HUNGARIAN STANDARD

MSZ 7300

The COLOROID Colour System

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Prior to application of a standard please check whether there has been a modification, correction or revocation furthermore whether it has been referenced to by any law with technical content.

The subject of this standard is as follows: colour characteristics of the COLOROID colour system and their practical use furthermore interrelations and conversion methods between the CIE 1931 colour measuring system and the COLORIOD colour system in case of daylight illumination (with CIE D65 beam distribution).

The purpose of the standard is the description of visual appearance of surface colours (materials, objects, surfaces, building colours) and that of the appearance related relationships, specifications, requirements and regulations explicitly and easily with clear-cut numbers i.e. the Coloroid colour characteristics. Professional use of COLOROID colour characteristics in official regulations, design documentation. Association of COLOROID colour characteristics to any colour sample.

Content

ICS 01.070; 17.180.20   Ref. No.: MSZ 7300:2002

1. Definition of terms *

1.1. General terms

1.1.1.   **Adaptation**: according to MSZ 9620-2 (845-02-07)

1.1.2.   **Non-adapted eye**: an eye where the adaptation of the features of the organ of vision to a specified luminance and spectral distribution is prevented by the fact that there are simultaneous colour stimuli with different luminosity and of spectral distribution in the field of vision. In the everyday life our eyes behave so in general when there is a large field of vision.

1.1.3.   **Adapted eye**: an eye where the features of the organ of vision are adapted to sequential colour stimuli being different in luminosity, in spectral distribution and angle of vision. Our eyes behave so during comparison of colours, within a laboratory environment, in a small field of vision.

1.1.4.   **Additive mixing of colour stimuli**: according to MSZ 9620-3 (845-03-15)

1.1.5.   **Achromatic colour**: according to MSZ 9620-2 (845-02-26)

1.1.6.   **Basic hue**: according to MSZ 9620-3 (845-02-36)

1.1.7.   **CIE radiation distribution**: according to MSZ 9620-3 (845-03-12)

1.1.8.   **CIE 1930 colour stimuli measuring diagram (colour stimuli measuring diagram)**: according to MSZ 9620-3 (845-03-35)

1.1.9.   **CIE colour stimuli measuring detector**: according to MSZ 9620-3 (845-03-31)

1.1.10   **CIE colour stimuli measuring system**: according to MSZ 9620-3 (845-03-28)

1.1.11.   **Coloroid colour atlas:** a colour atlas containing 3100 colour samples within the accuracy of digital printing process. The copies are sequentially numbered. Instrumental measure-ment data of colour samples of each copy are contained in the Appendix of the atlas.

1.1.12   **Coloroid conversion software**: software displaying all (millions of) colours being distinguished by the human eye, within the limits of colour space and accuracy allowed by the calibrated monitor and printer of the users computer. The sofware is capable of converting between colour signals of COLOROID, CIE XYZ, CIELab, CUELuv, sRGB, :MUNSELL and other systems in both directions.

1.1.13.   **Dominant wavelength (characteristic wavelength)** : according to MSZ 9620-3 (845-03-44)

1.1.14.   **Uniform colour (stimuli) space**: according to MSZ 9620-3 (845-03-51)

1.1.15.   **Colour scale progressing by sensation thresholds**: a colour scale where the classification is being made according to measurements of sensation thresholds (line element measurements). The differences between elements are identical multiples of the perceptible minimum colour difference.

1.1.16   **Colour system based on sensation** : a colour system where the classification is being made according to hue, saturation and luminosity

1.1.17.   **Minimum perceivable colour difference**: the minimum colour difference being distinguishable by the CIE 1931 colour stimuli measuring instrument.

1.1.18.   **System based on the minimum perceivable colour difference**: a colour system based on sensation where the colour scales are progressing according to sensation thresholds.

1.1.19.   **Aesthetically uniform colour system**: a colour system based on sensation, where the difference of colour stimuli of adjacent surface colours specified by integer number of colour characteristics is

identical and not less than the harmony colour difference.

