Test EIZO CS2400S: Entry-level model on reference level

Entry-level model in the world of 24-inch graphics monitors with a wide color gamut and hardware calibration surprises with best values on reference level in picture quality

04.10.2023, Manuel Findeis

Introduction

With the CS2400S, EIZO introduced a successor to the CS2420 in June 2023. The EIZO CS2400S now represents the new entry in the high-end league of graphics monitors in the 24-inch class with a large color space.

As usual, the EIZO CS2400S uses a wide-gamut panel with IPS technology. The aspect ratio of 16:10 and the resolution of 1920 x 1200 pixels have also remained the same. However, a lot has changed under the hood. The maximum brightness is now 410 cd/m² and the contrast ratio is 1350:1.

EIZO has also been successively introducing USB-C to all devices for quite some time. The advantages are obvious, especially for notebook owners: The USB-C port reduces cable clutter, replaces a docking station and can also supply a notebook with up to 70 watts. Since the USB-C port also provides a second USB upstream, the entry-level CS model now also gets a KVM switch.

EIZO also promises perfection out of the box for its new entry-level model. This includes the usual ColorEdge ingredients such as an extended color space with 99% Adobe RGB, hardware calibration, the "Digital Uniformity Equalizer" (DUE) for a flawless image homogeneity and a 16-bit LUT for an absolutely precise color representation with up to 10-bit color depth.

As with other newly introduced monitors from around 2019, EIZO was able to reduce the power consumption of the CS2400S quite significantly on top of that despite this sophisticated technology: compared to its predecessor by a whopping 25% or from 26 to 18 watts.

The EIZO CS2400S comes with an RRP of 798 euros on the market and is currently already available in online stores for 750 euros (including shipping costs).

For detailed information on features and specifications, please refer to the EIZO ColorEdge CS2400S data sheet.

Unpacking and assembly

The motto "perfection out of the box" really starts with the unpacking of the EIZO CS2400S. The device is completely assembled in the box. You only have to lift it out and can start immediately.

EIZO has been committed to sustainable and resource-saving actions in material selection, production and transport for quite some time. However, the CS2400S is the first ColorEdge monitor to be shipped without Styrofoam padding. Instead, an "eggshell carton" and packing paper are now also used here instead of Styrofoam and plastic bags.

Packaging (Image: EIZO)

We really didn't miss anything when unpacking. The repacking, on the other hand, was a bit tricky with the "origami cardboard pads".

Nothing has to be mounted on the EIZO CS2400S. The two mounting illustrations below are only meant to show how easy it is to release the stand leg at the push of a button in order to mount the display on a swivel arm, for example.

Assembly of the support leg

Fixation with wing screw

Scope of delivery

The EIZO CS2400S comes with a power cord, a USB 3.0 hub cable, an HDMI cable, and a USB-C cable. We would have liked to see one for the DisplayPort in this price range.

The EIZO CS2400S is the first ColorEdge monitor in the CS series to come with a calibration report. Until now, this was reserved for the CG series models. Otherwise, only a quick start guide is included in paper form.

Scope of delivery

We could not download a detailed manual as PDF this time either. It is currently only available online as an HTML version. We hope that this will not be the case for other devices in the future. A PDF version can be stored locally and read offline, which is of course much more convenient.

Of course, we still have to mention the part that is not visible here - called software - in the scope of delivery. The included software for the hardware calibration, the ColorNavigator, is already a decisive argument for choosing an EIZO graphics monitor.

Optics and mechanics

With the devices with four-digit product designations, EIZO ushered in a completely new design era in 2016. The EIZO CS2420 as the predecessor of the CS2400S also belonged to this generation. The models were not only considerably slimmer and less bulky than their predecessors, because the design was also convincing from an aesthetic point of view. The ColorEdge displays have remained serious since then, but look sleek and sporty at the same time. However, we partly had to criticize the sluggishness of the height adjustment in these screens.

With the introduction of the EIZO CG2700S and the EIZO CG2700X in 2022, the ColorEdge devices seem to have gotten a somewhat adjusted design line again. The EIZO CS2400S is also in line with this new design line. However, this is more of a design evolution and certainly not a completely new look.

All ColorEge devices from 2016 can therefore be combined well on the desk. However, the EIZO CS2400S matches the two CG models mentioned above as if it were made of one piece. Fortunately, the EIZO CS2400S does not have the perforated plate or metal grille that mostly covers the rear. Heat dissipation or not: This is certainly not everyone's cup of tea in terms of looks and ease of maintenance. In any case, the plastic casing of the current review sample is continuous and also has fewer vents than the predecessor.

Front view in the highest position

Rear view in the highest position

Compared to the predecessor, the back in particular looks much more elegant. However, we missed the silver-colored application above the handle. It had made a surprisingly strong contribution to the sporty impression of the 2016 generation.

Front view in the lowest position

Rear view in the lowest position

As usual, the EIZO CS2400S with its Flexstand system can hardly be topped when it comes to the scope of ergonomic features. The height adjustment covers a lush 15.5 cm. However, there is also some fine-tuning to be seen in the stand leg - and not only visually.

As before, the height can be adjusted in two stages. First, the base unit can be extended telescopically in the lower area. In addition, the display can be moved further upwards in the upper area - directly at the connection between the screen and the stand leg.

In the past, there was often criticism due to the sluggishness of the height adjustment. In contrast, the EIZO CS2400S seems to have a much stronger spring inside. Therefore, the height adjustment is also possible with relatively little effort and in a relatively smooth motion despite the two-stage design.

View 45° rotation to the left

View 45° rotation to the right

Regarding the lateral rotation, our pictures only show a 45° rotation to the right and left respectively. In fact, the display can be rotated almost completely around its own axis with a total of 344°. Hardly any other manufacturer offers that.

Side view

View from the side with maximum tilt angle to the rear

The tilt option is also very generous at -5 to +35°. Of course, the EIZO CS2400S can also be tilted by 90° for working in portrait mode. We would not describe the mechanics of

the ergonomics functions and the effort required to operate them as particularly smooth, but rather as tight. However, everything can be adjusted very precisely, stably and without annoying wobbling.

View pivot sideways

Front view pivot

Visually, the fine-tuning of the Flexstand is particularly noticeable in the turntable. Instead of a flat disc, it has a chic trough at the front. Together with the smooth transition of the stand leg into the turntable and the beveled edges, the Flexstand now looks a bit more elegant and is also more comfortable to hold during transport.

Support leg

Turntable

Above the stand suspension, the EIZO CS2400S has a recessed grip that is helpful during transport as well as height adjustment.

Transport handle

For cable routing, the predecessor included a circular plastic clip that could be inserted into the turntable either perpendicularly or parallel to the stand. To put it kindly, this solution seemed quite inexpensive. Now, a massive clip is found directly on the stand leg.

Cable routing

The power supply of the EIZO CS2400S is located directly in the casing and equipped with a dedicated on/off switch. For waste heat, the display has corresponding ventilation slots in the recessed grip and all around the frame. We could hardly determine any

heating in the area of the ventilation slots even after longer use. The cooling is purely passive.

Ventilation slots, top view

Ventilation slots, top side view

Technology

Operating noise

We did not notice any operating noise with the EIZO CS2400S. The monitor is completely silent in standby as well as in operation - regardless of the brightness setting. However, the noise development in particular can be subject to a certain series dispersion, which is why this assessment does not have to apply equally to all devices of a series.

Power consumption

	Manufacturer (in watts)	Measured (in watts)
Operation max.	149	30,37
Operation typical	18	-
140 cd/m²	k. A.	19,18
Operation min.	k. A.	14,18
Energy saving mode (standby)	0,3	<0,27
Switched off (Soft-off)	0,3	<0,27
Switched off (power switch)	0	0

Measured values without additional consumers (loudspeaker and USB)

EIZO states a maximum consumption of 149 watts in the spec sheet (at maximum brightness and operation of all signal and USB ports). The USB-C port can supply external devices with up to 70 watts. Even if you subtract these 70 watts from the mentioned maximum consumption, our measurements still remain considerably below that with 30.37 watts.

The soft-off button reduces the power consumption almost to zero. Our measured value fluctuates slightly around 0.25 watts. However, it is not necessary to press the soft-off button since the consumption is just as low in standby.

Practically all ColorEdge devices launched before the CG279X had an unnecessarily high power consumption of almost 10 watts in standby as soon as the USB hub cable was connected. However, you want to keep that connected all the time. For hardware calibration, the connection is absolutely necessary for data exchange, and the USB hub obviously does not work without it.

This problem is also a thing of the past with the EIZO CS2400S. You hear a relay click when switching to standby. At the same time, the power consumption is reduced to almost zero. Thanks to the separate power switch, you can completely disconnect the monitor from the mains if desired.

At 140 cd/m² at the workstation, the meter displays 19.18 watts. The efficiency at this brightness is calculated to 1.2 cd/W. This is a good value in the overall monitor comparison. Compared with other graphics displays, the rate is even really good.

EIZO's DUE ("Digital Uniformity Equalizer") was set to "Uniformity" or "Color Consistency" for the best possible image homogeneity during our measurements here. Usually, such functions lead to an increased power consumption. This is sometimes even the case for other manufacturers.

On the other hand, the switch in the admin menu for the power consumption hardly plays a role in the values mentioned in the table above (min., max. and 140 cd/m²) for the EIZO CS2400S. Only at the upper end is a slightly higher maximum brightness achieved with the same power consumption.

