EIZO CG3146

Evaluation for Media & Entertainment Production

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Contents

Introduction

The EIZO CG3146 monitor part of the CG series range in the EIZO line up designed for the most critical SDR and HDR colour grading applications. The CG3146 is a 10bit DCI 4K aspect ratio screen, being 4096 x 2160. The CG3146 faithfully reproduces 99% of the DCI-P3 standard, a contrast ratio of 2,000,000:1, viewing angle of 178°, 178° (H/V), a response time of 10msec (grey/grey), and internal calibration with built in probe.

The CG3146 is ready to use after only 3 minutes warm-up time.

Front Appearance

The monitor's front bezel includes a dial for quickly and easily navigating the OSD menu or adjusting monitor settings, such as brightness. This allows for easy and fast access to the various presets.

Inputs

The ColorEdge PROMINENCE CG3146 is equipped with a Single-Link 12G/6G/3G/HD-SDI and Dual- or Quad-Link 3G*/HD-SDI connections for seamless transmission of 4K video data. The SDI connections support 2SI (2 sample interleave) to ensure picture is always maintained during transmission. VPID (Video Payload ID) is also supported for SDI connections.

The monitor has an HDMI (Deep Colour, HDCP 2.2 / 1.4) and DisplayPort (HDCP 1.3) input located conveniently on the side of the monitor for flexible connection to a range of other video devices. Four USB downstream ports and one upstream port are also equipped.

The monitor's HDMI and DisplayPort inputs support DCI 4K at 60p. HDMI input supports 12-bit 4:2:2 at 50/60p and DisplayPort input supports up to 10-bit 4:4:4 at 50/60p.

Panel

The LCD panel on the CG3146 is a Dual Layer wide gamut blue led-RG phosphor LED backlight 10-bit panel.

Testing

Equipment for Testing

Probes

Colorimetry Research CR100 Colourimeter NIST Certified
Colorimetry Research CR300 2nm Spectrophotometer NIST Certified
Konica Minolta CA210 Colourimeter
CG3146 internal

Software – EIZO ColorNavigator 7, Light Illusion Colourspace INF, Colorimetry Research CRI App

Contrast Ratio

The measured contrast ratio for the CG3146, when calibrated to a D65 whitepoint, was 1,402,528:1 in SDR (@100nit) and over 2,000,000:1 in HDR

Response

The response as per the CG3146 specification 10 ms (grey-to-grey)

Warm-Up Time

The marketing information states a warm-up time of 3 minutes, which is very short. The graph below shows the luminance response from a cold start turn on. Ambient temperature was 18^0 C and approximately 48% RH.

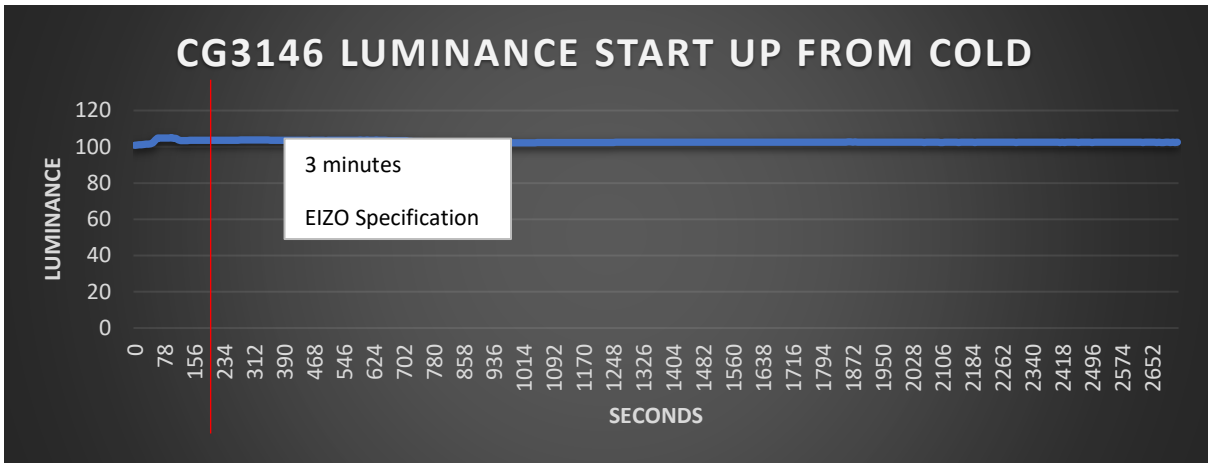


Figure 2 CG3146 Luminance Warm-Up Time

It can be seen from Figure 2 that the CG3146 is stable from the very initial turn on. The CG3146 was stable and at correct luminance at around the 120second mark.