1.1.20.   **Surface colour**: according to MSZ 9620-2 (845-02-20)

1.1.21.   **Luminance factor**: according to MSZ 9620-4 (845-04-69)

1.1.22.   **Harmony colour difference, harmony interval**: Colour difference in the COLOROID colour system, separating only just distinguishable colours, within observation conditions where the un-adapted eye perceives in a large field of vision many simultaneous colour samples with different hue, saturation and luminosity. It is greater than the minimum perceivable colour difference between colours distinguishable with an adapted eye.

1.1.23.   **Harmonic composition**: composition of colours being established with an aesthetical intent, with members in harmony with each other. In a harmonic composition colours are separated with at least a unity harmony colour difference.

1.1.24.   **Wavelength**: according to MSZ 9620-1 (845-01-14)

1.1.25.   **Complementary wavelength**: according to MSZ 9620-3 (845-03-45)

1.1.26.   **Illumination**: according to MSZ 9620-1 (845-01-38)

1.1.27.   **Spectrum, radiation spectrum**: according to MSZ 9620-1 (845-01-08)

1.1.28.   **Locus of spectral colour(stimuli), spectral curve**: according to MSZ 9620-3 (845-03-37)

1.1.29.   **Radiation distribution**: according to MSZ 9620-3 (845-0-10)

1.1.30.   **Colour, colour perception, (colour sensation)**: according to MSZ 9620-3 (845-03-01) and MSZ 9620-2 (845-02-18)

1.1.31.   **Colour(samples) atlas**: according to MSZ 9620-3 (845-03-27). Collection of colour samples provided with colour signals, selected according to principles of a specified colour system.

1.1.32.   **Colour saturation**: according to MSZ 9620-2 (845-02-40)

1.1.33.   **Hue**: according to MSZ 9620-2 (845-02-35)

1.1.34.   **Colour perception (formerly: colour sensation)**: according to MSZ 9620-2 (845-02-18)

1.1.35.   **Space of colour perceptions (formerly: space of colour sensations, short: colour space)**: Spatial representation of three dimensional population of colour perceptions, where any colour perception is being represented by one and only one point (colour point).
Remark: the word colour space should only be used when it does not create misunderstanding

1.1.36.   **Colour stimulus**: according to MSZ 9620-3 (845-03-02)

1.1.37.   **Colour(stimuli) diagram**: according to MSZ 9620-3 (845-03-35)

1.1.38.   **Colour(stimuli) coordinates**: according to MSZ 9620-3 (845-03-33)

1.1.39.   **Colour stimuli correspondence functions (formerly: CIE colour componernt functions)**: according to MSZ 9620-3 (845-03-23)

1.1.40.   **Colour (stimuli) components**: according to MSZ 9620-3 (845-03-22)

1.1.41.   **Colour stimuli space**: according to MSZ 9620-3 (845-03-25)

1.1.42.   **Colour characteristics**: Coordinates of the colour point representing the colour.
Remarks:

1. In case of creating colour systems not only the principle of classification but also the applied coordinate system is free selectable.
2. Coordinates are allocated to different terms, according to the principle of classification. For example the coordinates in the COLOROID colour system denote COLOROID-hue, COLOROID-saturation and COLOROID-luminosity.

1.1.43.   **Colour difference**: visual difference between two similar colour perceptions. The direction and extent of the difference is explicitly definable.

1.1.44.   **Colour point**: explicitly defined place of a given colour perception in a given colour system.

1.1.45.   **Colour system**: array of colours based on defined principles, in a clearly arranged form, with explicit index numbers allocated to.

1.1.46.   **Colour scale**: sequential composition of colours being arranged according to some defined principles.

