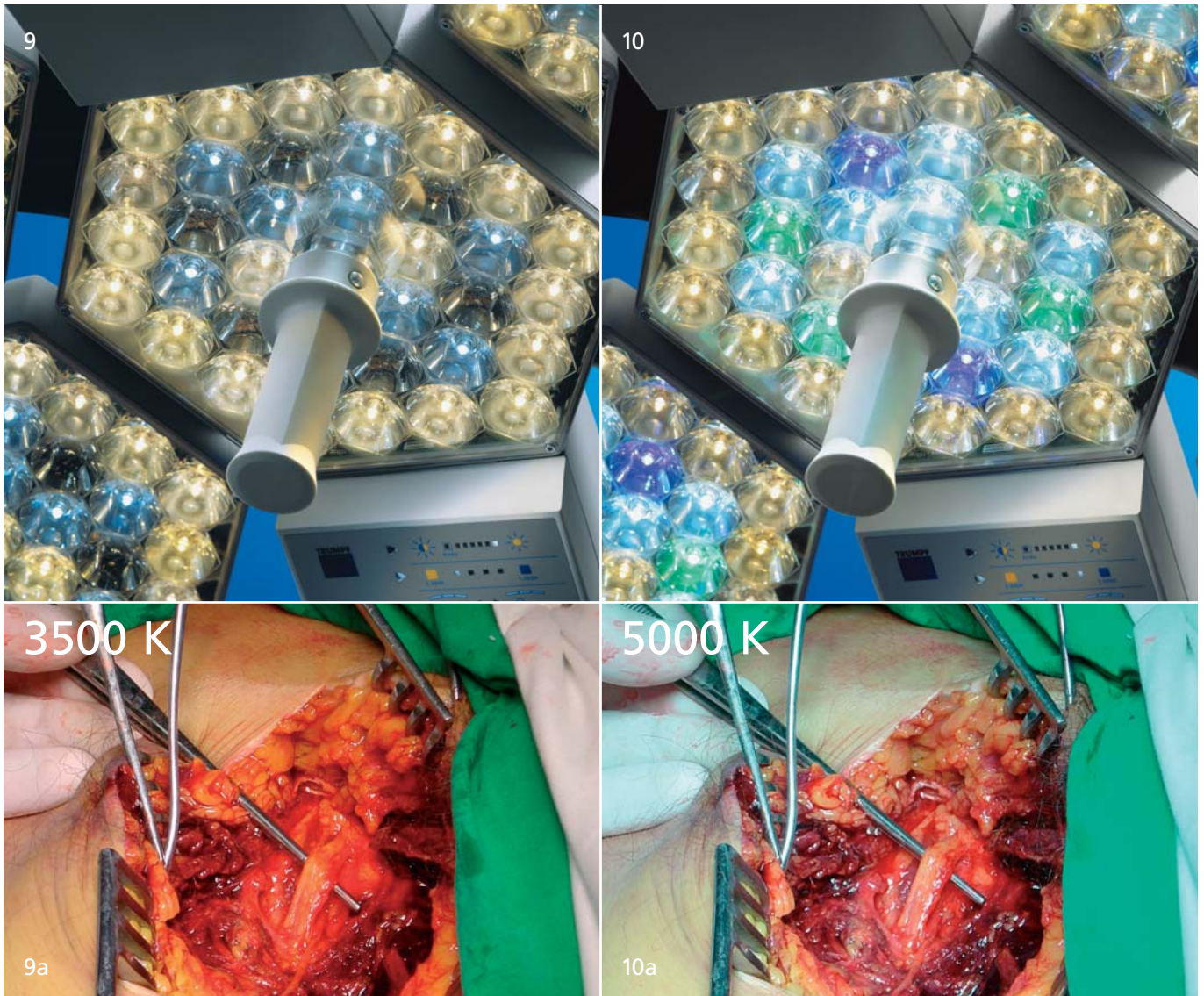


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9/10 Individual adjustment of the colour temperature from 3,500 to 5,000 kelvin



Multi-lens matrix: powerful, homogeneous light on the surface and at depth

During an operation, there must be good visibility in the entire surgical area; homogeneous illumination at the site of the surgery is indispensable. Therefore, TRUMPF is using a multi-lens matrix to distribute the light emitted from the LED lamps uniformly. The lamps have three or five segments positioned side by side, each consisting of a number of individual convergent lenses.