Connections

Looking at the device from the back, the ports are primarily located to the right of the base unit and are labeled in an exemplary manner. With DisplayPort, HDMI and USB-C, all important digital inputs are available. DVI does not really play a role anymore nowadays.

The power supply is firmly integrated into the EIZO CS2400S's case. The power connector is located on the left of the base unit along with a dedicated power switch. Sitting in front of the device, you can reach it pretty well with your right hand.

Connections

The USB-C interface can be used as a signal input via DisplayPort Alternate mode. Furthermore, it serves as a USB upstream together with another type B port and can simultaneously supply external devices with up to 70 watts.

The integrated USB 3.0 hub provides four downstream sockets. Two of them offer USB 3.0 speed, the other two only USB 2.0, but they are good for connecting a mouse and keyboard, for example. All four downstream ports are located on the left behind the monitor frame in a small bay.

Easy to reach USB ports on the side, 2 x USB 3.0 and 2 x USB 2.0

Thanks to the two upstream ports with KVM switch functionality, you can conveniently integrate a notebook into your workflow and also take peripherals such as mouse, keyboard, memory card reader and external hard drives from the main computer to the notebook when switching the signal input. A separate docking station or additional power supply is no longer required.

Operation

Operation is via six very reliably responding multifunction touch keys. The soft-off key is now also electrostatic. The feedback is further improved by a signal tone that can be switched off. As soon as you touch a key, a menu bar with the respective functions is displayed on the screen directly above it. Two of the keys can also be assigned with other functions via the OSD.

Modern and reliable touch keys

The keys are illuminated with white LEDs and are thus easy to find even in the dark. We never found the illumination annoying during image editing. However, the brightness can be adjusted if necessary.

OSD

The EIZO OSD may look a bit sober at first glance. In fact, it is one of the best we have seen in our tests. It is always striking how the manufacturer manages to structure an all-around professional feature set so clearly and simply that even newcomers can intuitively cope right away.

With any keystroke the quick selection appears. Here you can change the signal source and color mode immediately or jump to the main menu. Furthermore, there are two function keys that can be freely assigned with a selection of useful functions.
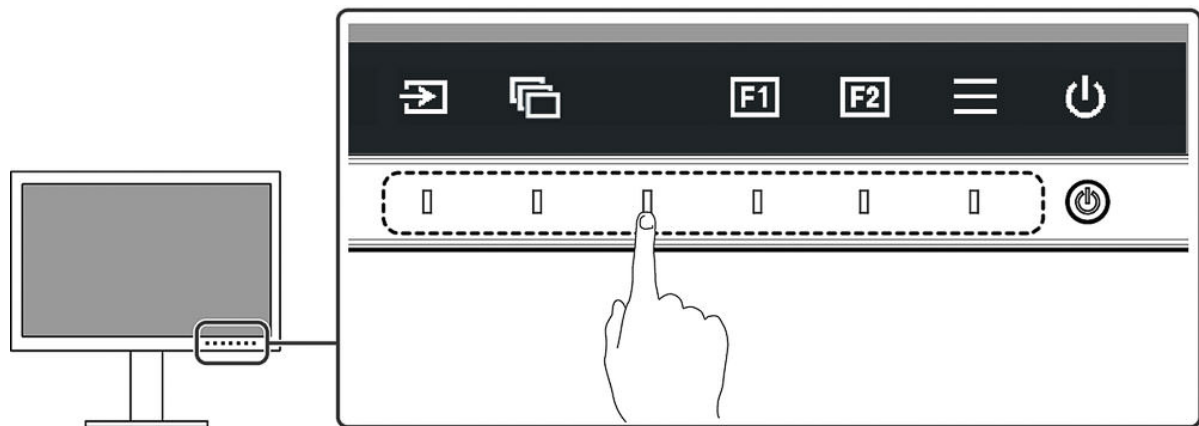
OSD: Entry with quick selection (Screenshot: EIZO manual)

The color modes of EIZO's ColorEdge devices differed seriously from the picture modes common in all-round monitors. They usually perform all sorts of "optimizations" behind less meaningful labels in the background, which make a defined and reproducible display of content impossible.

There are a total of ten presets, all of which can be hardware-calibrated with user-defined targets and renamed accordingly. The user mode of the three factory presets is freely configurable. The presets for sRGB and Adobe RGB self-explanatorily correspond to the targets of the corresponding color spaces.
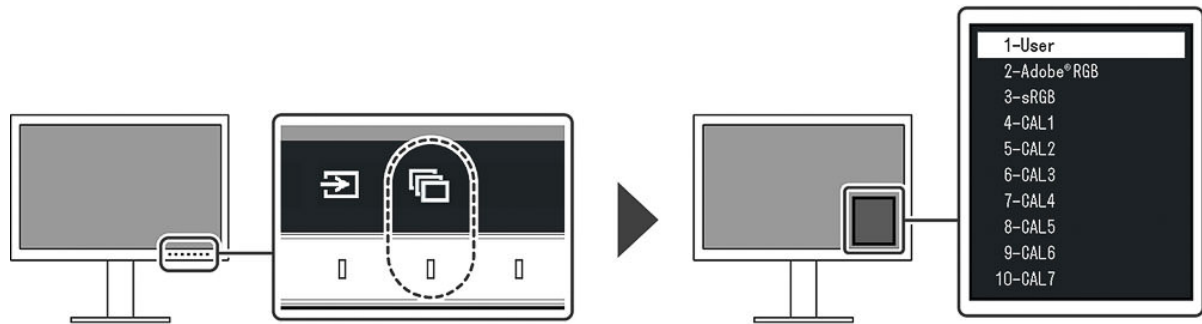
OSD: Plenty of memory for hardware calibration (screenshot: EIZO manual)

However, there are also three major differences compared to presets with the same name in (graphics) monitors from other manufacturers. First, the brightness and even the color temperature can be freely adjusted in the OSD. In many other sRGB modes, the brightness is already locked and partly adjusted to such a low level that the mode is hardly usable in practice.

Secondly, the associated ColorNavigator software automatically creates an ICC color profile for the factory presets and enters or exchanges it in the operating system's color management. It doesn't matter whether the color mode is selected via the ColorNavigator taskbar icon or directly via OSD. In any case, the profile in the OS color management is automatically changed in the background, so that the correct profile is always used in color management-capable applications.

Third, pre-calibration from the factory, which other manufacturers understandably emphasize when promoting their devices, is all well and good. Unfortunately, all displays age over time and then also change their color properties. The pre-calibration from the factory is therefore only more or less accurate after a few years. However, the factory presets can be readjusted at any time via hardware calibration in all reasonably current ColorEdge devices from EIZO in combination with ColorNavigator 7.
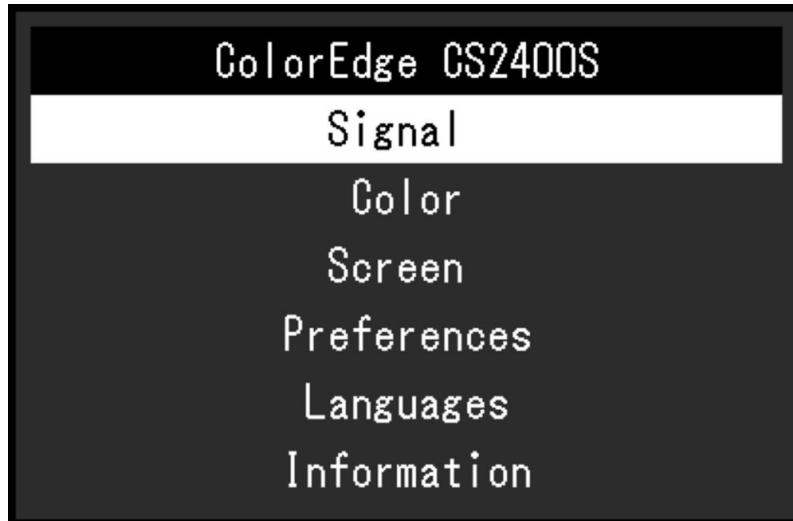
OSD: Main menu (Screenshot: EIZO manual)

The main menu currently consists of six main levels - only five would have been sufficient. The option to scale input signals that deviate from the native resolution as desired was previously located under "Signal" and has now unnecessarily been given its own, otherwise empty menu item with "Screen".

Apart from that, the functionality of the individual menu items is logical and self-explanatory. Every input is executed promptly and without any delay. This is especially true for switching between different color modes or color space emulations. This makes OSD operation really fun!

However, the OSD is rarely used in practice, since switching between the color modes or different calibration targets is most conveniently done via the ColorNavigator.

OSD: Image settings (Screenshot: EIZO manual)

The admin menu can only be accessed via a special key combination when the device is turned on. The settings made here are not affected when the monitor is completely reset.

The most important thing here is the priority of the DUE. However, the DUE priority can also be set without a detour via the Admin menu in ColorNavigator. Then you will also receive the important warning that after changing this setting, the calibration must also be performed again.

OSD: Administrator menu (Screenshot: EIZO manual)

Image quality

The panel's bezel and surface are matte and effectively anti-reflective. However, especially bright objects become visible above average quickly and clearly when approaching the display.

At reset, the monitor sets the following values:

Factory settings	
Image mode:	"User"
Brightness:	100 cd/m²
Contrast:	Not available
Gamma:	2,2
Color temperature:	6500 K
RGB:	2000/1947/1727
Color Gamut:	Native
DUE Priority	Uniformity
Sharpness:	Not available
Response time:	Not available

These values were used for the following evaluation with factory settings. The DUE priority was set to "Uniformity/Color constancy".