1.1.47.   **Colour body**: according to MSZ 9620-3 (845-03-26)

1.1.48.   **Saturation**: according to MSZ 9620-2 (845-02-41)

1.1.49.   **Luminance**: according to MSZ 9620-2 (845-02-28)

1.2   Concepts of COLOROID colour system

1.2.1   COLOROID colour system: colour system of surface colours enlightened by daylight and sensed by normal colour vision observers, built on harmonic colour differences according to sensation, that well approximates the aesthetic uniformness.

Notes:

1. The COLOROID colour system is aesthetically uniform, as between its neighbouring surface colours being characterised by integer numbers the same number of harmony intervals exist, therefore it is applicable to describe harmony relations and to create harmonic colour compositions.

2. The use of the COLOROID colour system for colour measurements, for comparison of colours does not require special laboratory environments, as its colour space is uniform, related to the non adapted eye.

3. With the help of the colour signals of the COLOROID colour system the colours of any colour system, colour standard, colour set, colour atlas, colour register can unambiguously be determined, as its colour space is continuous.

4. Any colour, having the colour signals of COLOROID colour system, can be displayed, as a mutually unambiguous connection exists between its colour space and the colour space of the CIE XYZ chromatic stimulus measuring system.

5. The colours determined by the colour signals of COLOROID colour system can be created on monitors and printers within the limits of technical possibilities, e.g. by the help of the software made for the existing IBM PC and Mackintosh machines, as its colour signals are in transformational connection with the sRGB and other colour displaying systems.

6. The experiments determining the psychometric scales of the COLOROID colour system have been carried out in premises illuminated by lights reflected from the Northern sky, in the vicinity of the window. Illumination was between 1600-1800 lx. Samples (15-18 cm^2 surface sheets) have been demonstrated on horizontal surfaces, in front of a grey surface having a uniform Y= 30 CIE chromatic stimuli component, so, that the light incident through the window reaches them at approximately 45°. The samples have been observed with 90° looking angle. The number of persons participating in the experiment was altogether 70.000

1.2.3   COLOROID colour characteristics: This is the name of the following three quantities collectively.They enable to determine the colour in question unambiguously (see Figure No. 1.)

COLOROID hue, denotation: A.

COLOROID saturation, denotation: T.

COLOROID luminosity, denotation: V.

1.2.3   COLOROID-coordinates: Semipolar coordinates, representing the members of the population   of colours placed inside a linear circular cylinder, to be used for the explicit definition of colour points, namely the angular coordinate representing numerically the COLOROID hue of the colour (A), the radial coordinate representing numerically the COLOROID saturation of the colour (T), the vertical axial coordinate representing the COLOROID luminosity of the colour (V). (see Figure No.1.).

1.2.4   COLOROID colour space: A colour space, in which the perceived colours are specified by COLOROID colour characteristics. (see Figure No. 2.)

1.2.5   Absolute white colour of COLOROID (W): It is placed on the upper limit point of the axis of COLOROID colour space. The colour of the surface illuminated by CIE D_{65} beam distribution, with perfectly scattered reflection, having both COLOROID luminosity value and Y_w colour component value of 100. (See Figure 3.).

1.2.6   Absolute black colour of COLOROID (S): It is placed on the lower limit point of the axis of the COLOROID colour space. The colour of the surface illuminated by CIE D_{65} beam distribution,

perfectly light-absorbing (β=0 luminance factor), having both COLOROID luminosity value and Y_s colour component value of 0. (see Figure No. 3)

Note: The chromatic stimulus coordinates of the absolute white and absolute black colours of the COLOROID colour system agree with the chromatic stimulus coordinates of the D65 point of the CIE 1931 colour diagram, thus $x_w=x_s=x_o= 0.312726$ and $y_w=y_s=y_o = 0.329023$.

