



# Information technology — MPEG systems technologies —

## Part 8:

### Coding-independent code points

#### TECHNICAL CORRIGENDUM 1

*Technologies de l'information — Technologies des systèmes MPEG —*

*Partie 8: Points de code indépendants du codage*

*RECTIFICATIF TECHNIQUE 1*

Technical Corrigendum 1 to ISO/IEC 23001-8:2013 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

Replace 7.2 (Transfer characteristics) with the following:

“

#### **7.2 Transfer characteristics**

Type: *Unsigned integer, enumeration*

Range: *0 – 255*

**TransferCharacteristics** indicates the opto-electronic transfer characteristic of the source picture as specified in Table 3 as a function of a linear optical intensity input  $L_c$  with a nominal real-valued range of 0 to 1. For interpretation of entries in Table 3 that are expressed in terms of multiple curve segments parameterized by the variable  $\alpha$  over a region bounded by the variable  $\beta$  or by the variables  $\beta$  and  $\gamma$ , the values of  $\alpha$  and  $\beta$  are defined to be the positive constants necessary for the curve segments that meet at the value  $\beta$  to have continuity of value and continuity of slope at the the value  $\beta$ , and the value of  $\gamma$ , when applicable, is defined to be the positive constant necessary for the associated curve segments to meet at the

value  $\gamma$ . For example, for transfer\_characteristics equal to 1, 6, 14, or 15,  $\alpha$  has the value  $1 + 5.5 * \beta = 1.099\ 296\ 826\ 809\ 442\dots$  and  $\beta$  has the value  $0.018\ 053\ 968\ 510\ 807\dots$

An 8-bit field should be adequate for representation of the **TransferCharacteristics** code point.

**Table 3 — Interpretation of Transfer characteristics (TransferCharacteristics) value**

Value	Transfer Characteristics	Informative Remarks
0	Reserved	For future use by ISO/IEC
1	$V = \alpha * L_c^{0.45} - (\alpha - 1) \quad \text{for } 1 \geq L_c \geq \beta$ $V = 4.500 * L_c \quad \text{for } \beta > L_c \geq 0$	Rec. ITU-R BT.709-5 Rec. ITU-R BT.1361 conventional colour gamut system (functionally the same as values 6, 14, and 15; the value 1 is preferred)
2	Unspecified	Image characteristics are unknown or are determined by the application.
3	Reserved	For future use by ISO/IEC
4	Assumed display gamma 2.2	Rec. ITU-R BT.470-6 System M (historical) United States National Television System Committee 1953 Recommendation for transmission standards for colour television United States Federal Communications Commission Title 47 Code of Federal Regulations (2003) 73.682 (a) (20) Rec. ITU-R BT.1700 (2007 revision) 625 PAL and 625 SECAM
5	Assumed display gamma 2.8	Rec. ITU-R BT.470-6 System B, G (historical)
6	$V = \alpha * L_c^{0.45} - (\alpha - 1) \quad \text{for } 1 \geq L_c \geq \beta$ $V = 4.500 * L_c \quad \text{for } \beta > L_c \geq 0$	Rec. ITU-R BT.601-6 525 or 625 Rec. ITU-R BT.1358 525 or 625 Rec. ITU-R BT.1700 NTSC Society of Motion Picture and Television Engineers 170M (2004) (functionally the same as values 1, 14, and 15; the value 1 is preferred)
7	$V = \alpha * L_c^{0.45} - (\alpha - 1) \quad \text{for } 1 \geq L_c \geq \beta$ $V = 4.0 * L_c \quad \text{for } \beta > L_c \geq 0$	Society of Motion Picture and Television Engineers 240M (1999)
8	$V = L_c \quad \text{for } 1 > L_c \geq 0$	Linear transfer characteristics

Value	Transfer Characteristics	Informative Remarks
9	$V = 1.0 + \text{Log}_{10}(L_c) \div 2$ for $1 \geq L_c \geq 0.01$ $V = 0.0$ for $0.01 > L_c \geq 0$	Logarithmic transfer characteristic (100:1 range)
10	$V = 1.0 + \text{Log}_{10}(L_c) \div 2.5$ for $1 \geq L_c \geq \text{Sqrt}(10) \div 1000$ $V = 0.0$ for $\text{Sqrt}(10) \div 1000 > L_c \geq 0$	Logarithmic transfer characteristic (100 * Sqrt(10) : 1 range)
11	$V = \alpha * L_c^{0.45} - (\alpha - 1)$ for $L_c \geq \beta$ $V = 4.500 * L_c$ for $\beta > L_c > -\beta$ $V = -\alpha * (-L_c)^{0.45} + (\alpha - 1)$ for $-\beta \geq L_c$	IEC 61966-2-4
12	$V = \alpha * L_c^{0.45} - (\alpha - 1)$ for $1.33 > L_c \geq \beta$ $V = 4.500 * L_c$ for $\beta > L_c \geq -\gamma$ $V = -(\alpha * (-4 * L_c)^{0.45} - (\alpha - 1)) \div 4$ for $-\gamma \geq L_c \geq -0.25$	Rec. ITU-R BT.1361 extended colour gamut system
13	$V = \alpha * L_c^{(1 \div 2.4)} - (\alpha - 1)$ for $1 > L_c \geq \beta$ $V = 12.92 * L_c$ for $\beta > L_c \geq 0$	IEC 61966-2-1 (sRGB or sYCC)
14	$V = \alpha * L_c^{0.45} - (\alpha - 1)$ for $1 \geq L_c \geq \beta$ $V = 4.500 * L_c$ for $\beta > L_c \geq 0$	Rec. ITU-R BT.2020 (10-bit system) (functionally the same as values 1, 6, and 15; the value 1 is preferred)
15	$V = \alpha * L_c^{0.45} - (\alpha - 1)$ for $1 \geq L_c \geq \beta$ $V = 4.500 * L_c$ for $\beta > L_c \geq 0$	Rec. ITU-R BT.2020 (12-bit system) (functionally the same as values 1, 6, and 14; the value 1 is preferred)
15..255	Reserved	For future use by ISO/IEC

In 7.3 (Matrix coefficients) replace the specification of case 10 with the following:

- Otherwise (MatrixCoefficients is equal to 10), the signal  $E'_Y$  is determined by application of the transfer characteristics function as follows, and Equations 30 to 37 apply for specification of the signals  $E'_{PB}$  and  $E'_{PR}$ :

$$E_Y = K_R * E_R + (1 - K_R - K_B) * E_G + K_B * E_B \quad (28)$$

$$E'_Y = (E_Y)' \quad (29)$$

NOTE 2 – In this case,  $E_Y$  is defined from the "linear-domain" signals for  $E_R$ ,  $E_G$ , and  $E_B$ , prior to application of the transfer characteristics function, which is then applied to produce the signal  $E'_Y$ .  $E_Y$  and  $E'_Y$  are real values with the value 0 associated with nominal black and the value 1 associated with nominal white.

$$E'_{PB} = (E'_B - E'_Y) \div (2 * N_B) \quad \text{for } -N_B \leq E'_B - E'_Y \leq 0 \quad (30)$$

$$E'_{PB} = (E'_B - E'_Y) \div (2 * P_B) \quad \text{for } 0 < E'_B - E'_Y \leq P_B \quad (31)$$

$$E'_{PR} = (E'_R - E'_Y) \div (2 * N_R) \quad \text{for } -N_R \leq E'_R - E'_Y \leq 0 \quad (32)$$