Grayscale

The grayscale is already extraordinarily neutral ex-works. There are also no differences between the left and right halves of the screen. The brightest levels are completely visible and the darkest levels up to and including level 5.

The screen brightens up a bit overall in more deviating viewing angles. This reduces the contrast slightly. However, we could not determine any losses in the details in the grayscale.
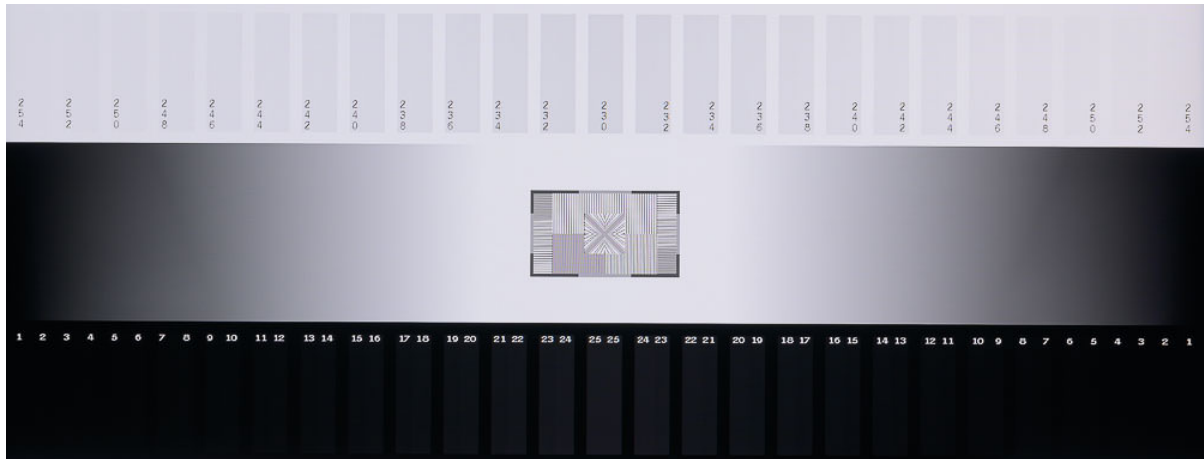
Grayscale

Even fine gray gradients look extremely smooth and flowing and do not reveal any color shimmer or banding effects. Only in test images where the gray gradient fills the entire screen (from black at the left edge to white at the right edge) is the gradient in the vertical in the darkest areas at the left edge not quite on CG level. This is due to the brightening in the corners, which we'll see right later in the illumination.

Overall, the subjective impression of the EIZO CS2400S is already first-class in the grayscale display and even stands out positively from graphics monitors of other manufacturers.

Illumination

The left photo shows a completely black image roughly as seen with the naked eye in a completely darkened room; here the noticeable weaknesses become visible. The right photo with a longer exposure time, on the other hand, highlights the problem areas and only serves to show them more clearly.
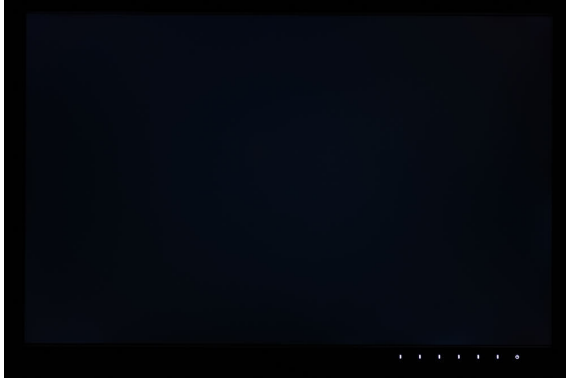
Illumination with normal exposure
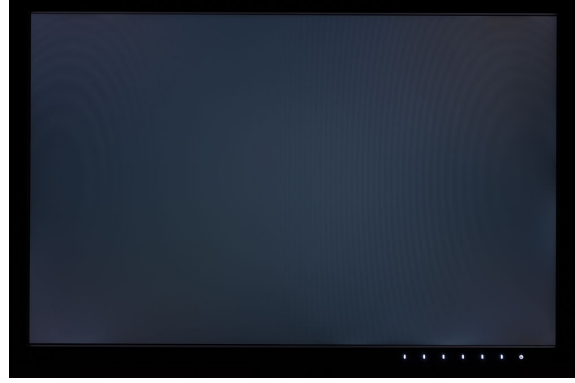
Illumination with extended exposure

With a central sitting position, slight and primarily viewing angle-related brightenings can be seen, especially in the lower corners. At the edge on the right in the center, a faint irradiation can be sensed, which is only really visible in the picture with a much longer exposure time. In contrast to the corner brightenings, it does not disappear completely when viewed vertically. However, it is so subtle in any case that you have to consciously look for it to even notice it.

Glow effect horizontal

Glow effect from oblique above

If you deviate from the centered sitting position, the usual brightening of the entire display becomes visible in IPS panels. However, it is only below average and completely color-neutral - regardless of the viewing direction (at best with a reddish tendency, but evenly over the entire screen). Colored clouds can often be observed here in other monitors, but not at all in the EIZO CS2400S.

Brightness, black level and contrast

The measurements are performed after a calibration to D65 as white point. If possible, all dynamic controls are deactivated. Due to the necessary adjustments, the results turn out lower than when performing the test series with native white point. However, no adjustments were necessary in the case of the EIZO CS2400S, since it didn't just come

to us with lip service, but actually perfectly calibrated to D65 ex works. Therefore, there are no differences between "ex-factory" and "calibrated" in our measurements.

The measurement window is not surrounded by a black border. The values can therefore be compared more with ANSI contrast and reflect real-world situations much better than measurements of flat white and black images.

All ColorEdge devices from EIZO (also the CS series) have a special function for uniformity optimization with the "Digital Uniformity Equalizer" (DUE). With the "DUE Priority" option, priority can be given either to the most uniform illumination possible (uniformity) or to high brightness and contrast values.

The option must be changed in the administrator settings or via the ColorNavigator software and then remains unaffected by the factory reset. The hardware calibration is always dependent on this option. If you change it, the device must also be recalibrated.

The brightness of the EIZO CS2400S is now no longer set in steps from 0 to 100, as is usually the case, but in concrete cd/m² specifications. This makes setting the desired target brightness much easier. The controller positions are very reliable and match our measurements practically exactly up to 190 cd/m². Furthermore, the control range can be adjusted much finer than usual.

The control range of the EIZO CS2400S goes from 40 to 450 cd/m² and thus exceeds the manufacturer's specification for the maximum brightness of 410 cd/m². However, with the "DUE Uniformity" setting, the brightness control turns purple from 340 cd/m² as a warning. A further increase of the brightness control does not really increase the brightness anymore. We therefore only used the slider range from 40 to 340 cd/m² (step size 30 cd/m²).

With the "DUE Brightness" setting, the brightness slider only turns purple from 400 cd/m². Accordingly, we used the slider range from 40 to 400 cd/m² (step size 36 cd/m²) here.
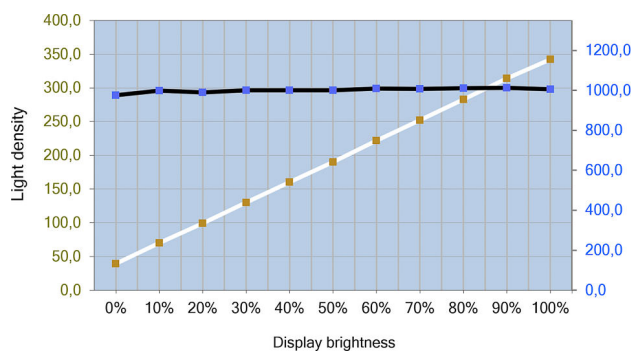
Brightness and contrast curve of the EIZO CS2400S - DUE "Uniformity
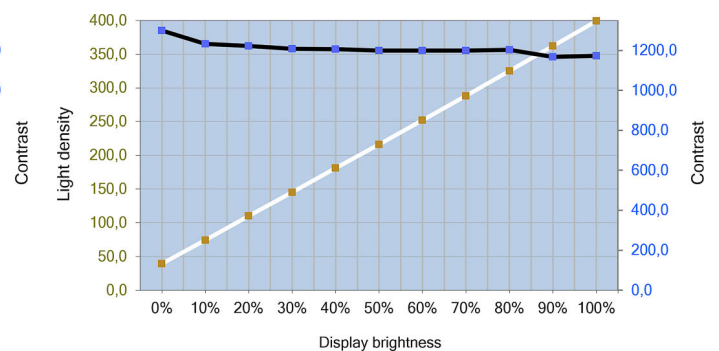
Brightness and contrast curve of the EIZO CS2400S - DUE "Brightness

EIZO specifies the contrast ratio of the IPS-based wide-gamut panel with 1350:1, the maximum brightness with 410 cd/m². With the "DUE Brightness" option, the CS2400S is also close with 1210:1 and achieves an excellent contrast. We measure the maximum brightness with 399 cd/m².

However, you will usually use the EIZO CS2400S with the "DUE Uniformity" option - i.e. optimal image homogeneity. Although the maximum brightness drops here, it is still on the usual level with 342 cd/m². The contrast ratio of 1000:1 is also very good here. The luminance can be reduced to a minimum of 39 cd/m² in both modes.

Our measurements of the maximum brightness with the "DUE Brightness" option are only 3% below the manufacturer's specification. Nevertheless, one might ask why the manufacturer specifies 410 cd/m² when the monitor already "stops" at 400 cd/m².