This achieves a light intensity of up to 160,000 Lux. Since each of the LEDs has its own convergent lens, each creates its own light field. This results in up to 184 individual light fields at different heights. Together they create a very homogeneous and shadow-free light.

Striking contrasts

Unique worldwide: The different coloured LEDs not only provide homogeneous spectral light distribution; they also make it possible to adjust the colour temperature individually. Whether the surgeon is operating in tissue areas which have a weak or heavy supply of blood, the colour temperature can be changed for optimal contrast and differentiation. Light with a higher colour temperature improves the ability to concentrate, for example, by reducing fatigue during night operations.



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- 3 iLED 3 camera / iLED 3
- 4 iLED 5 / iLED 3 fixed focus camera
- 5 iLED 5 camera / iLED 3 / TFT 21"

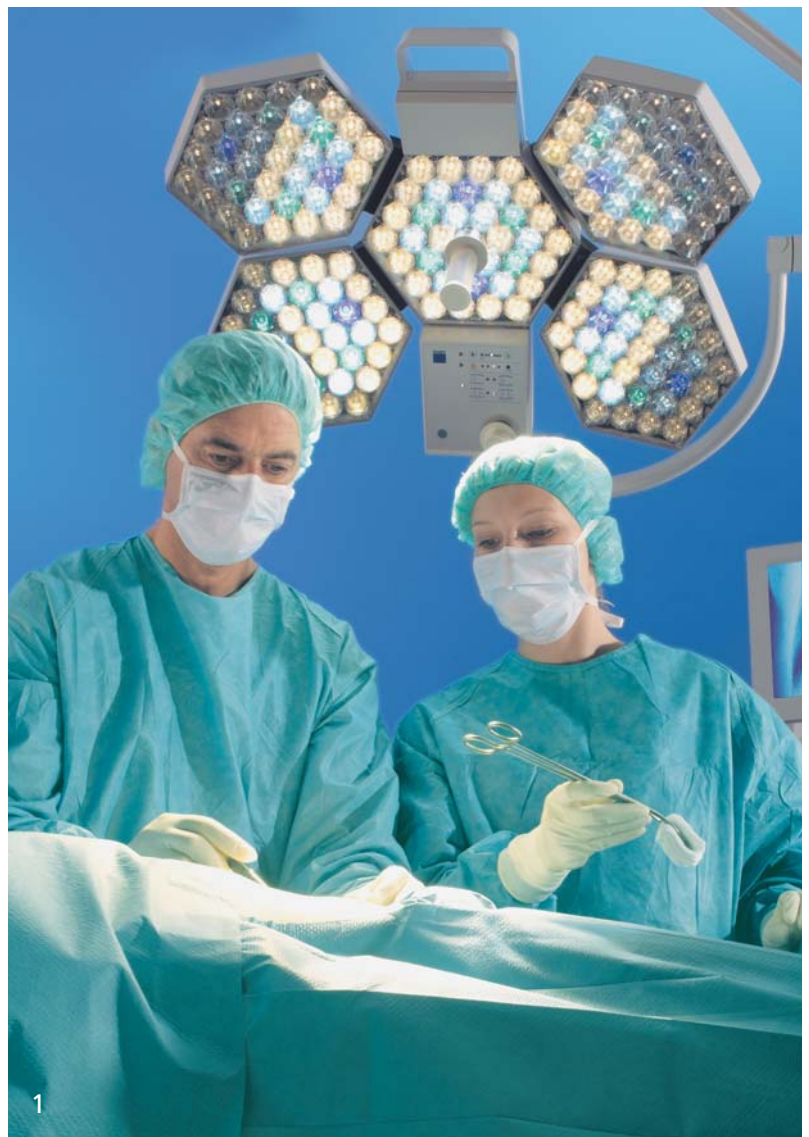
iLED – Shadow-free light on the surface and at depth

Shadow correction

Even in the case of extreme shadowing, the iLED provides optimal light in the wound area. For the first time, a new technology provides adaptation of the light emission area for particular zones. The new technology makes it possible to switch off certain zones of the light field and concentrate on the light intensity of the other LEDs. The result is constant light intensity in all working situations.