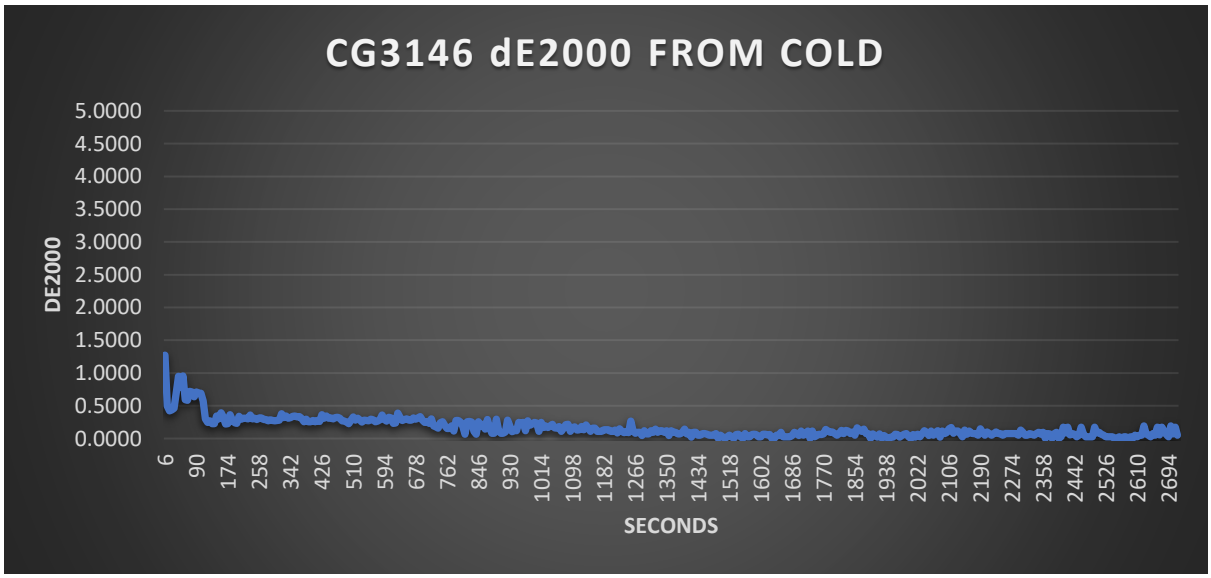


Figure 3 CG3146 Chromaticity Warm-Up Time

Looking at the chromaticity warm-up time, it can be seen that the CG3146 is stable in around 100 seconds.

Calibration and Colour Accuracy

The following pages show the CG3146 out of box (OOB) preset calibration responses as well as the native performance of the CG3146. The native performance is derived from a very large profile using a CR100 probe correlated to a CR300 2nm spectrophotometer. The native colour space is then extracted from the profile and a comparison of the measured patches against the theoretical patches is shown.

The Green dots in the CIE diagram indicate dE2000 errors less than 1; Orange errors 1>2.3 and Red errors over 2.3.

Native Panel

The native panel response shows the CG3146 to be extremely linear. This means that a 1D lut matrix calibration will give very good results with the CG3146. Also, it allows for small profiles to be run and create 3D lut calibration that is highly accurate.

Standard SDR Presets

The standard SDR presets tested and verified were the following: -

ITU-R BT.709 – showed an average dE2000 over 1034 patches of 0.3014

DCI P3 with a D65 whitepoint at 48nit - showed an average dE2000 over 1000 patches of 0.5604

Standard HDR Presets

ST2084 P3 Colourspace @ 1000nit – PQ_P3_D65 - showed an average dE2000 over 1000 patches of 0.6557

HLG with a P3 Colourspace - showed an average dE2000 over 1034 patches of 0.7025

EIZO CG3146 Internal Probe Calibration with ColorNavigator 7

The EIZO internal probe was correlated against the Colorimetry Research CR300 2nm spectrophotometer. ColorNavigator 7 was then used to calibrate the monitor to PQP3D65 using the following settings: -

1000nit, Black level minimum

PQ 1000 Clipping

DCI P3 gamut

Standard gamma priority

Gamut clipping ON

The CG3146 was then profiled with the Colorimetry Research CR100 which was correlated against the same CR300.