The achievable maximum brightness is actually also dependent on other parameters, which the EIZO CS2400S also takes into account in its warning. We found the highest position of the brightness slider without purple tint at 411 cd/m² when you set the color temperature to "Native". According to our measurements, you then reach 407 cd/m² at a color temperature of 7500 K.

Image homogeneity

We examine the image homogeneity on the basis of four test images (white, neutral tones with 75 %, 50 %, 25 % brightness), which we measure at 15 points. This results in the averaged brightness deviation in % and the likewise averaged delta C (i.e. the chromaticity difference) in relation to the respective centrally measured value. The perception threshold for brightness differences is between 10 and 15 %.

+1.98%	+1.3%	+0.92%	+0.64%	+0.83%
+0.46%	-0.11%	0.0%	-0.55%	+0.51%
+0.22%	-0.04%	+0.07%	-0.65%	+0.54%

Brightness distribution for the white test pattern

0.46	0.4	0.4	0.23	0.3
0.41	0.44	0.0	0.4	0.3
0.46	0.25	0.29	0.47	0.55

Color homogeneity in the white test pattern

Unfortunately, other manufacturers often hide pseudo-functions behind functions to improve uniformity, which sometimes cause more harm than good.

The DUE ("Digital Uniformity Equalizer") from EIZO plays in a completely different league here. You do not have to make any concessions in the CS series. The display is very even across the entire panel surface. Brightness and color deviations can neither be seen with the naked eye nor by measuring. This is already pleasantly noticeable even during everyday work with office documents, even though this precision is of course not absolutely necessary here.

The brightness distribution is beyond reproach with an average value of only 0.63%. The maximum deviation of 1.98% is also excellent. In terms of color homogeneity, the EIZO CS2400S also performs with fantastic results. We find the maximum deviation in the bottom right corner with a Delta C of only 0.55. The average value is only 0.38%.

|									
-5.9%	-6.45%	-5.55%	-5.75%	-9.85%		0.46	0.24	0.32	0.17	0.46
-8.44%	-7.01%	0.0%	-4.14%	-12.51%		0.28	0.39	0.0	0.14	0.15
-14.4%	-13.05%	-11.4%	-9.85%	-11.93%		0.37	0.42	0.42	0.64	0.78

Brightness distribution of the white test image - "DUE Brightness"
Color homogeneity of the white test image - "DUE Brightness".

The predecessor, the EIZO CS2420, was already able to come up with very good results in terms of image homogeneity. However, the EIZO CS2400S is absolutely on reference level and even beats the EIZO CG319X.

If you want the best possible contrast or need an even higher maximum brightness, set the DUE to "Brightness". We have already shown the resulting improvements above. The color purity remains first-class even then. However, the brightness distribution is only satisfactory.

Coating

The surface coating of the panel has a great influence on the visual assessment of image sharpness, contrast and sensitivity to ambient light. We examine the coating with the microscope and show the surface of the panel (foremost film) in extreme magnification.
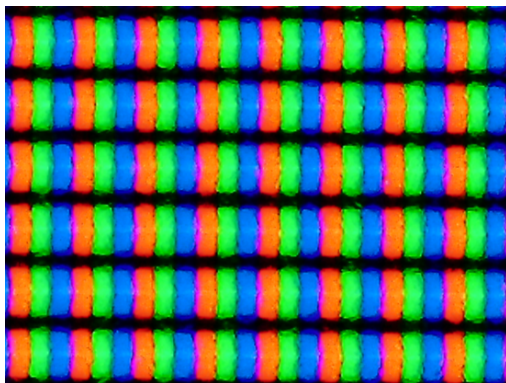
Coating of the EIZO CS2400S
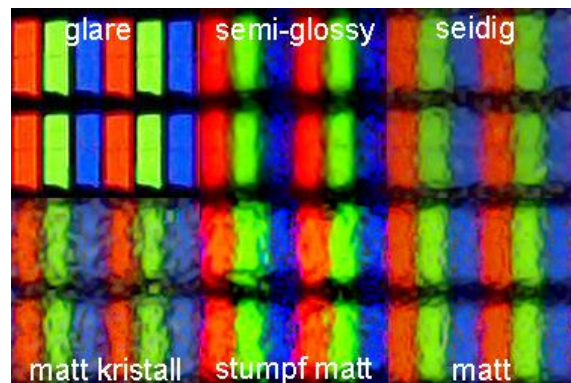
Coating reference image

Microscopic view of the subpixels, focusing on the screen surface: The EIZO CS2400S has a dull matte surface with microscopically visible pits for diffusion.

Viewpoint

The EIZO CS2400S uses a wide-gamut panel with IPS technology. The factory specification for the maximum viewing angle is 178 degrees horizontally and vertically. These are the typical values for modern IPS and VA panels.

IPS panels are generally known for their good viewing angle neutrality. Especially the color reproduction remains completely stable even at extreme viewing angles. We have never seen real color shifts here. However, a general change in color temperature can often be observed. The colors remain consistent, but the picture looks noticeably warmer overall. Furthermore, there is usually a significant loss of brightness and thus contrast in more extreme viewing angles.


Horizontal and vertical viewing angles

All this is not the case with the EIZO CS2400S. The picture shows the screen of the EIZO CS2400S at horizontal viewing angles of ±60 degrees and vertical ones of +45 and -30 degrees. We couldn't see any change in the color temperature, especially horizontally, even at very extreme viewing angles. A brightness loss is also hardly noticeable. It is already noticeable vertically, but it is comparatively low here as well.

The EIZO CS2400S therefore scores extraordinarily well in viewing angle neutrality even compared to particularly good IPS panels or other graphics monitors. This level is only topped by the CG series with its special True Black panels.

Interpolation

The ColorEdge devices do not have a separate sharpness control. This would not make sense for digital image signals anyway.

The sharpness at native resolution is very good, as expected. At 1280 x 720 and page-perfect monitor scaling, you can see that the necessary pixel enlargement is mainly caused by additionally inserted gray pixels. This leads to somewhat bolder contours with a slight impression of blurriness. Color fringes do not appear.
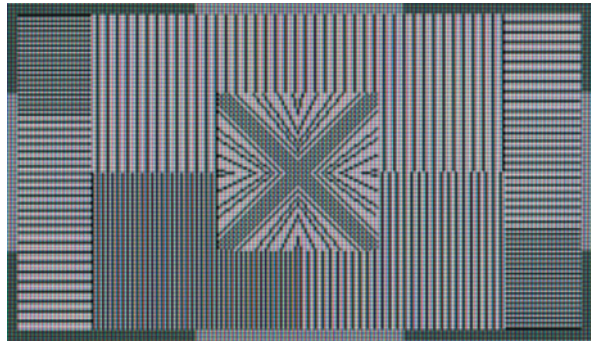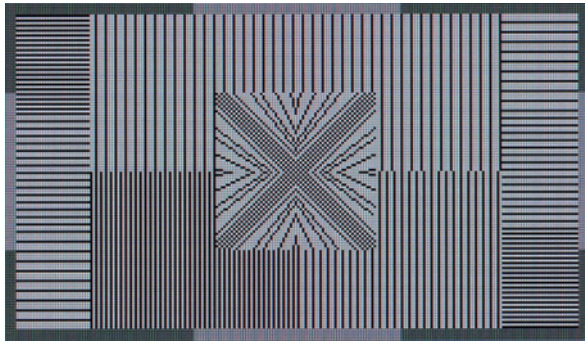
Test graphic native, full screen
Test graphic 1280 x 720, full screen
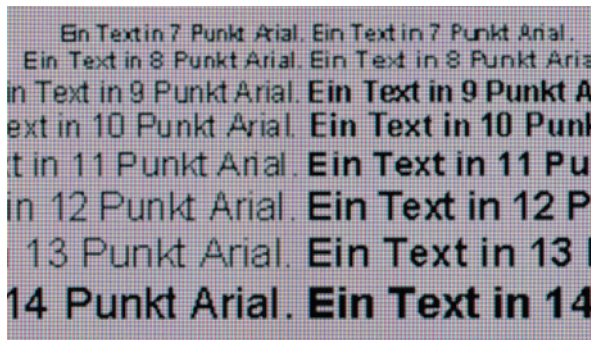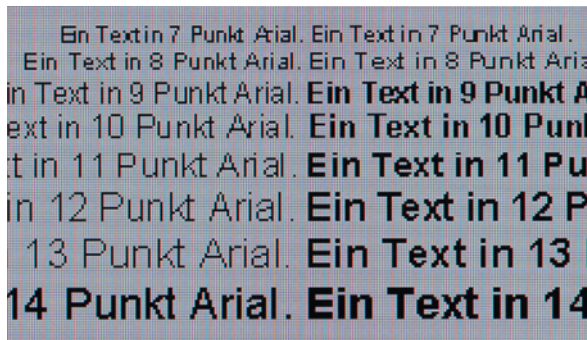
Text rendering native, full screen
Text rendering 1280 x 720, full screen

For input signals that deviate from the native resolution, the EIZO CS2400S offers the options "full screen" (distorted if necessary), "aspect ratio" (undistorted) and also a pixel-precise 1:1 display. Furthermore, there is an automatic mode.

In all interpolated resolutions, the readability of texts and the reproduction of the test graphics are - according to the scaling level - good to very good. The unavoidable interpolation artifacts are low. Even texts with bold letters remain legible. It is also pleasing that a distortion-free, maximally area-filling display was possible without problems in (almost) all tested resolutions.

