INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

T.42

Corrigendum 1
(03/2004)

SERIES T: TERMINALS FOR TELEMATIC SERVICES

Continuous-tone colour representation method for facsimile

Corrigendum 1

ITU-T Recommendation T.42 (2003) – Corrigendum 1

ITU-T Recommendation T.42

Continuous-tone colour representation method for facsimile

Corrigendum 1

Summary

This Recommendation defines a colour data representation method in order to make it possible to interchange continuous-tone colour image data over facsimile communication services such as Group 4 and Group 3 facsimile. This Corrigendum fixes errors in the description of D65 illuminant data and aligns them with ISO 13655. Variables X_0, Y_0 and Z_0 are changed to "$X_0 = 95.047$; $Y_0 = 100.000$; $Z_0 = 108.883$" in the Summary, in 6.2.2.2 (White point and illuminant data) and in Appendix I ("Method for colorimetric calculation from spectral measurement"). Values of Table I.2/T.42 are replaced with correct values in ISO 13655.

CIELAB space is selected as the basic colour space mainly for hard copy (printed) application. CIE Illuminant D50 and its perfectly diffuse reflecting white point ($X_0 = 96.422$; $Y_0 = 100.000$; $Z_0 = 82.521$) is selected as the basic illuminant and white point, respectively. The default gamut range chosen is L* = [0, 100], a* = [–85, 85], b* = [–75, 125]. The exact expression is in terms of offset and range. The YCC space based on sYCC is selected also as the basic colour space mainly for soft copy (displayed) application. CIE illuminant D65 and its perfectly diffuse reflecting white point ($X_0 = 95.047$; $Y_0 = 100.000$; $Z_0 = 108.883$) is the illuminant and white point respectively. The default gamut chosen is Y = [0, 1], Cb = [–0.5, 0.5], Cr = [–0.5, 0.5]. The exact expression is in terms of offset and range.

The main difference from the previous version is the following:

– ITU-YCC addition.

Source

Corrigendum 1 to ITU-T Recommendation T.42 (2003) was approved on 15 March 2004 by ITU-T Study Group 16 (2001-2004) under the ITU-T Recommendation A.8 procedure.

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

Compliance with this Recommendation is voluntary. However, the Recommendation may contain certain mandatory provisions (to ensure e.g. interoperability or applicability) and compliance with the Recommendation is achieved when all of these mandatory provisions are met. The words "shall" or some other obligatory language such as "must" and the negative equivalents are used to express requirements. The use of such words does not suggest that compliance with the Recommendation is required of any party.

INTELLECTUAL PROPERTY RIGHTS

ITU draws attention to the possibility that the practice or implementation of this Recommendation may involve the use of a claimed Intellectual Property Right. ITU takes no position concerning the evidence, validity or applicability of claimed Intellectual Property Rights, whether asserted by ITU members or others outside of the Recommendation development process.

As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

CONTENTS

ITU-T Recommendation T.42

Continuous-tone colour representation method for facsimile

Corrigendum 1

1) Clause 6.2.2.2 – White point and illuminant data

Replace clause 6.2.2.2 as follows:

6.2.2.2 White point and illuminant data

CIE Illuminant D65 and its perfectly diffuse reflecting white point ($X_0 = 95.047$; $Y_0 = 100.000$; $Z_0 = 108.883$) are the basic values. Other illuminants and/or white points are not permitted for ITU-YCC.

2) Appendix I – Method for colorimetric calculation from spectral measurement

Replace Appendix I as follows:

Appendix I

Method for colorimetric calculation from spectral measurement

The following is a brief synopsis of the material presented in ISO 13655, *Graphic technology – Spectral measurement and colorimetric computation for graphic arts images*.

The data shall be measured from at least 400 nm to at least 700 nm inclusive, at not greater than 20-nm intervals. The reference for spectral data shall be based on computed data at 10-nm intervals where the spectral function is triangular with a 10-nm bandwidth at the half-power point. The measurements will be made with a sample mounted on a back backing, as defined by ISO 5, Part 4, subclause 4.7. The reflectance measurement geometry will be 45/0 or 0/45 as defined in ISO 5, Part 4. The measurement resolution shall be to the nearest 0.01% relative to a perfectly diffuse reflector.

The tristimulus values of the reference white under D50 illumination will be defined as $X_0 = 96.422$; $Y_0 = 100.000$ and $Z_0 = 82.521$. The spectral weights for illuminant D50 and 2° observer are given in Table I.1.

The tristimulus values of the reference white under D65 illumination will be defined as $X_0 = 95.047$; $Y_0 = 100.000$; and $Z_0 = 108.883$. The spectral weights for illuminant D65 and 2° observer are given in Table I.2.

These weights, Wx, Wy and Wz, will be used in the following manner to derive the tristimulus values:

$$X = \sum_{\lambda} (R(\lambda) Wx(\lambda))$$

summed over λ ranging from 360 to 780 nm. R is the reflectance value as a function of wavelength (λ).