The calibration showed an average dE2000 over 4913 patches of 0.5733

Profile Name: EIZO CG3146 SDR NATIVE
Created: 2021-08-24

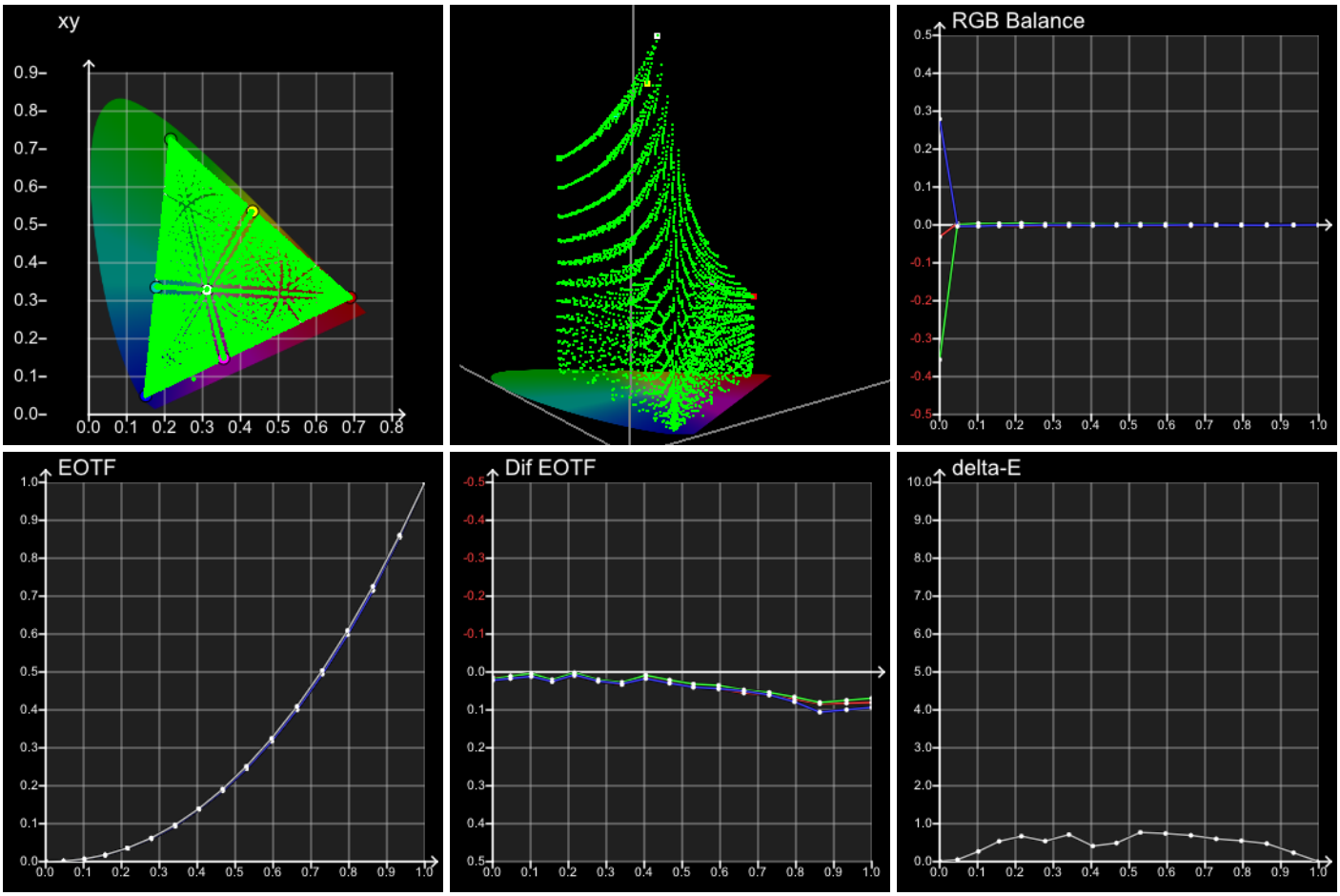
Probe: CR100
Probe Match: CR300

Target Colour Space: EIZO CG3146 SDR EXTR 2.2 NATIVE 24.8.2021_1
Target Luma Max: 105.400
Target Luma Min: 0.0001
NOTES
Native CG3146 panel

Gamut Coverage: 92%
Profile Luma Max: 105.400
Profile Luma Min: 0.0001
Profile CR: 1402528:1

Profile Points: 4913

dE00 Coverage			dE00 Limits	
<1:	4910	(99.94%)	Min:	0.0005
>1 <2.3:	3	(0.06%)	Max:	1.1584
>2.3:	0	(0.00%)	Avg:	0.4462



dE Primary

dE 2000 Grey

RGB	dE 2000
0, 0, 0	0.0105
12, 12, 12	0.0386
26, 26, 26	0.3310
40, 40, 40	0.5893
55, 55, 55	0.9590
71, 71, 71	0.6137
87, 87, 87	0.8320
103, 103, 103	0.4945
119, 119, 119	0.5481
135, 135, 135	0.9541
152, 152, 152	0.8924
169, 169, 169	0.7421
186, 186, 186	0.5678
203, 203, 203	0.4596
220, 220, 220	0.3645
238, 238, 238	0.2011
255, 255, 255	0.0005

dE 2000 Red

RGB	dE 2000
12, 0, 0	0.1701
26, 0, 0	0.2762
40, 0, 0	0.4763
55, 0, 0	0.4370
71, 0, 0	0.5153
87, 0, 0	0.5637
103, 0, 0	0.5724
119, 0, 0	0.5492
135, 0, 0	0.4531
152, 0, 0	0.4397
169. 0. 0	0.4308

dE 2000 Green

RGB	dE 2000
0, 12, 0	0.2595
0, 26, 0	0.2854
0, 40, 0	0.4234
0, 55, 0	0.3672
0, 71, 0	0.3794
0, 87, 0	0.3684
0, 103, 0	0.3969
0, 119, 0	0.3040
0, 135, 0	0.2557
0, 152, 0	0.1613
0. 169. 0	0.1172

dE 2000 Blue

RGB	dE 2000
0, 0, 12	0.1904
0, 0, 26	0.4581
0, 0, 40	0.6116
0, 0, 55	0.6003
0, 0, 71	0.5878
0, 0, 87	0.6844
0, 0, 103	0.7065
0, 0, 119	0.6550
0, 0, 135	0.5553
0, 0, 152	0.4962
0. 0. 169	0.4210

dE Secondaries

dE 2000 Cyan

RGB	dE 2000
0, 12, 12	0.1453
0, 26, 26	0.2091
0, 40, 40	0.3517
0, 55, 55	0.3650
0, 71, 71	0.3724
0, 87, 87	0.3068
0, 103, 103	0.2542
0, 119, 119	0.2080
0, 135, 135	0.4759
0, 152, 152	0.6067
0, 169, 169	0.5435

dE 2000 Magenta

RGB	dE 2000
12, 0, 12	0.2155
26, 0, 26	0.3556
40, 0, 40	0.5384
55, 0, 55	0.3439
71, 0, 71	0.3309
87, 0, 87	0.3370
103, 0, 103	0.2052
119, 0, 119	0.2453
135, 0, 135	0.3957
152, 0, 152	0.4692
169, 0, 169	0.4986
186, 0, 186	0.4790

dE 2000 Yellow

RGB	dE 2000
12, 12, 0	0.1777
26, 26, 0	0.1842
40, 40, 0	0.5054
55, 55, 0	0.6190
71, 71, 0	0.6904
87, 87, 0	0.7301
103, 103, 0	0.4170
119, 119, 0	0.4037
135, 135, 0	0.6213
152, 152, 0	0.5182
169, 169, 0	0.5293
186, 186, 0	0.4370

dE Secondary

Profile Name: EIZO CG3146 REC.709 Preset
Created: 2021-08-24

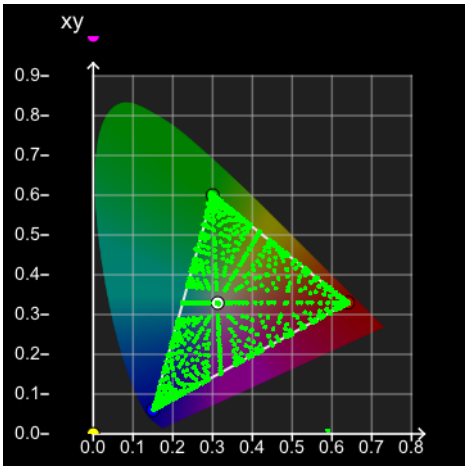
Probe: CR100
Probe Match: CR300

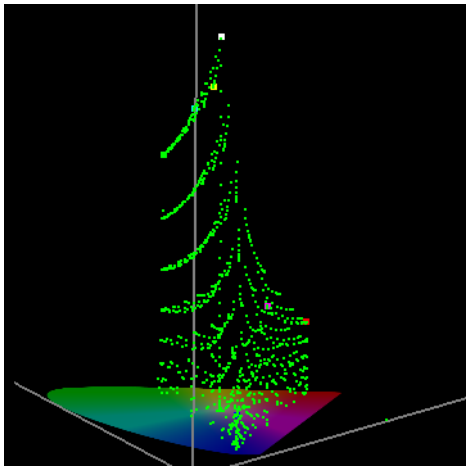
Target Colour Space: Rec709
Target Luma Max: 105.300
Target Luma Min: 0.0000
NOTES
Preset Rec709 OOB