Signal	Distortion-free, maximum area-filling reproduction	Unscaled playback
SD (480p)	Yes	Yes
SD (576p)	Yes	Yes
HD (720p)	Yes	Yes
HD (1080p)	Yes	Yes
Ultra HD, 4K	No	No
PC (5:4)	No	Yes
PC (4:3)	Yes	Yes

PC (16:10)	Partial (not at 1680 x 1050)	Yes
PC (16:9)	Yes	Yes

Color rendering

In the case of monitors for the graphics sector, we first test the color reproduction in the factory setting after the reset and - if available - in an sRGB and Adobe RGB mode. Afterwards, the test sample is calibrated with Quato iColor Display. If the screen has a full-fledged hardware calibration, this is used in conjunction with the manufacturer's software instead.

Color space comparison in CIELAB (D50)

The following illustrations are based on the colorimetric data after calibration to D65 as the white point. The reference white for the preparation in CIELAB is D50 (adapted with Bradford).

White volume: Screen color space
Black volume: reference color space
Colorful volume: intersection
Comparison targets: sRGB, Adobe RGB, DCI-P3

The following graphs show the color space coverage after hardware calibration to the native color space compared to different target color spaces.
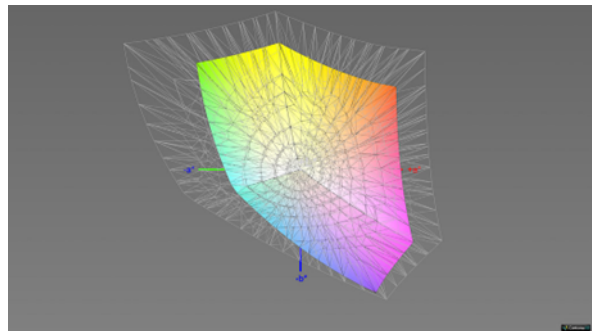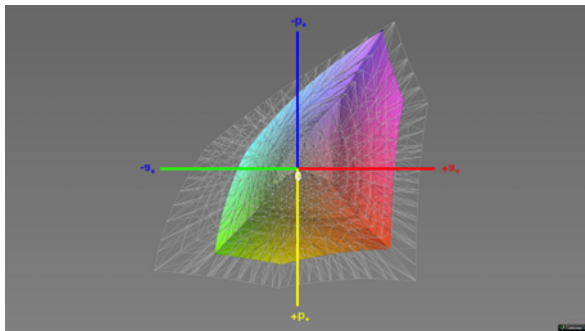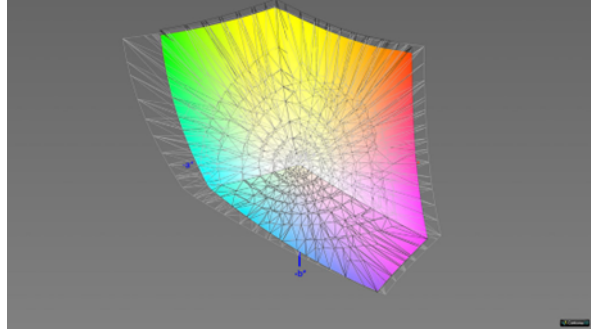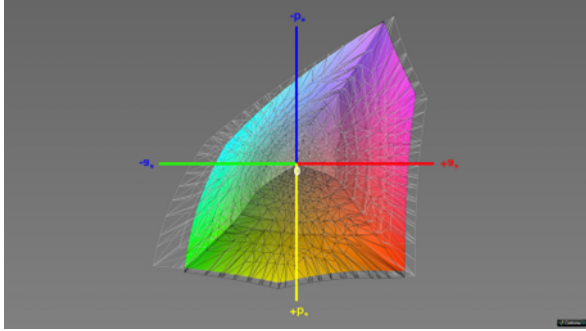

Coverage of sRGB color space, 3D slice 1
Coverage of sRGB color space, 3D slice 2
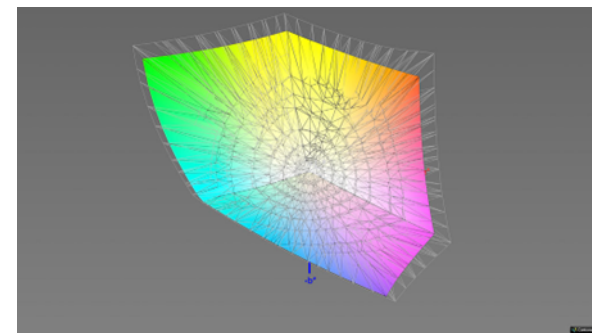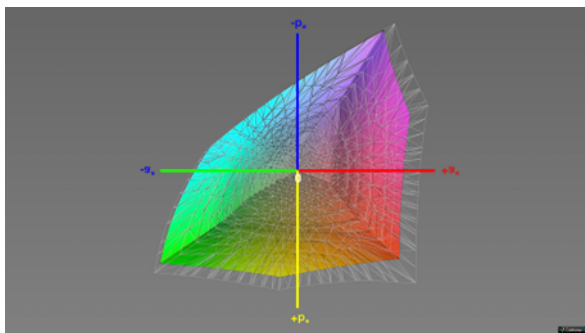
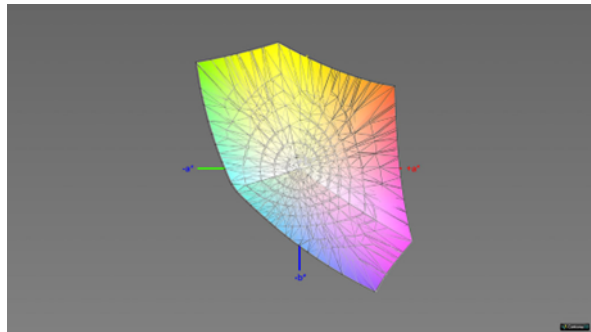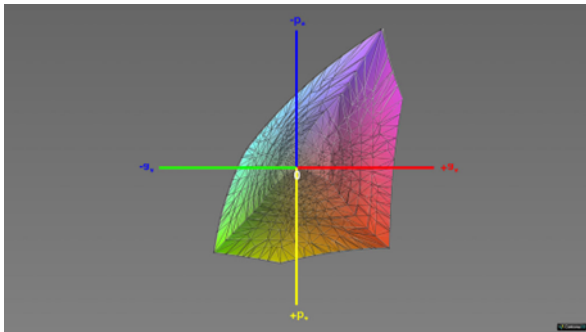
Adobe RGB color space coverage, 3D slice 1
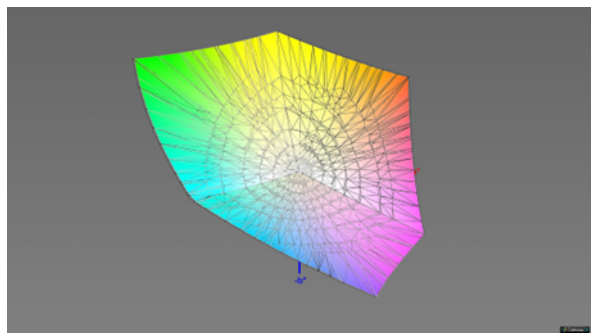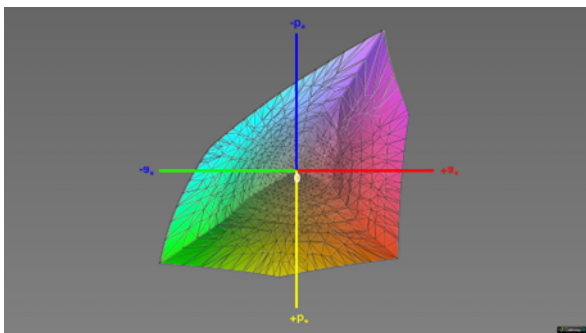*Adobe RGB color space coverage, 3D slice 2*

DCI-P3 color space coverage, 3D slice 1
DCI-P3 color space coverage, 3D slice 2

The EIZO CS2400S already has two color space presets ex-works: sRGB and Adobe RGB. As already mentioned in the OSD, these presets are inherently superior to the presets of the same name found in graphics monitors from other manufacturers. In principle, they are full-fledged hardware calibrations with a stored ICC profile that can be readjusted at any time.

The goal of the presets is to limit the native color space as precisely as possible to the target color space, so that a reliable result is also obtained outside of color management-capable applications. As you can easily see from the graphics, the EIZO CS2400S manages this with extraordinary precision. The colorful intersection is so congruent with the target that you can hardly recognize a black grid (target) and a white grid (monitor color space).