1.2.7 **COLOROID limit colours:** The most saturated colours that can be drawn onto the nappe of the cylinder comprising the COLOROID colour space, located along a closed curve. (see Figure No. 4.).
In the CIE 1931 colour diagram (MSZ 9620/2)
- colours located along spectrum colour lines between λ= 450 nm and λ = 625 nm, moreover
- colours located along the line connecting the points λ= 450 nm and λ = 625 nm. (see Figure No.5., Table F2.)
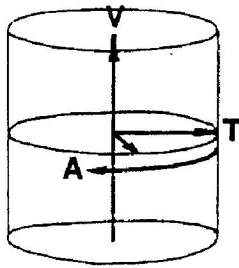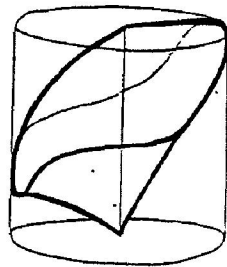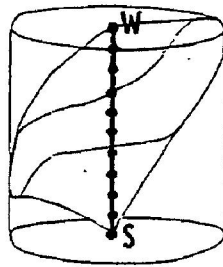

| Figure 1. | Figure 2. | Figure 3. | Figure 4. |
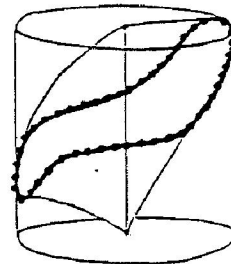
1.2.8 **COLOROID basic colours:** 48 different COLOROID limit colours characterised with integer numbers, being located at approximately identical number of harmony intervals to each other.
The COLOROID basic colours are recorded in the CIE 1931 diagram by the φ angle. The φ angle is the angle of the half line originated from the D65 point of the CIE 1931 colour diagram to the x axis. (Figure 6., Table F1.)

| Figure 5. | Figure 6. |

1.2.9 **COLOROID colour planes:** The half planes delimited by the achromatic axis of the COLOROID colour space, having the same COLOROID hue and dominant wavelength. (See Figure 7.) -

In each colour plane colours are inclosed by the neutral axis and two curves, the so called COLOROID delimiting curves. The shape of surfaces inclosed by delimiting curves is being different for each hue and depends on the luminosity of the spectrum colour or of the purple being located on one apex of the colour plane. Along the vertical lines of the nets drawn on the COLOROID colour planes COLOROID saturation values are identical, along their horizontal lines COLOROID luminosity values are identical. (Figure 8.).

Note: Colours implemented with various means or colours being created in the nature, belonging to individual colour planes are inclosed by internal delimiting curves of COLOROID. (See Figure 8.).
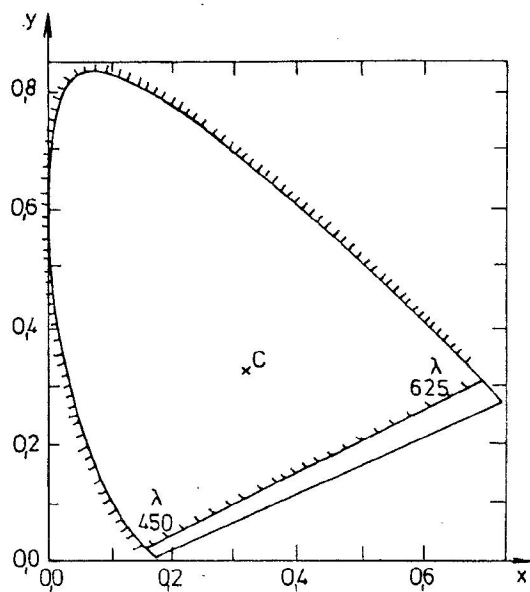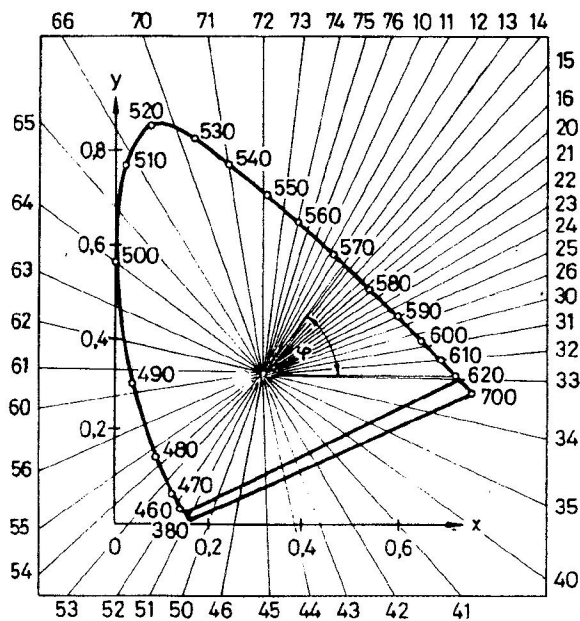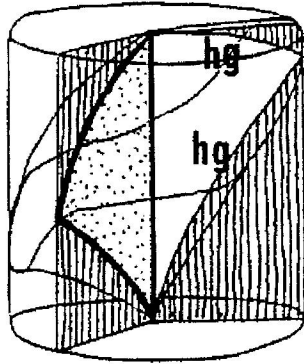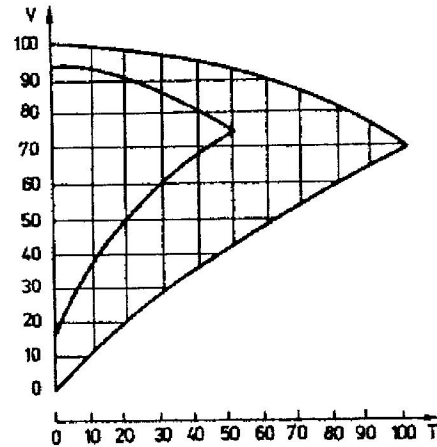