Table I.1/T.42 – Spectral weights (W) for illuminant D50 and 2° observer for calculating tristimulus values at 10-nm intervals

Wavelength (nm)	W(X)	W(Y)	W(Z)
360	0.000	0.000	0.001
370	0.001	0.000	0.005
380	0.003	0.000	0.013
390	0.012	0.000	0.057
400	0.060	0.002	0.285
410	0.234	0.006	1.113
420	0.775	0.023	3.723
430	1.610	0.066	7.862
440	2.453	0.162	12.309
450	2.777	0.313	14.647
460	2.500	0.514	14.346
470	1.717	0.798	11.299
480	0.861	1.239	7.309
490	0.283	1.839	4.128
500	0.040	2.948	2.466
510	0.088	4.632	1.447
520	0.593	6.587	0.736
530	1.590	8.308	0.401
540	2.799	9.197	0.196
550	4.207	9.650	0.085
560	5.657	9.471	0.037
570	7.132	8.902	0.020
580	8.540	8.112	0.015
590	9.255	6.829	0.010
600	9.835	5.838	0.007
610	9.469	4.753	0.004
620	8.009	3.573	0.002
630	5.926	2.443	0.001
640	4.171	1.629	0.000
650	2.609	0.984	0.000
660	1.541	0.570	0.000
670	0.855	0.313	0.000
680	0.434	0.158	0.000
690	0.194	0.070	0.000
700	0.097	0.035	0.000
710	0.050	0.018	0.000
720	0.022	0.008	0.000

Table I.1/T.42 – Spectral weights (W) for illuminant D50 and 2° observer for calculating tristimulus values at 10-nm intervals

Wavelength (nm)	W(X)	W(Y)	W(Z)
730	0.012	0.004	0.000
740	0.006	0.002	0.000
750	0.002	0.001	0.000
760	0.001	0.000	0.000
770	0.001	0.000	0.000
780	0.000	0.000	0.000
Total	X = 96.421	Y = 99.997	Z = 82.524
NOTE – This table is extracted from ASTM E308 – 1985. The sums are intended as check-sums for the spectral weights, and are not normative for the white point tristimulus values.			

Table I.2/T.42 – Spectral weights (W) for illuminant D65 and 2° observer for calculating tristimulus values at 10-nm intervals

Wavelength (nm)	W(X)	W(Y)	W(Z)
360	0.000	0.000	0.001
370	0.002	0.000	0.010
380	0.006	0.000	0.026
390	0.022	0.001	0.104
400	0.101	0.003	0.477
410	0.376	0.010	1.788
420	1.200	0.035	5.765
430	2.396	0.098	11.698
440	3.418	0.226	17.150
450	3.699	0.417	19.506
460	3.227	0.664	18.520
470	2.149	0.998	14.137
480	1.042	1.501	8.850
490	0.333	2.164	4.856
500	0.045	3.352	2.802
510	0.098	5.129	1.602
520	0.637	7.076	0.791
530	1.667	8.708	0.420
540	2.884	9.474	0.202
550	4.250	9.752	0.086
560	5.626	9.419	0.037
570	6.988	8.722	0.019

Table I.2/T.42 – Spectral weights (W) for illuminant D65 and 2° observer for calculating tristimulus values at 10-nm intervals

Wavelength (nm)	W(X)	W(Y)	W(Z)
580	8.214	7.802	0.014
590	8.730	6.442	0.010
600	9.015	5.351	0.007
610	8.492	4.263	0.003
620	7.050	3.145	0.001
630	5.124	2.113	0.000
640	3.516	1.373	0.000
650	2.167	0.818	0.000
660	1.252	0.463	0.000
670	0.678	0.248	0.000
680	0.341	0.124	0.000
690	0.153	0.055	0.000
700	0.076	0.027	0.000
710	0.040	0.014	0.000
720	0.018	0.006	0.000
730	0.009	0.003	0.000
740	0.005	0.002	0.000
750	0.002	0.001	0.000
760	0.001	0.000	0.000
770	0.000	0.000	0.000
780	0.000	0.000	0.000
Total	95.049	99.999	108.882

NOTE – This table is extracted from ASTM E308 – 1985. The sums are intended as check-sums for the spectral weights, and are not normative for the white point tristimulus values.

SERIES OF ITU-T RECOMMENDATIONS

Series A	Organization of the work of ITU-T
Series B	Means of expression: definitions, symbols, classification
Series C	General telecommunication statistics
Series D	General tariff principles
Series E	Overall network operation, telephone service, service operation and human factors
Series F	Non-telephone telecommunication services
Series G	Transmission systems and media, digital systems and networks
Series H	Audiovisual and multimedia systems
Series I	Integrated services digital network
Series J	Cable networks and transmission of television, sound programme and other multimedia signals
Series K	Protection against interference
Series L	Construction, installation and protection of cables and other elements of outside plant
Series M	TMN and network maintenance: international transmission systems, telephone circuits, telegraphy, facsimile and leased circuits
Series N	Maintenance: international sound programme and television transmission circuits
Series O	Specifications of measuring equipment
Series P	Telephone transmission quality, telephone installations, local line networks
Series Q	Switching and signalling
Series R	Telegraph transmission
Series S	Telegraph services terminal equipment
Series T	**Terminals for telematic services**
Series U	Telegraph switching
Series V	Data communication over the telephone network
Series X	Data networks and open system communications
Series Y	Global information infrastructure, Internet protocol aspects and Next Generation Networks
Series Z	Languages and general software aspects for telecommunication systems

Printed in Switzerland
Geneva, 2004