

Specification of ECI RGB.

(Defined by the European Color Initiative – ECI)

Chromaticity co-ordinates of primaries:

R: x=0.67, y=0.33, z=0;

G: x=0.21, y=0.71, z=0.08;

B: x=0.14, y=0.08, z=0.78.

Note: these are the primaries defined in the NTSC (National Television Standard Committee) video standard of 1953.

Gamma: 1.8

The reference white for ECI RGB is specified as D50 (i.e. chromaticity co-ordinates of x=0.3457, y=0.3585; z=0.2958).

(Note: this is different to the reference for NTSC, which is illuminant S_c)

Conversion from XYZ (D50) to ECI RGB:

$$\begin{bmatrix} Re \\ Ge \\ Be \end{bmatrix} = \begin{bmatrix} 1.8951 & -0.5943 & -0.2824 \\ -0.9666 & 1.9783 & -0.0561 \\ 0.0768 & -0.1523 & 1.3072 \end{bmatrix} \begin{bmatrix} X \\ Y \\ Z \end{bmatrix}$$

where XYZ are normalised such that Y=1 and values of RGB outside of 0-1 are clipped.

$$\begin{aligned} R &= (Re)^{1/1.8} \\ G &= (Ge)^{1/1.8} \\ B &= (Be)^{1/1.8} \end{aligned}$$

Hints for Profile makers

1) D50 referenced characterisation data

When chromatically adapted to the D50 white point, and normalised such that Y=1 for white, the tristimulus values of the primaries are:

R: X=0.6503, Y=0.3203, Z=0.00000;

G: X=0.1781, Y=0.6020, Z=0.0678;

B: X=0.1359, Y=0.0777, Z=0.7571;

White: X=0.9642, Y=1.00, Z=0.8249

The matrix to convert XYZ to linear ECI RGB (i.e. prior to application of the non-linear function) is that given above.