Coverage of the sRGB color space in the sRGB preset, 3D slice 1
Coverage of the sRGB color space in the sRGB preset, 3D slice 2

Adobe RGB color space coverage in Adobe RGB preset, 3D slice 1
Adobe RGB color space coverage in Adobe RGB preset, 3D slice 2

The following table summarizes the results for the factory preset and after hardware calibration with ColorNavigator:

Color space	Manufacturer information	Cover in factory preset	Coverage after calibration
sRGB	100 %	97 %	99 %
Adobe RGB	99 %	98 %	99 %
ECI-RGB v2	k. A.	-	87 %
DCI-P3 RGB	95 %	97 %	96 %
ISO Coated v2 (FOGRA39L)	99 %	-	99 %

Color mode: Custom (factory default)

We have summarized the explanations for the following charts for you: Delta E deviation for color values and white point, Delta C deviation for gray values, and gradation.
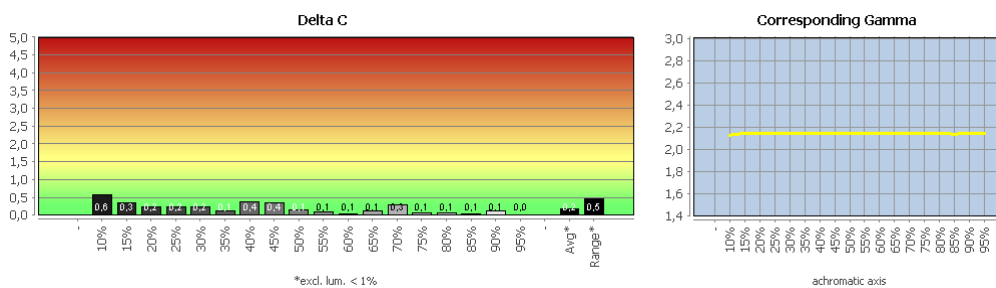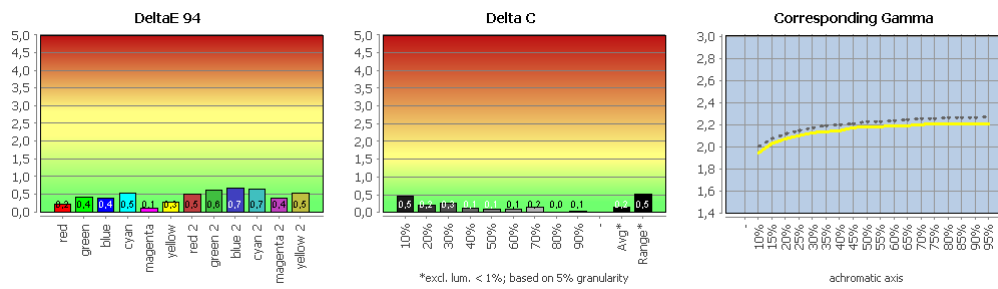

Gray balance in factory setting, "User" picture mode

A look at the grayscale measurement chart reveals how our subjective impression was already so extraordinarily good. The EIZO CS2400S can already convince with an excellent grayscale balance ex-factory. All other parameters we recorded correlate well with the respective settings in the OSD. The gamma curve is perfectly linear.

The detailed test results can be downloaded as a PDF file.

## Comparison sRGB mode with sRGB working color space

Color reproduction in factory setting, picture mode "sRGB

In sRGB mode, the gray balance remains excellent (Delta-C-Average: 0.16; Delta-C-Range: 0.53). We also measure the color temperature exactly as set in the monitor OSD at 6500 K. The gamma may be slightly below the norm with an average of 2.15, but the curve is perfectly adjusted.

In terms of colors, the large native color space is trimmed extremely precisely to the target color space. An average Delta E94 of only 0.58 is an excellent value for the color deviations. Even the maximum is only 1.08.

The detailed test results can be downloaded as a PDF file.

Comparison Adobe RGB mode with Adobe RGB working color space
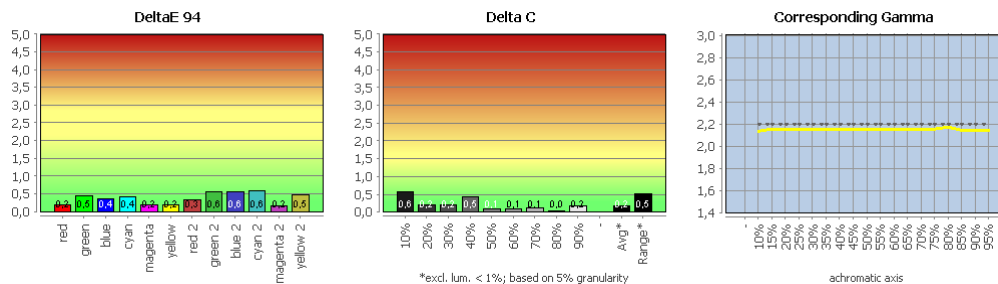
Color reproduction in factory setting, "Adobe RGB" picture mode

The detailed test results can be downloaded as a PDF file.

We find practically the same picture in the Adobe RGB preset. The excellent gray balance values do not change at all within the measuring accuracy. The gamma curve is perfectly linear according to the standard. The average value of 2.19 is also practically a precision landing.

In terms of color deviations, we determine the average Delta E94 with only 0.28 and the maximum deviation with exactly 1. These are exorbitantly good values that are definitely on reference level.

Corresponding content can therefore already be reproduced very attractively with the factory presets without any further measures, even in applications that are not color management-capable.

Measurements after calibration and profiling

Hardware calibration

In contrast to standard monitors, professional displays from EIZO offer the possibility of hardware calibration. The necessary software is called ColorNavigator at EIZO and is generally included in the scope of delivery.

This is a powerful calibration tool that meets professional demands and is still easy to use. If you have experienced the software solutions of other manufacturers, the ColorNavigator is already a decisive reason in itself to reach for an EIZO display.

With hardware calibration, the calibration settings are made directly in the monitor via USB connection. Therefore, the subsequently measured profile does not contain any calibration data, which is written to the LUT of the graphics card at every system start in the case of a software calibration. A hardware calibration, on the other hand, is completely independent of the computer and the graphics card.

This allows a significantly higher precision during calibration and at the same time avoids the undesired clipping of color gradations. While in a software calibration the number of possible color values is trimmed by the RGB adjustment via the RGB gain controls of the OSD, in a hardware calibration the maximum possible 256 color levels per color channel are fully preserved.

In addition to the corresponding hardware requirements in the monitor itself, manufacturer-specific software is also necessary for this. The application that comes with the colorimeters is usually not capable of this. The necessary interaction of hardware and software is therefore a very important quality criterion for a graphics display.

We have already described the software in great detail in the review of the EIZO CG279X. Those who want to look at this in detail will find all the information in the linked review.

For the following measurements, the EIZO CS2400S was calibrated from ColorNavigator (Color-Gamut "Native", Gamma 2.2, color temperature "6500 K", DUE "Uniformity") and profiled.

Neither represents a generally valid recommendation. This also applies to the choice of gradation, especially since the current characteristic is taken into account anyway as part of color management.

Profile validation
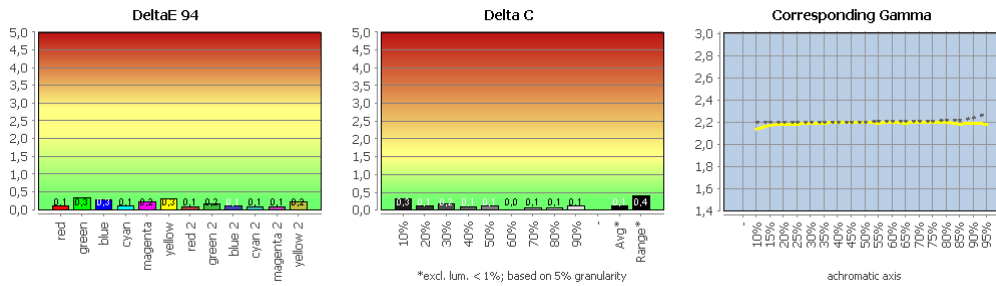
Profile validation

The EIZO CS2400S does not show any noticeable drifts or unsightly non-linearities. The matrix profile describes its condition very accurately. A repetition of the profile validation after 24 hours did not reveal any significantly increased deviations. All calibration targets were met. The gray balance and color values are extremely good.

The detailed test results can be downloaded as a PDF file.

Comparison with sRGB (color transformed)
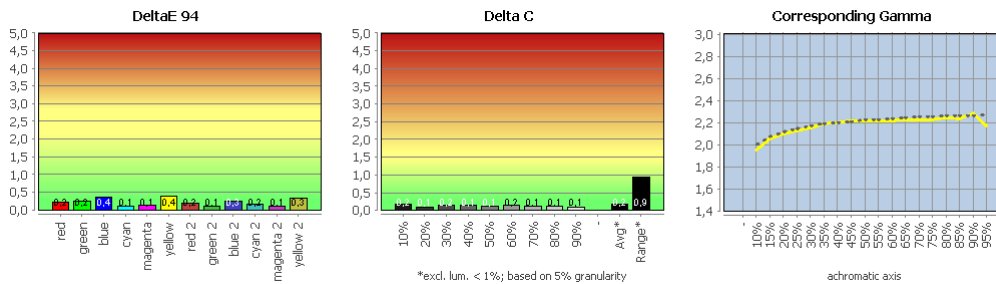
Comparison with sRGB (color transformed)

Our CMM takes into account the working color space and screen profile and performs the necessary color space transformations with colorimetric rendering intent on this basis.

The graphics speak for themselves. The range on the far right may stand out a bit in the gray balance, but this is only noticeable because the other values are so extremely good. The measured value for the range is also very good.
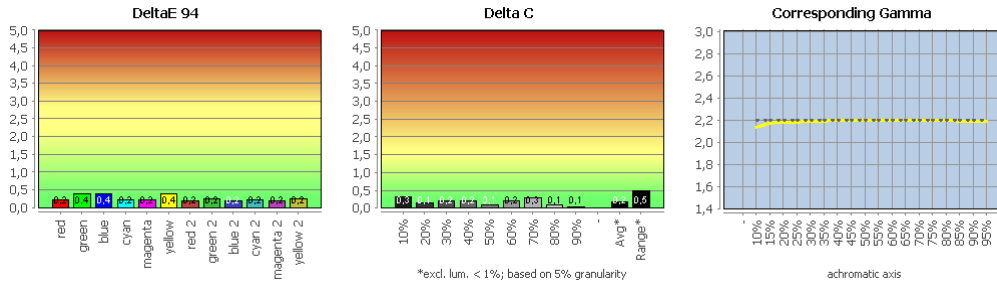
We can also speak of perfection for the color values (Delta-E94-Average: 0.26; Delta-E94-Max: 0.97). These deviations are certainly among the lowest we have ever measured.

