see similar files: http://130.149.60.45/~farbmetrik/TE21/TE21.HTM
technical information: http://www.ps.bam.de or http://130.149.60.45/~farbmetrik

Conclusion 31/2007 ISO TC159/SG4/WG2
Ergonomics – Visual Display Requirements

ISO TC159/SG4/WG realizes that the colour spaces CIELAB and CIELUV of *CIE Division 1* will soon become ISO/CIE standards. In applications we use these CIE colour spaces and *device−dependent* relative RGB colour spaces. For users of visual display systems a *device−independent* RGB colour space is useful. This produces via software the elementary hues Red, Green and Blue for the RGB data 100, 010 and 001 and equally spaced output in CIE colour spaces for equally spaced RGB input. We recommend that *CIE Division 1* study the colorimetric definition of such a space, which can be used in visual display applications.

Remark: We have realized that an example colour space of this type is published in CIE X030:2006, p. 139−144.
unanimous vote (Finland, Germany, Japan, Korea, Netherlands, Schweden, USA)
TE210−1

At the CIE meeting in Stockholm, June 2008, *CIE Division 1* decided to establish the CIE Reportership R1–47 **Hue Anles of Elementary Colours** by *Thorstein Seim (Norway)* in response to the request of ISO TC 159 **Visual Display Requirements** and to present the result at the next CIE meeting in Budapest 2009.

The report **CIE R1−47:2009 Hue Angles of Elementary Colours** lists in chapter 3.6 the average CIELAB hue angles 26, 92, 166, and 270 of *Miescher, NCS, and the CIE.*

CIE R1−47 recommends to use the CIELAB hue angles **25, 92, 162 and 271** of the CIE test colours no. 9 to 12 according to CIE 13.3 for the four elementary colours R_e, Y_e, G_e, and B_e.

For free download of CIE R1−47 see the CIE Division 1 web site
http://cie.co.at *under MINUTES & REPORTS*
TE210−3

Resolution Busan 18/2009 of ISO/IEC JTC1/SC28 "Office Equipment"
SC28 Review of the AWG recommendation on jn28n1280 (DIN 33872−1 to 6)

The German proposal included the concept of a human visual RGB. SC28 recognizes the importance of correct understanding of the human visual system and the potential importance and application of this understanding to office equipment and office systems. SC28 welcomes the German plan to continue development of the human visual RGB within *CIE Division 1 and Division 8.*

In addition SC28 welcomes a new proposal from Germany in the future based on this CIE human visual RGB work, potentially in relation to AWG/PWG5 NWI–9 *(Office colour space).*

unanimous vote (Austria, China, Germany, Japan, Korea, USA)
TE210−5

At the CIE meeting in South Africa, June 2011, *CIE Division 1* decided to establish the Reportership **CIE R1−57 Border between Luminous and Blackish Colours** by *Thorstein Seim (Norway)* in response to the resolution 18/2009 of ISO/IEC JTC1/SC28.

In addition *CIE Division 8* decided to establish the Reportership **CIE R8−09 Output Linearization Methods for Displays and Printers** by *Klaus Richter (Germany)* in response to the same resolution 18/2009 of ISO/IEC JTC1/SC28.

Both reports **CIE R1−57** and **CIE R8−09** have relations and may appear during 2013 at the CIE web site.

Possible Result: Definition of a *device−independent visual RGB*$_e$* system as response to the request of SC28. All surface colours define a hue circle of maximum chroma located within the CIE *(x,y)* chromaticity diagram. CIELAB chroma *C*$_{ab}$* and lightness *L** of this circle as function of hue *h_{ab}* serves as reference points of a *device−independent visual RGB*$_{ab}$ system* (compare the reference *C*$_{ab}$, L** hue circle of the *NCS* system).
TE210−7

Output linearization according to CIE R8-09 and user test according to DIN 33872-1 to -6
Colour device company which produces:
display, data projector, printer, offset machine, ...

Device output of colour test chart according to DIN 33872-X or CIE R8-09 by two options:
option 1: automatic company device output
option 2: output according to CIE R8-09

Visual output test for option 1 or 2
with Y/N user questions of DIN 33872-2 to -6
(no colour measurement necessary)

Agrees the output with the user wishes (Y/N)?
If the answer is Yes (Y) then finish.
If No (N) agreement to the user wishes then:
look for a device with properties according to R8-09
or send (printed) output to a **linearization company.**
Get back a device driver or profile which produces an output according to CIE R8-09.

Linearization company:
Measures 1080 user colours and produces *linearization code according to CIE R8-09* in driver or profile for user device

For the test charts of DIN 33872-1 to -6 see
http://www.ps.bam.de/33872E

For english text of DIN 33872 see
http://www.iso.org/scit (docum. N183−189)

For test chart with 1080 colours of CIE R8-09 see
http://130.49.60.45/~farbmetrik/RE68/RE68L0NP.PDF

For more technical information about CIE R8-09 see
http://130.49.60.45/~farbmetrik/outlin

Advantages of Output Linearization:
– Device-independent hue output (CIE R1-47).
– Linear relation between *rgb** and CIELAB data.
– No loss of visual information for 16 step colour series on different colour devices.
– remark: for *rgb** colour specification in device-independent *RGB** colour space see CIE R1-57 & http://www.iso.org/scit (open document N275).
1−000030−L0
TE211−3N

Proposed CIE output linearization for display and data projector devices
Display or data projector company:

realized output options:
– Company preference (Y/N)?
– 1x ISO 9241−306 (CIE?) linearized (Y/N)?
– 8x ISO 9241−306 (CIE?) linearized (Y/N)?
– One option, not specified (Y/N)?

User display or data projector without or with device specific *up to 8 PS linearization codes* in display output software.

User visual test for up to 8 room light reflections
with output of ISO 9241−306 test charts.
Agrees the output with the user wishes (Y/N)?

If No (N) agreement to the user wishes then:
Output of reference test chart with 1080 colours.
Continues colour change in output (Y/N)?
If Yes, then linearization possible and decision:
Ask display or linearization company for help.

Linearization company: <
Measures 1080 colours of display output without room light reflection and produces *8 PS linarization codes* for eight room light reflections.

For test charts of ISO 9241−306 see (1,7 and 20MB)
http://www.ps.bam.de/ME15/10L/M15E00FP.PDF
http://130.149.60.45/~farbmetrik/OE58/OE58D1PX.PDF

Advantages of Output Linearization:
– Linear relation between rgb and CIELAB data.
– No loss of visual information for 16 step colour series on different devices.
– Linearized output of whole display for ergonomic work depending on room light reflections, for solutions see ISO 9241−306.
TE2000030−L0
TE211−7N

input: *w/rgb/cmyk −> w/rgb/cmyk_*
output: no change