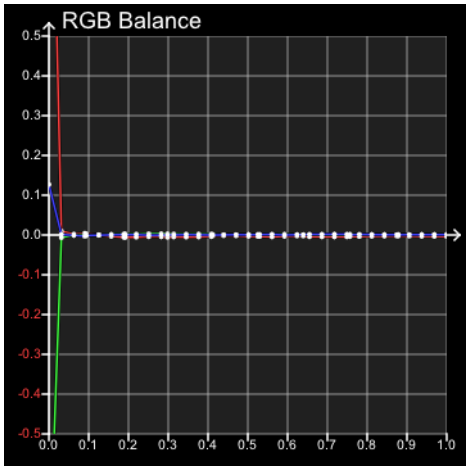
Gamut Coverage: 98%
Profile Luma Max: 104.700
Profile Luma Min: 0.0000
Profile CR: Inf

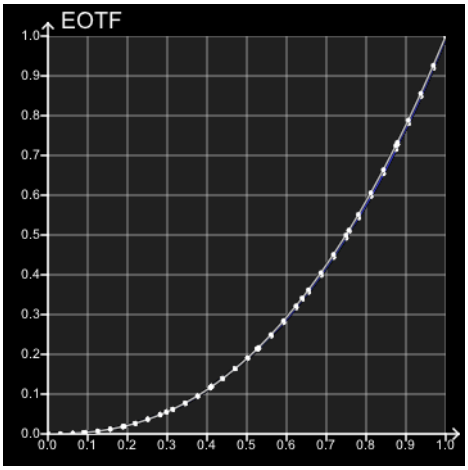
Profile Points: 1034

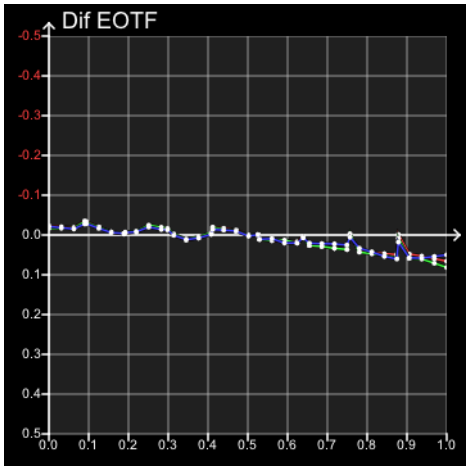
dE00 Coverage			dE00 Limits	
<1:	1034	(100.00 %)	Min:	0.0076
			Max:	0.8131
>1 <2.3:	0	(0.00%)	Avg:	0.3014
>2.3:	0	(0.00%)		

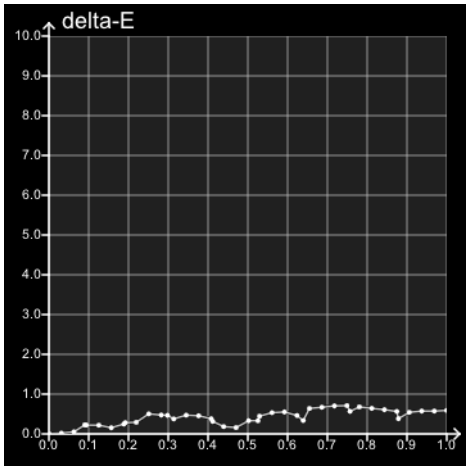












dE Primary

dE 2000 Grey

RGB	dE 2000
0, 0, 0	0.0076
8, 8, 8	0.0223
16, 16, 16	0.0317
23, 23, 23	0.1425
24, 24, 24	0.1355
32, 32, 32	0.1387
40, 40, 40	0.2118
48, 48, 48	0.3662
49, 49, 49	0.4127
56, 56, 56	0.4161
64, 64, 64	0.5699
72, 72, 72	0.6044
76, 76, 76	0.6380
80, 80, 80	0.5550
88, 88, 88	0.6052
96, 96, 96	0.6357
104, 104, 104	0.5631
105, 105, 105	0.3896
112, 112, 112	0.2302
120, 120, 120	0.2166
128, 128, 128	0.4642
134, 134, 134	0.4587
135, 135, 135	0.5676
143, 143, 143	0.6526
151, 151, 151	0.7193
159, 159, 159	0.4646
163, 163, 163	0.3900
167, 167, 167	0.7064
175, 175, 175	0.7426
183, 183, 183	0.7520
191, 191, 191	0.7669
193, 193, 193	0.8131
199, 199, 199	0.6836
207, 207, 207	0.6429
215, 215, 215	0.6147
223, 223, 223	0.5394
224, 224, 224	0.4684
231, 231, 231	0.5586
239, 239, 239	0.6793
247, 247, 247	0.7140
255, 255, 255	0.7972

dE 2000 Red

RGB	dE 2000
23, 0, 0	0.1741
49, 0, 0	0.3288
76, 0, 0	0.4591
105, 0, 0	0.4384
134, 0, 0	0.2249
163, 0, 0	0.1992
193. 0. 0	0.2975

dE 2000 Green

RGB	dE 2000
0, 23, 0	0.3200
0, 49, 0	0.3510
0, 76, 0	0.5559
0, 105, 0	0.3318
0, 134, 0	0.4653
0, 163, 0	0.1299
0. 193. 0	0.1055