Overall, the result is excellent for both color and gray values.

The detailed test results can be downloaded as a PDF file.
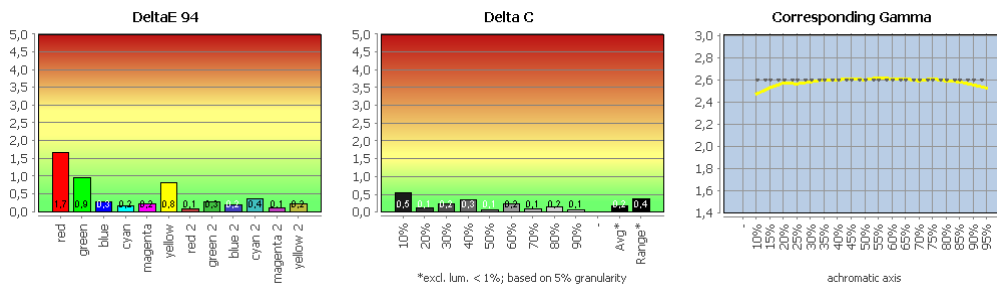
Comparison with Adobe RGB (color transformed)

Comparison with Adobe RGB (color transformed)

In view of the graphs, it hardly makes sense to write much more here. Again, the deviations are among the lowest we have ever measured. The gray balance is perfect (Delta-C-Average: 0.17; Delta-C-Range: 0.64), just like the color values (Delta-E94-Average: 0.28; Delta-E94-Max: 1.00).

The detailed test results can be downloaded as a PDF file.

Comparison with DCI-P3 (color transformed)

Comparison with DCI-P3 (color transformed)

Since the color space coverage here "only" reaches 96%, the slightly higher maximum deviation in red is also quickly explained. But even that remains below the magic limit of Delta E <2 and is only noticeable because the other values are so extremely good (Delta-E94-Average: 0.43; Delta-E94-Max: 1.68). As before, the gray balance is simply perfect (Delta-C-Average: 0.18; Delta-C-Range: 0.39).

The detailed test results can be downloaded as a PDF file.

Color space emulations

Color space emulations are used to limit the color space of the monitor to a desired target color space. This is always necessary when accurate color reproduction is required, but the applications or signal sources used do not support color management. This would be, for example, office applications, most Internet browsers or external signal sources such as BD players.

With the factory presets for sRGB and Adobe RGB, the EIZO CS2400S practically already comes with two color space emulations ex-works. As we saw above, they are already so perfect that trying to improve them further only has an academic character. However, a DCI-P3 preset, which might be interesting for videographers for example, is not available ex-factory.

As already mentioned in the OSD, a color space emulation in the ColorEdge devices is nothing more than a full-fledged hardware calibration to the desired target color space. Since an ICC profile is also created, you will get a correct representation even if you briefly switch to Lightroom or Photoshop in between, for example.

Comparison of DCI-P3 emulation with DCI-P3
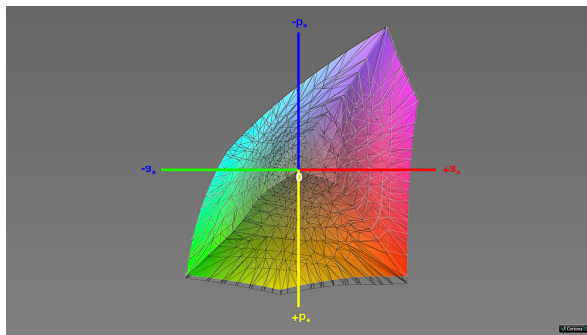
*Coverage of the DCI-P3 color space in the DCI-P3 emulation, 3D cut 1*
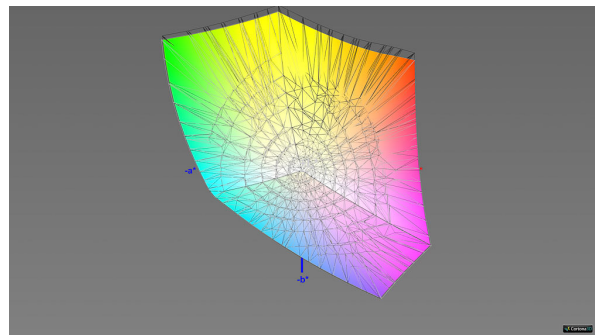
Coverage of DCI-P3 color space in DCI-P3 emulation, 3D cut 2

The color tree graphics above make it clear how well the native monitor color space is clipped to the target color space here as well. There is practically no overcoverage at all, only a slight undercoverage.

Accordingly, the values are excellent here as well. The gray balance (Delta-C-Average: 0.20; Delta-C-Range: 0.76) is first-rate and the high gamma setting of 2.6 is reliably achieved. On average, we determine the gamma with 2.57, and the gradient is also almost perfectly linear.

In the area of color space undercoverage for red, we find the maximum deviation in the color values as before with a Delta E94 of only 1.64. This should be below the perception threshold for the vast majority of people. For all other deviations, this is definitely true with a Delta E94 average of only 0.39.
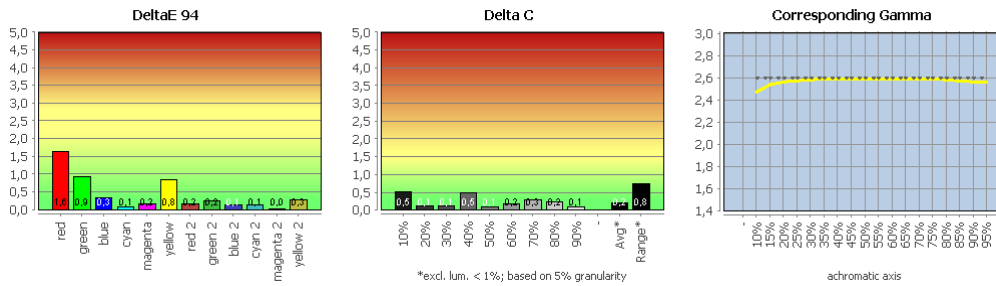
Comparison of DCI-P3 emulation with DCI-P3

The detailed test results can be downloaded as a PDF file.

Reaction behavior

We examined the response behavior in native resolution at 60 Hz on the DisplayPort. The monitor was reset to the factory settings for the measurement.

Image buildup time and acceleration behavior

We determine the image build-up time for the black to white change and the best gray to gray change. Additionally, we name the average value for our 15 measuring points.

The measurement value CtC (Color to Color) goes beyond the conventional measurements of pure brightness jumps - after all, one usually sees a colored image on the screen. This measurement therefore measures the longest period of time that the monitor needs to change from one mixed color to the other and stabilize its brightness. The mixed colors cyan, magenta and yellow are used - each with 50% signal brightness. In the CtC color change, therefore, not all three subpixels of a pixel switch in the same way, but different rise and fall times are combined.

The data sheet states a response time of 19 ms for GtG. The EIZO CS2400S does not have an acceleration option (overdrive).

Switching times

We measure the black/white change with 25 ms and the fastest gray change with 23.2 ms. The average value for our 15 measuring points is a whopping 34.3 ms. The CtC value is also quite pronounced at 28 ms.

There are no overshoots to be observed, the tuning is very neutral.

The switching time diagram shows, among other things, how different brightness jumps add up, how fast the monitor reacts in the factory setting in the best case and which average response time can be assumed.
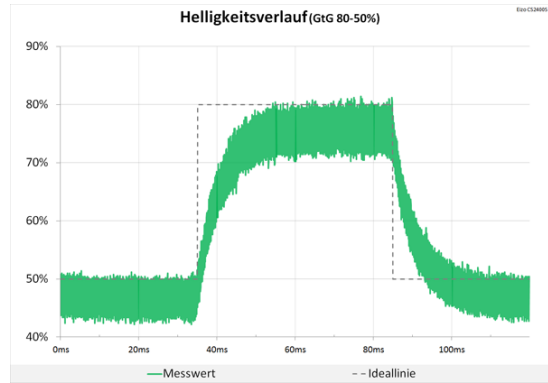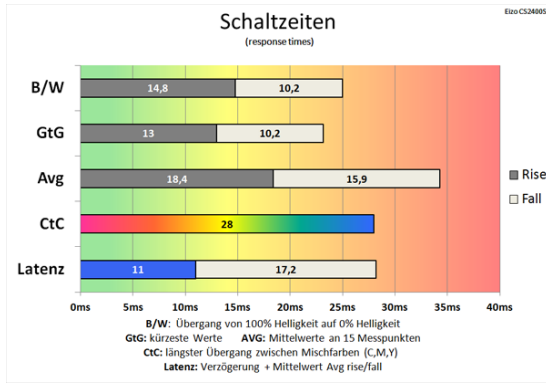
60 Hz: very slow switching times

*60 Hz: no overshoots*

Network diagrams

In the following network diagrams you can see an overview of all measured values for the different brightness jumps of our measurements. Ideally, the green and red lines would be close to the center. Each axis represents a brightness jump of the monitor defined in level and dynamics, measured via light sensor and oscilloscope.
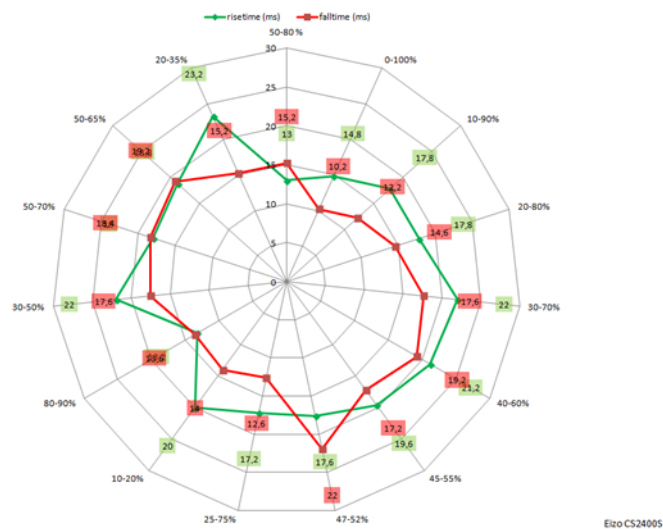

Response time 60 Hz

Latency

The latency is an important value for gamers; we determine it as the sum of the signal delay time and half the average frame rate. The signal delay of the EIZO CS2400S is still quite decent at 11 ms. However, the half average frame rate of 17.2 ms is already very slow. That makes a total of 28.2 ms.