184 points of light for the operating room

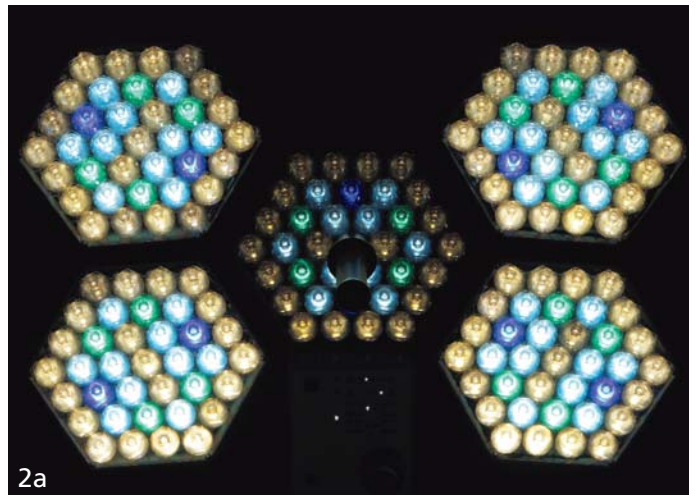
With a variety of optical light systems, the multi-lens matrix provides optimal backlighting of obstacles.



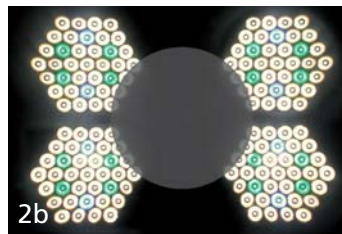
1 Constant light intensity for all working situations



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2a

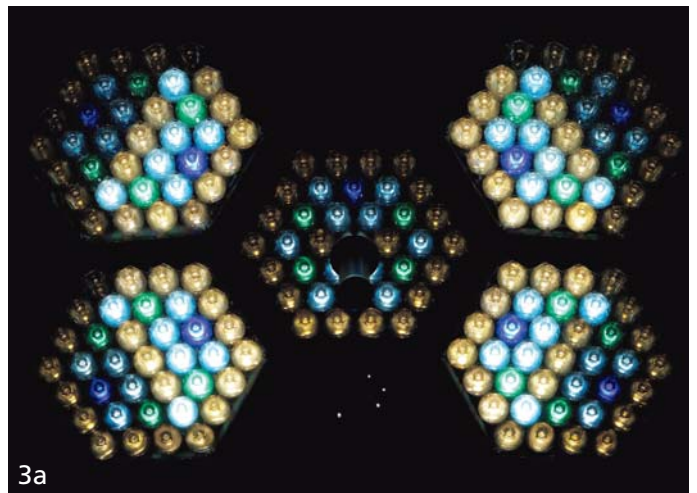


2b

Patented concept:
The head of the surgeon blocks parts of the light emission surface (2). The blocked portions of the light emission surface are switched off (2a), the light intensity of the remaining LEDs is increased (2b). The result: No shadow in the operating area



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3a



3b

In case of shadows and great wound depth (3) the unnecessary zones of the light emission surface are also switched off (3a), and the light intensity of the remaining LEDs is increased even more (3b, view from the depth of the wound). The result: 20 % more light in the depth of the wound compared to conventional lamps