dE 2000 Blue

RGB	dE 2000
0, 0, 23	0.1071
0, 0, 49	0.2482
0, 0, 76	0.3888
0, 0, 105	0.3852
0, 0, 134	0.4268
0, 0, 163	0.4785
0. 0. 193	0.3542

dE Secondaries

dE 2000 Cyan		dE 2000 Magenta		dE 2000 Yellow	
RGB	dE 2000	RGB	dE 2000	RGB	dE 2000
0, 23, 23	0.2981	23, 0, 23	0.3450	23, 23, 0	0.2315
0, 49, 49	0.2208	49, 0, 49	0.1264	49, 49, 0	0.4385
0, 76, 76	0.4618	76, 0, 76	0.2557	76, 76, 0	0.5981
0, 105, 105	0.4247	105, 0, 105	0.3005	105, 105, 0	0.4962
0, 134, 134	0.1178	134, 0, 134	0.2110	134, 134, 0	0.5026
0, 163, 163	0.1649	163, 0, 163	0.2361	163, 163, 0	0.2606
0, 193, 193	0.1631	193, 0, 193	0.2556	193, 193, 0	0.4217
0, 224, 224	0.1861				
0, 255, 255	0.1486				

dE Secondary

Profile Name: EIZO CG3146 DCI-P3 Preset
Created: 2021-08-23

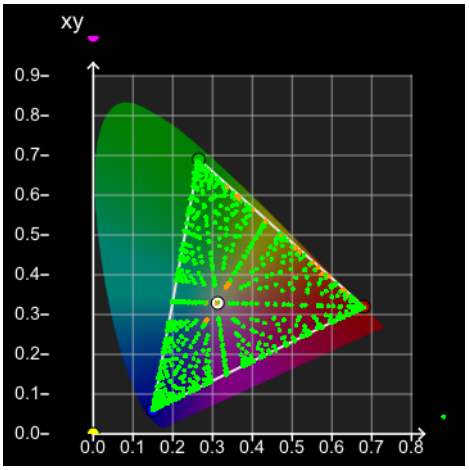
Probe: CR100
Probe Match: CR300

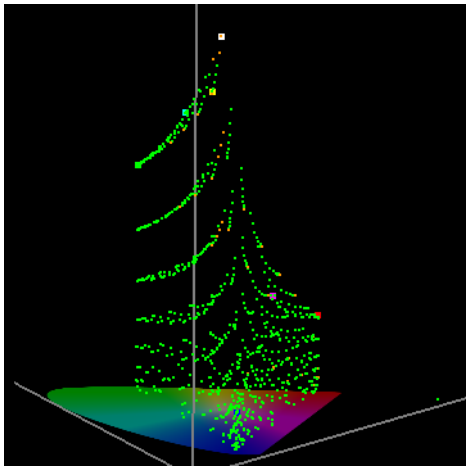
Target Colour Space: DCI P3 D65
Target Luma Max: 49.2700
Target Luma Min: 0.0000
NOTES
Preset DCI P3 OOB

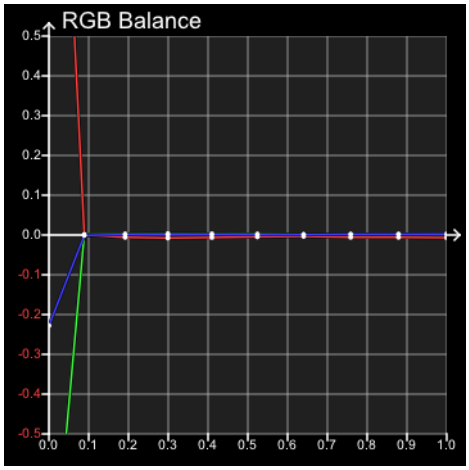
Gamut Coverage: 97%
Profile Luma Max: 49.2000
Profile Luma Min: 0.0000
Profile CR: Inf

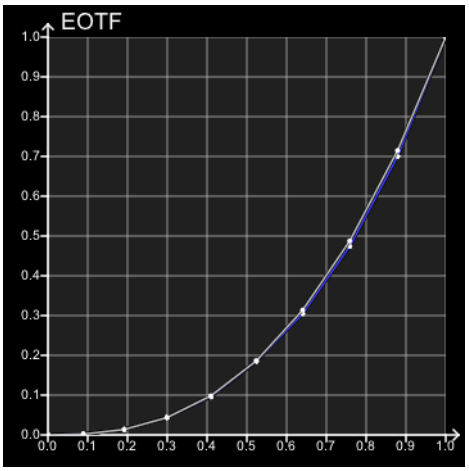
Profile Points: 1000

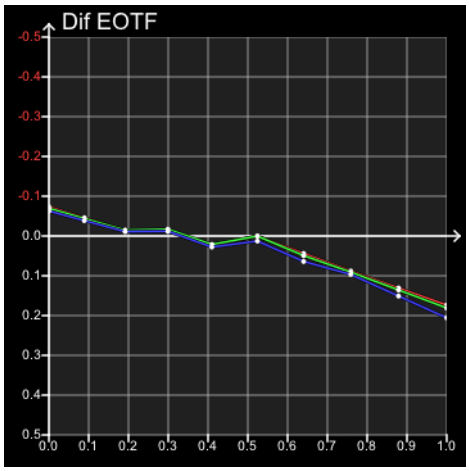
dE00 Coverage			dE00 Limits	
<1:	919	(91.90%)	Min:	0.0034
>1 <2.3:	81	(8.10%)	Max:	1.6927
>2.3:	0	(0.00%)	Avg:	0.5604