It was clear from the start that the EIZO CS2400S is not a gaming monitor. However, the review sample performs rather ponderously even compared to other ColorEdge devices.

Backlight

The backlight of the EIZO CS2400S shines continuously. The comparison in the diagram shows: Both at full and reduced brightness settings, the luminous flux is not interrupted, as would be the case with PWM backlights. Thus, the screen is suitable for working in front of it for a longer time even at reduced brightness.
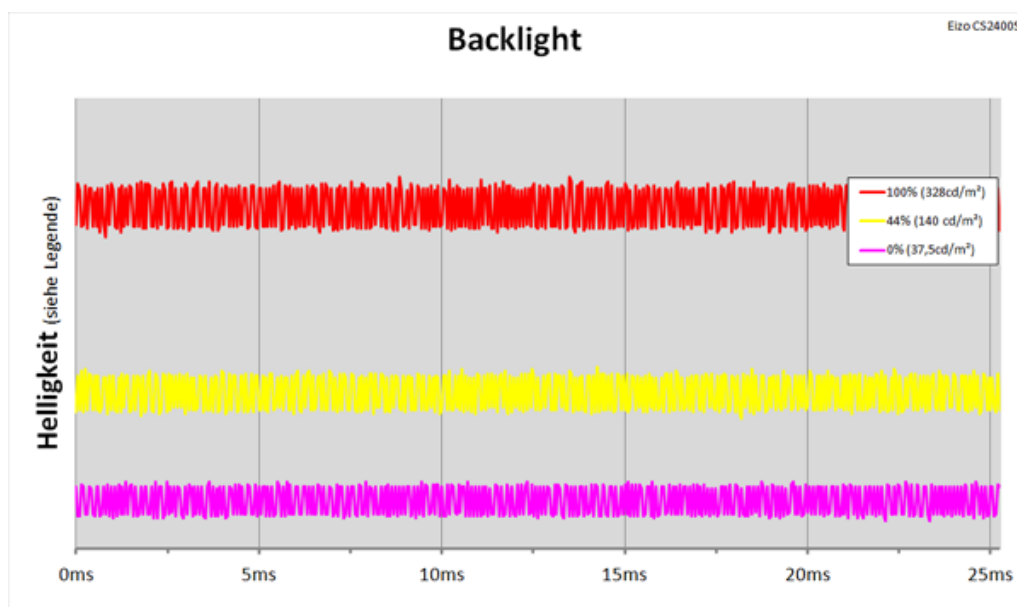
LED backlight with continuous brightness control

Sound

The EIZO CS2400S does have a small beeper on board, but it is only used for acoustic feedback when operating the touch keys. Otherwise, it neither has built-in speakers nor an analog audio or headphone output. Therefore, it does not make much sense to connect audio signals via HDMI or DisplayPort. When using external sources (such as a BD player), they must therefore be able to output picture and sound signals separately.

DVD and video

HD players like Blu-ray players, HDTV receivers and game consoles can be connected directly to the HDMI socket of the EIZO CS2400S. However, the sound signals have to be

disconnected from the input player and output elsewhere since the review sample itself does not support any sound playback or sound forwarding.

The 16:10 format does not correspond to any common video standard, but there is no real disadvantage in view of the good illumination of the EIZO CS2400S compared to 16:9 monitors with Full HD. During movie playback, a part of the screen is simply not used at the top and bottom.

The excellent picture quality of the EIZO CS2400S naturally also makes itself positively felt when watching videos. Purists can trim the native color space exactly to the HDTV standard. For everyone else, the expanded color space with stronger colors that always remain natural in the skin tones is a real added value. Many movies simply look even more brilliant with it.

The contrast is excellent even with small, brightly shining elements against a dark background. The bright colors also contribute considerably to the contrast perception.

If still required, the EIZO CS2400S can also independently scale all older video resolutions from 480p to 720p to the maximum possible size without distortion. It also masters 24p playback - but only at the HDMI input and with 1080p feeds. We could generally only set 60 Hz on the DisplayPort in connection with the NVIDIA graphics card driver. The same applies for all PC resolutions via HDMI. If you select an HDTV resolution, 60, 59 and 50 Hz are generally also possible.

Long camera movements already looked extraordinarily smooth on the PC at 60 Hz. At 24p, the playback was so smooth that we rarely see it even on 24p monitors.

Evaluation

Housing processing/mechanics:	5
Ergonomics:	5
Operation/OSD:	5
Energy consumption:	4
Noise generation:	5
Subjective image impression:	5

Viewing angle dependence:	5
Contrast:	5
Illumination (black image):	4,5
Image homogeneity (brightness distribution):	5
Image homogeneity (color purity):	5
Color space volume (sRGB; Adobe RGB; DCI-P3):	5;5;5
Before calibration (gray scale factory mode):	5
Before calibration (sRGB; Adobe RGB):	5;5
After calibration (sRGB; Adobe RGB; DCI-P3):	5;5;5
After calibration (profile validation):	5
Interpolated image:	5
Suitable for casual players:	2
Suitable for hardcore players:	1
Suitable for DVD/Video (PC):	5
Suitable for DVD/Video (external feed):	5
Price-performance ratio:	5
Overall rating:	**4.7** (VERY GOOD**)**

Conclusion

EIZO itself sees the CS2400S as the most affordable entry into the high-end league of graphics monitors with extended color space, which is also supposed to offer "perfection out of the box". While you wouldn't expect anything other than perfection in the CG series - they simply have undisputed reference status in the industry - the performance in the CS series is always surprising. It is simply striking how the manufacturer manages to keep the competition at bay, even in this price range, time and again, sometimes very clearly.

The EIZO CS2400S is the best example of this. The measured values for the picture quality are so good across the board that you can really speak of reference level even for the entry-level model. This is not only true for the gray balance, color deviations and image homogeneity, but also for the viewing angle neutrality. Even the illumination quality is at the upper end of this price segment. It is only surpassed by the True Black panel of the CG series.
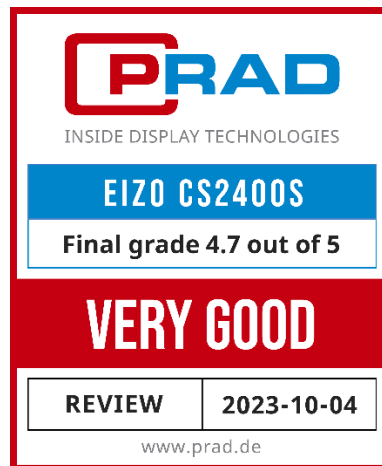
The EIZO CS2400S is clearly designed as a graphics specialist. However, the only thing it lacks to become a first-class all-rounder is a faster image build-up time - even more so than its predecessor. In all other areas, EIZO has managed to significantly improve an already very good monitor once again. This also applies to the energy consumption, which has been reduced by a whopping 25% and can keep up with many office monitors despite the performance level. With USB-C, the device is now also up to date in terms of connectivity.

Every user has to decide for themselves whether a 24-inch monitor with Full HD resolution is still up-to-date. If you do not have room for a 27-inch monitor - for

example, as a second display for tethered shooting in the photo studio - the EIZO CS2400S is definitely the right choice.

However, when it comes to the main monitor for EBV, we would also recommend ambitious amateurs to take a look at the EIZO CS2731 and see the higher purchase price as a long-term investment. With a 27-inch diagonal and WQHD resolution, it is much more comfortable to work with.

All those who are deliberately looking for a graphics monitor with a 24-inch diagonal can grab it without hesitation. The EIZO CS2400S definitely gets a recommendation from the editors. Considering the offered performance, the device is almost a bargain in terms of price-performance ratio.

PRAD
INSIDE DISPLAY TECHNOLOGIES
EIZO CS2400S
Final grade 4.7 out of 5
VERY GOOD
| REVIEW | 2023-10-04 |
www.prad.de

Note on our own behalf: *PRAD received the CS2400S on loan from EIZO for testing purposes. There was no influence on the test report from the manufacturer, nor was there an obligation to publish or a non-disclosure agreement.*

Link to original test report: https://www.prad.de/testberichte/test-eizo-cs2400s-einstiegsmodell-auf-referenz-niveau/