Integrated video and audio communication

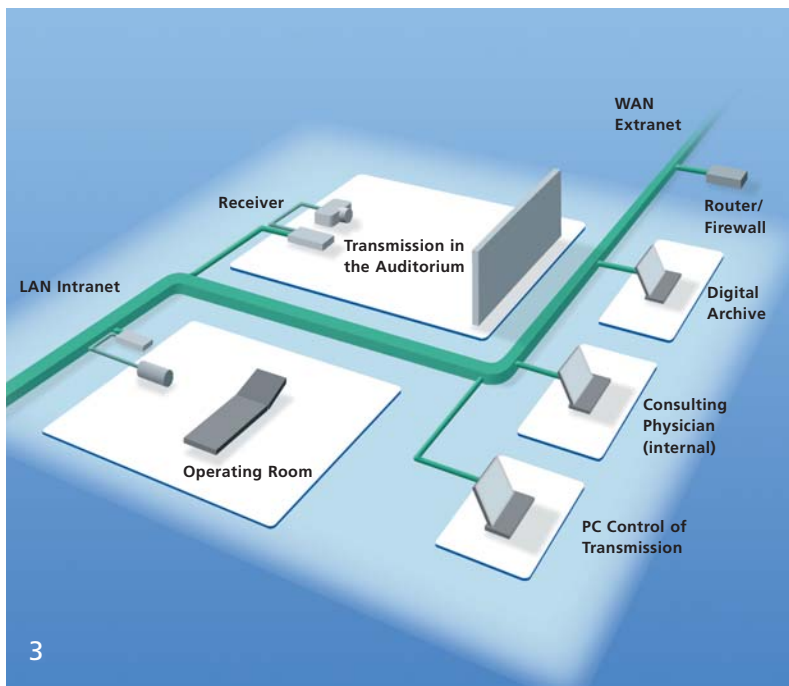


The integrated video camera systems of the iLED open up new possibilities in telemedical applications for teaching, research and documentation. State-of-the-art transmission technology and convenient, sterile operation guarantee optimal benefits.

- Super 1 CCD camera
- Fixed focus camera – new economical solution
- Digital transmission technology SDI
- Integrated USB interface for digital image capture and archiving
- Motorised camera rotation
- Sterile handling
- Modular system



1 Remote control via TCP / IP
2 Continued education or interdisciplinary consultation



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- 3 Loss-free transmission in the LAN network
- 4 Easy-to-change camera thanks to bayonet connection
- 5 Affordable fixed focus camera for simple image transmission integrated in the light
- 6 Camera on separate support arm
- 7 Control unit for operating the camera functions
- 8 Numerous connections and interfaces for data transmission



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Razor-sharp live transmissions

Thanks to the 1/6" CCD chip with 800,000 pixels, automatic image stabilisation, 25 x optical zoom and very high light intensity (F = 1.6–1.7).

Digital live transmission and storing image and sound

The camera system provides the option to store static images directly on the USB stick. The newly developed serial digital interface output (SDI) for loss-free live transmissions is also available as an option in addition to the MPEG2 and MPEG4 formats.

Original detail and true colour like never before

The new camera supports colour temperature control of the iLED between 3,500 and 5,000 K. This enables the surgeon to adjust the camera flexibly to the respective situation in the operating room.

Sterile handling

The most important camera functions, such as zoom, motorised camera rotation and digital image capture, are controlled via the external control unit, PC or sterile light panel. This offers an additional advantage in work ergonomics in the operating room.

Modular system

The uniform interfaces and simple bayonet connection of all camera designs are especially economical. The camera can be used both on a separate support arm and directly in the sterile handle of the light, both with the iLED 5 and iLED 3. That means it can always be used where it is needed, in all operating rooms and at an optimised cost.

iLED – New Standard for ergonomic control



Sterile ergonomic control

The sterile control system of the iLED – another important feature of the light – permits the surgical team to control all functions quickly and simply:

- On / off
- Dim
- Adjust colour temperature

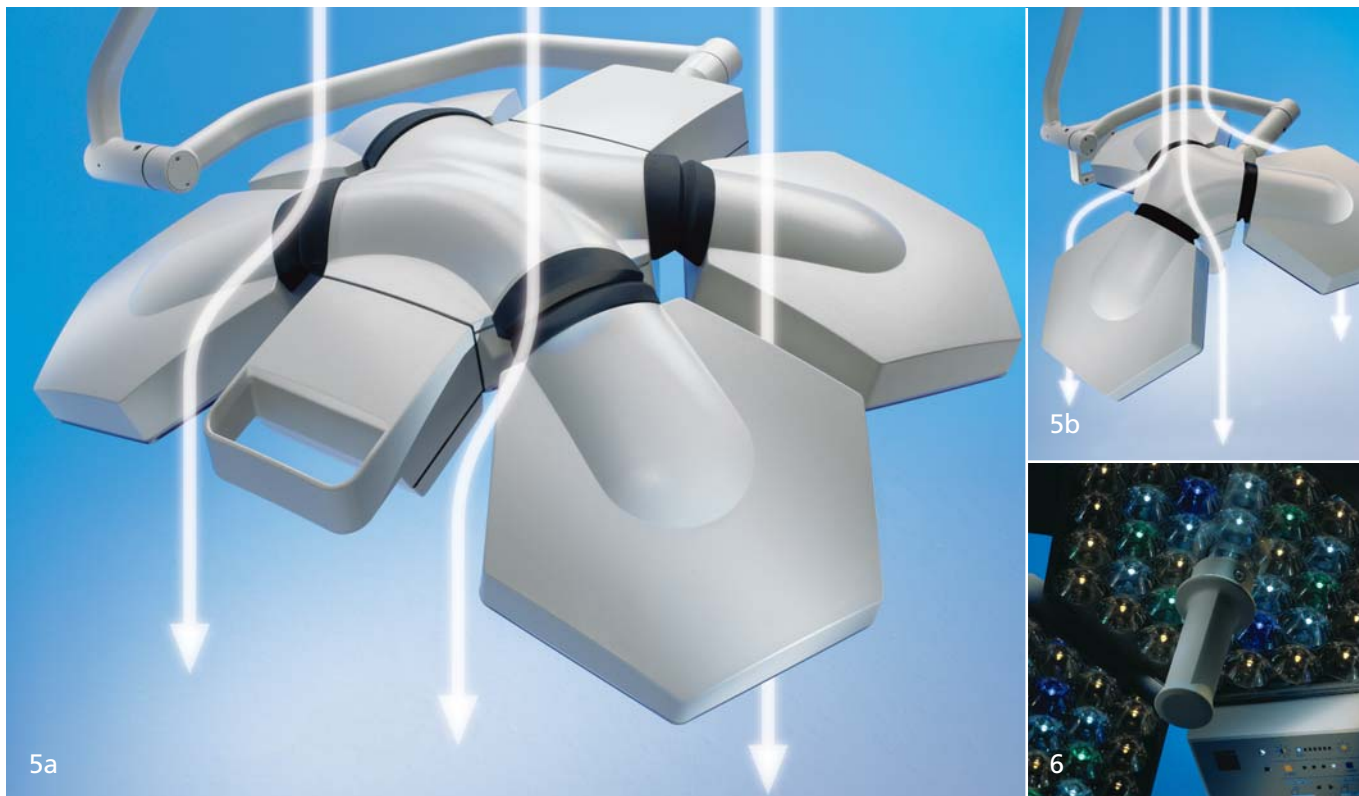
- Shadow correction
- Endo-light
- Camera functions

The two lights can be controlled synchronously via a single control panel.

Remote control

Operation via a wall control panel is also possible.





Compatibility with air supply ceilings

The open design of the iLED light reduces the surface area that impedes the flow of air from the air supply ceilings, resulting in a less turbulent flow underneath the light.

Functional design

Flat lighting elements and freely moveable support arms permit optimal utilisation of space.

Dimming with endo-light level

- Dimming stages between 30 % and 100 %
- The colour temperature remains constant at all dimming stages
- Endoscopy: The light of all lamps can be dimmed to 5 % or switched off

- 1 Sterile control system for fast, simple control
- 2 iLED 5 control panel
- 3 iLED 3 control panel
- 4 iLED 5 wall control panel
- 5 Great compatibility with air supply ceilings thanks to the open design of the iLED 5 and iLED 3 lights
- 6 Endo-light

| Technical Data | iLED 5 | iLED 3 |
|--|------------------------------------|---|
| Illuminance E_c at 1 m working distance | 160,000 lux | 120,000 lux |
| Colour temperature | 3,500–5,000 K | 3,500–5,000 K |
| Colour reproduction index Ra | 95 | 95 |
| Focusable light field size d10 at 1 m distance | 220–300 mm | 220–300 mm |
| Dimming range | 5–100 % | 5–100 % |
| Modelling: with 1 screen without tube | 98 % | 73 % |
| Modelling: with 1 screen with tube | 83 % | 60 % |
| Modelling: with 2 screens without tube | 64 % | 53 % |
| Temperature rise in the area of the surgeon's head | < 1 °C | < 1 °C |
| Bedienung der Leuchtenfunktionen | Completely sterile and non-sterile | Focusing sterile, otherwise non-sterile |
| Life cycle of the lights | > 20,000 h | > 20,000 h |