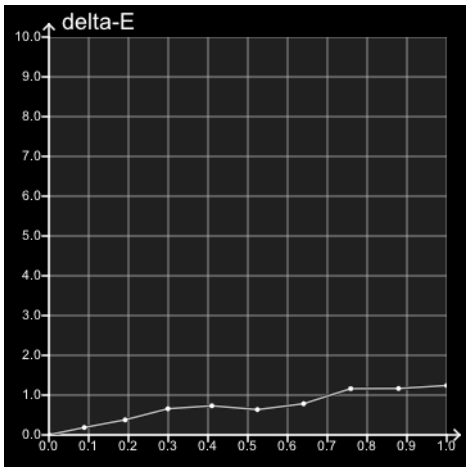












dE Primary

dE 2000 Grey				dE 2000 Red				dE 2000 Green				dE 2000 Blue			
RGB			dE 2000	RGB			dE 2000	RGB			dE 2000	RGB			dE 2000
0,	0,	0	0.0034	91,	0,	0	0.1498	0,	91,	0	0.2501	0,	0,	91	0.1699
91,	91,	91	0.1117	196,	0,	0	0.1778	0,	196,	0	0.3853	0,	0,	196	0.1138
196,	196,	196	0.4853	306,	0,	0	0.5067	0,	306,	0	0.6948	0,	0,	306	0.3640
306,	306,	306	0.9071	419,	0,	0	0.9443	0,	419,	0	0.9151	0,	0,	419	0.3705
419,	419,	419	0.9800	536,	0,	0	1.1660	0,	536,	0	1.1128	0,	0,	536	0.3554
536,	536,	536	0.9336	655,	0,	0	1.3082	0,	655,	0	1.1069	0,	0,	655	0.4820
655,	655,	655	0.8876												
776,	776,	776	1.3096												
899,	899,	899	1.4140												
1023,	1023,	1023	1.6927												

dE Secondaries

dE 2000 Cyan				dE 2000 Magenta				dE 2000 Yellow			
RGB			dE 2000	RGB			dE	RGB			dE
0,	91,	91	0.2731	91,	0,	912000		91,	91,	02000	
0,	196,	196	0.4962	196,	0,	1960.3828		196,	196,	00.1456	
0,	306,	306	0.3947	306,	0,	3060.1259		306,	306,	00.3884	
0,	419,	419	0.2856	419,	0,	4190.2074		419,	419,	00.7544	
0,	536,	536	0.3495	536,	0,	5360.4098		536,	536,	01.0896	
0,	655,	655	0.3800	655,	0,	6550.2314		655,	655,	01.0732	
0,	776,	776	0.3805	776,	0,	7760.4191		776,	776,	01.0964	
0,	899,	899	0.2604								
0,	1023,	1023	0.2029								

dE Secondary

Profile Name: EIZO CG3146PQP3D65 HDR Preset
Created:
2020-06-27

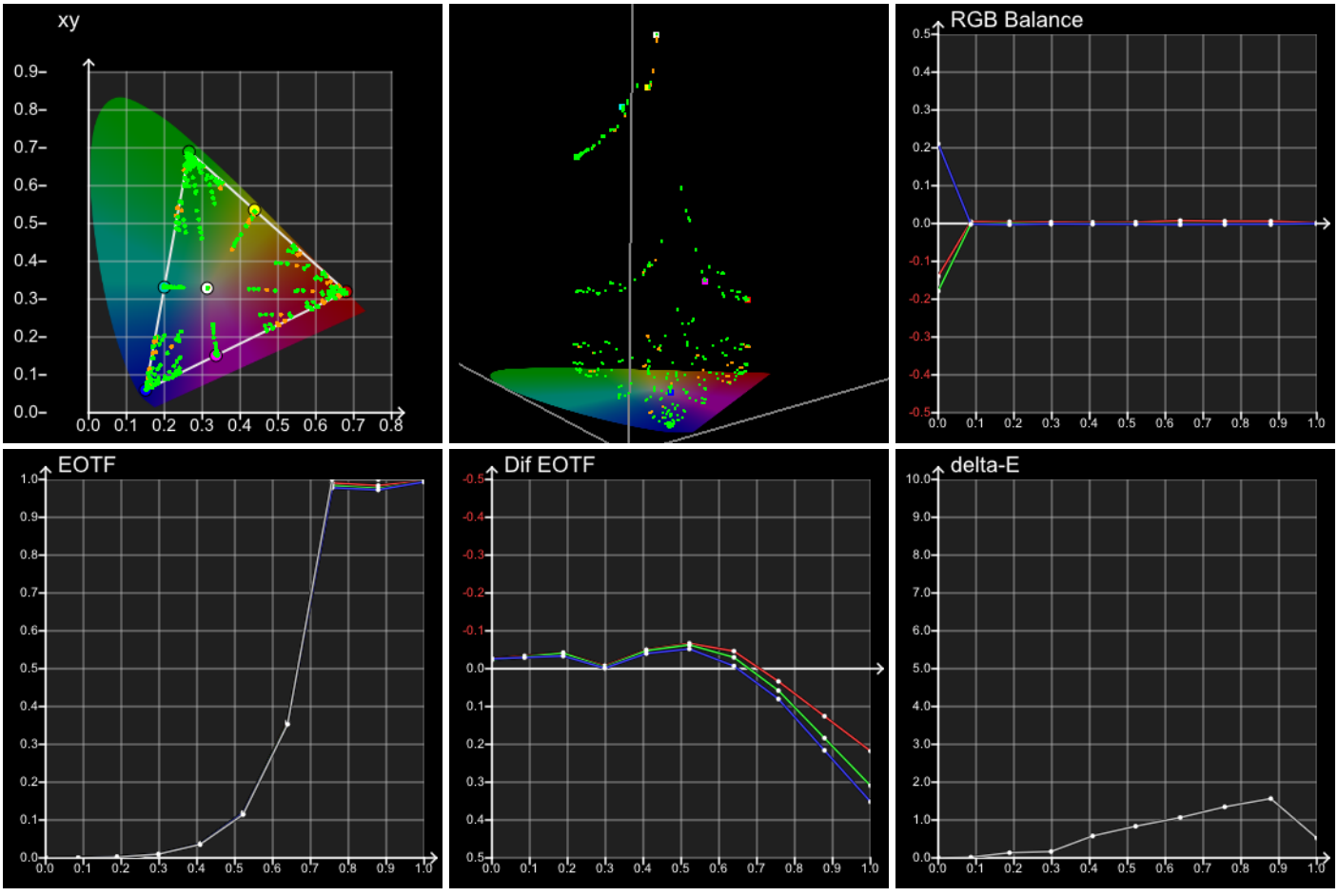
Probe: CR100
Probe Match: CR300

Target Colour Space: ST2084 P3 D65 1000NIT
Target Luma Max: 993.700
Target Luma Min: 0.0009
NOTES
Preset PQP3D65 OOB

Gamut Coverage: 61%
Profile Luma Max: 993.700
Profile Luma Min: 0.0009
Profile CR: 1109040:1

Profile Points: 998

dE00 Coverage			**dE00 Limits**	
<1:	834	(83.57%)	Min:	0.0030
>1 <2.3:	164	(16.43%)	Max:	1.9937
>2.3:	0	(0.00%)	Avg:	0.6557



dE Primary

dE 2000 Grey				dE 2000 Red				dE 2000 Green				dE 2000 Blue			
RGB			dE 2000	RGB			dE 2000	RGB			dE 2000	RGB			dE 2000
0,	0,	0	0.0030	88,	0,	0	0.0218	0,	88,	0	0.0224	0,	0,	88	0.0063
88,	88,	88	0.0122	193,	0,	0	0.1414	0,	193,	0	0.1156	0,	0,	193	0.0584
193,	193,	193	0.0897	305,	0,	0	0.2476	0,	305,	0	0.1816	0,	0,	305	0.0893
305,	305,	305	0.2369	417,	0,	0	0.3484	0,	417,	0	0.5099	0,	0,	417	0.3313
417,	417,	417	0.4542	534,	0,	0	0.8045	0,	534,	0	0.9135	0,	0,	534	0.3023
534,	534,	534	0.7933	654,	0,	0	1.1173	0,	654,	0	0.6135	0,	0,	654	0.2496
654,	654,	654	1.3905												
774,	774,	774	1.7069												
899,	899,	899	1.8800												
1023,	1023,	1023	0.6981												

dE Secondaries

dE 2000 Cyan				dE 2000 Magenta				dE 2000 Yellow			
RGB			dE 2000	RGB			dE	RGB			dE
0,	88,	88	0.0272	88,	0,	882000		88,	88,	02000	
0,	193,	193	0.2143	193,	0,	1930.0214		193,	193,	00.0163	
0,	305,	305	0.1707	305,	0,	3050.2139		305,	305,	00.1115	
0,	417,	417	0.5405	417,	0,	4170.0632		417,	417,	00.4997	
0,	534,	534	0.8872	534,	0,	5340.2918		534,	534,	00.5917	
0,	654,	654	0.6453	654,	0,	6540.6515		654,	654,	01.1045	
0,	774,	774	0.2721	774,	0,	7740.4092		774,	774,	00.9198	
0,	899,	899	0.3408								
0,	1023,	1023	0.4216								

dE Secondary

Profile Name: EIZO CG3146 HLG HDR Preset
Created: 2021-08-24

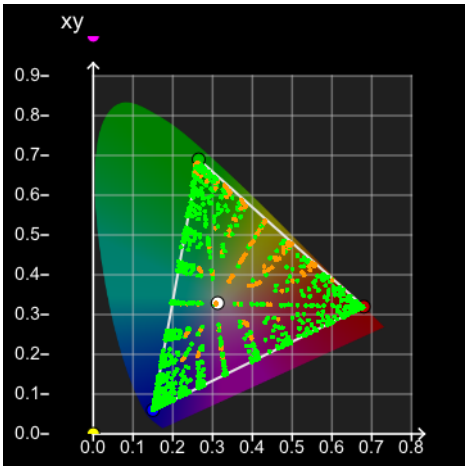
Probe: CR100
Probe Match: CR300

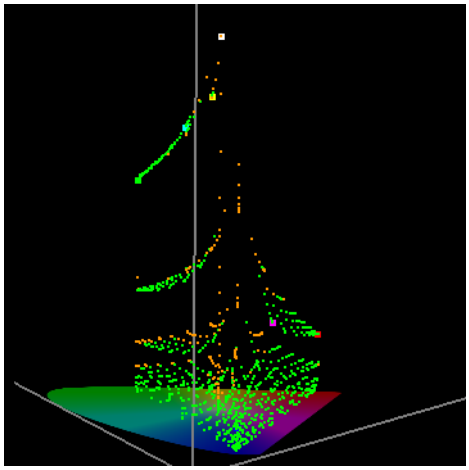
Target Colour Space: HLG P3 D65
Target Luma Max: 979.818
Target Luma Min: 0.0005
NOTES
Preset HLG-P3 OOB

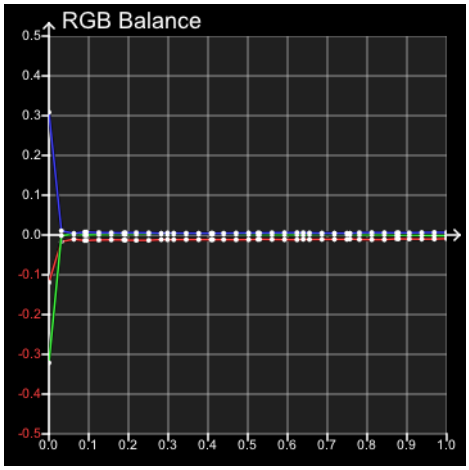
Gamut Coverage: 99%
Profile Luma Max: 979.818
Profile Luma Min: 0.0005
Profile CR: 2169365:1