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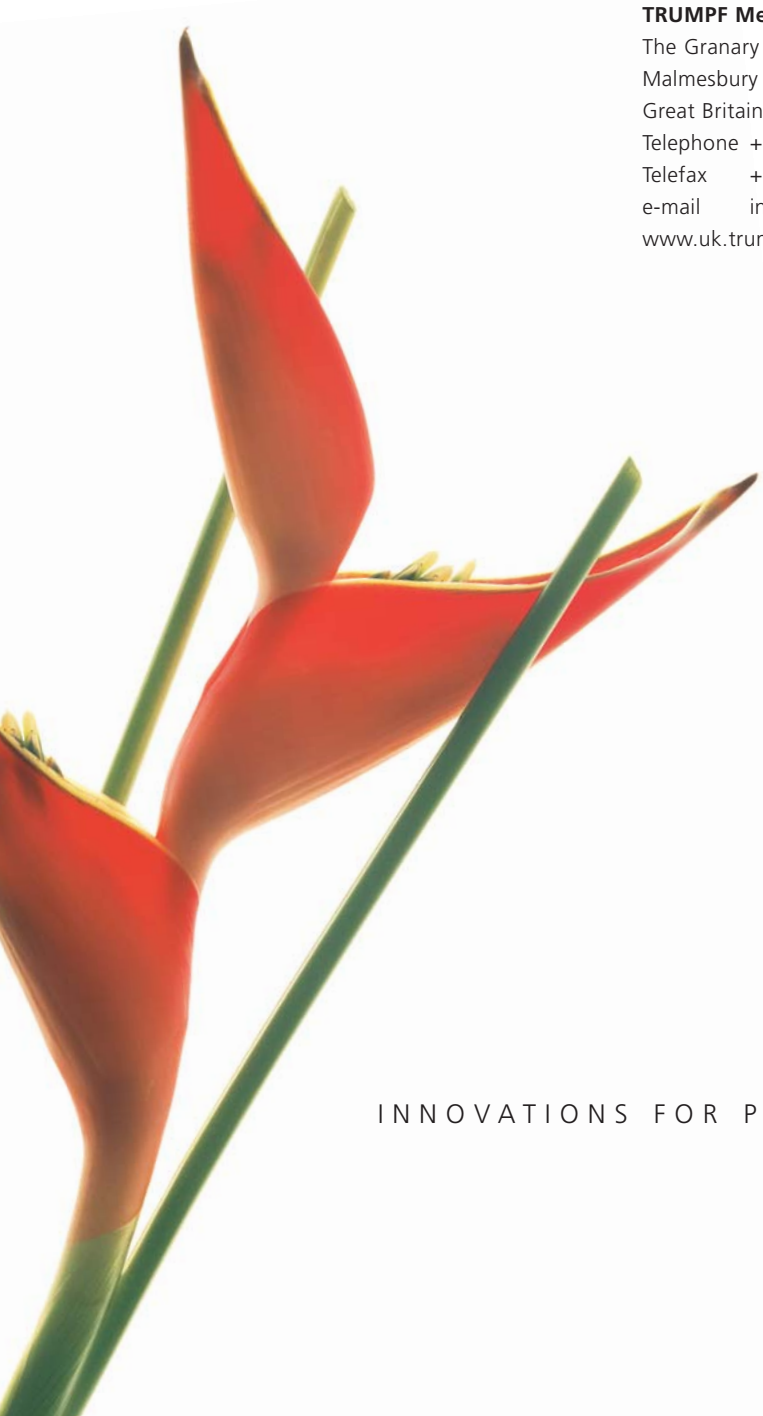
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