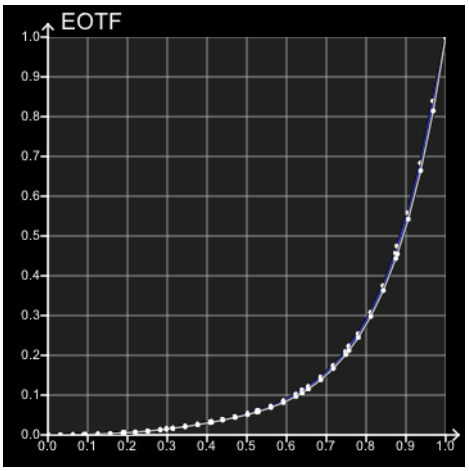
Profile Points: 1034

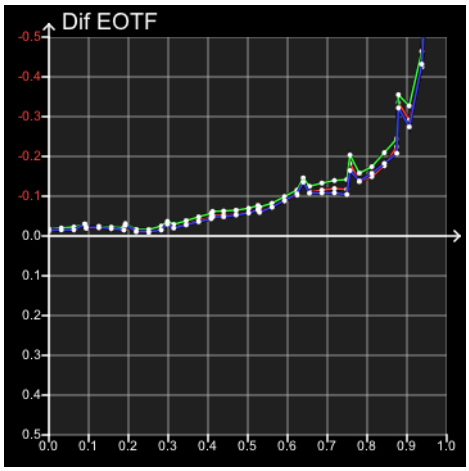
dE00 Coverage			dE00 Limits	
<1:	850	(82.21%)	Min:	0.0050
>1 <2.3:	184	(17.79%)	Max:	2.0353
>2.3:	0	(0.00%)	Avg:	0.7025

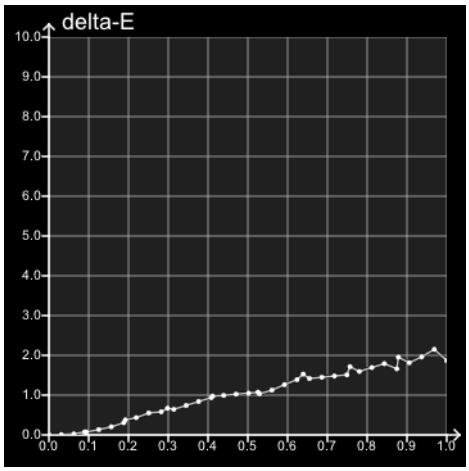












dE Primary

dE 2000 Grey

RGB	dE 2000
0, 0, 0	0.0050
8, 8, 8	0.0064
16, 16, 16	0.0267
23, 23, 23	0.0716
24, 24, 24	0.0721
32, 32, 32	0.1406
40, 40, 40	0.2250
48, 48, 48	0.3720
49, 49, 49	0.4068
56, 56, 56	0.5471
64, 64, 64	0.7130
72, 72, 72	0.7238
76, 76, 76	0.7376
80, 80, 80	0.7797
88, 88, 88	0.8671
96, 96, 96	0.9598
104, 104, 104	1.0552
105, 105, 105	1.0749
112, 112, 112	1.1140
120, 120, 120	1.1462
128, 128, 128	1.1510
134, 134, 134	1.1398
135, 135, 135	1.1188
143, 143, 143	1.1930
151, 151, 151	1.3364
159, 159, 159	1.4812
163, 163, 163	1.5402
167, 167, 167	1.5588
175, 175, 175	1.6535
183, 183, 183	1.7501
191, 191, 191	1.8210
193, 193, 193	1.9119
199, 199, 199	1.7811
207, 207, 207	1.8620
215, 215, 215	1.9768
223, 223, 223	1.6837
224, 224, 224	1.8523
231, 231, 231	1.8731
239, 239, 239	1.9493
247, 247, 247	2.0353
255, 255, 255	1.8689

dE 2000 Red

RGB	dE 2000
23, 0, 0	0.0217
49, 0, 0	0.1200
76, 0, 0	0.3749
105, 0, 0	0.5460
134, 0, 0	0.5823
163, 0, 0	0.7282
193. 0. 0	0.9966

dE 2000 Green

RGB	dE 2000
0, 23, 0	0.0726
0, 49, 0	0.3326
0, 76, 0	0.6974
0, 105, 0	0.6598
0, 134, 0	0.8644
0, 163, 0	1.2253
0. 193. 0	1.6804

dE 2000 Blue

RGB	dE 2000
0, 0, 23	0.0114
0, 0, 49	0.0260
0, 0, 76	0.0587
0, 0, 105	0.1298
0, 0, 134	0.2084
0, 0, 163	0.2258
0. 0. 193	0.2837

dE Secondaries

dE 2000 Cyan

RGB	dE 2000
0, 23, 23	0.0831
0, 49, 49	0.3749
0, 76, 76	0.6233
0, 105, 105	0.7014
0, 134, 134	0.6561
0, 163, 163	0.6630
0, 193, 193	0.6541
0, 224, 224	0.6270
0, 255, 255	0.7988

dE 2000 Magenta

RGB	dE 2000
23, 0, 23	0.0778
49, 0, 49	0.3619
76, 0, 76	0.5322
105, 0, 105	0.4708
134, 0, 134	0.4572
163, 0, 163	0.4940
193, 0, 193	0.4963

dE 2000 Yellow

RGB	dE 2000
23, 23, 0	0.0742
49, 49, 0	0.4106
76, 76, 0	0.5526
105, 105, 0	0.8211
134, 134, 0	0.9053
163, 163, 0	1.2871
193, 193, 0	1.6383

dE Secondary

Summary

The CG3146 is an excellent choice for media and entertainment post-production, vfx and editing uses where critical colour monitoring is required for SDR and HDR. Colour accuracy and the greyscale response was excellent out of box. Its colour accuracy, stability and uniformity stand out. The internal calibration probe is unique and an extremely useful feature and allows non-technical creatives to maintain the monitor in a colour accurate state.

Contact Us

Your local EIZO team is standing by to support you.

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