Figure 7.   Figure 8.

1.2.10 **COLOROID basic hues**: hues belonging to COLOROID basic colours. Similar to basic colours, there are 48 COLOROID basic hues.(See Figure 9.).

Note: In COLOROID colour planes A10, A11, A12, A13, A14, A15, A16 yellow, in COLOROID colour planes A20,A21,A22, A23, A24, A25, A26 orange, in COLOROID colour planes A30, A31, A32, A33, A34, A35 red, in COLOROID colour planes A40. A41, A42, A43, A44, A45, A46 purple and violet, in COLOROID colour planes A50, A51, A52, A53, A54, A55, A56 blue, in COLOROID colour planes A60, A61, A62, A63, A64, A65, A66 cold green, in COLOROID colour planes A70, A71, A72, A73, A74, A75, A76 warm green hued colours exist.

1.2.11 **COLOROID colour components: The common name of the following three colour components:**
- COLOROID colour content, mark: p.
- COLOROID white content, mark: w.
- COLOROID black content, mark: s. (See Figure 10. and 11.).

These quantities represent the rates of chromatic stimuli listed below, if any of the surface colours are created by additive mixing of the chromatic stimuli belonging to a surface colour of COLOROID:
- the COLOROID limit colour (H) corresponding to the wavelength of the dominant surface colour to be created,
- the absolute white (W) colour of COLOROID,
- the absolute black (S) colour of COLOROID.

The sum of the COLOROID colour components is equal to one, i.e. $p+w+s = 1$.

Note: The following relations exist between the CIE chromatic stimuli components of any colour of the COLOROID colour space (X,Y,Z) and the COLOROID chromatic stimuli components (p,w,s):

$$X = pX_\lambda + wX_w + sX_s$$
$$Y = pY_\lambda + wY_w + sY_s$$
$$Z = pZ_\lambda + wZ_w + sZ_s$$
$$\varepsilon = p\varepsilon_\lambda + w\varepsilon_w + s\varepsilon_s$$

where

X, Y, Z and ε are the CIE chromatic stimuli components of the examined surface colour resp. one hundredth of their sum

X_λ, Y_λ, Z_λ, ε_λ are the chromatic stimuli components of the COLOROID limit colour having identical wavelength as the examined surface, and the one hundredth of their sum

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X_w, Y_w, Z_w, ε_w are the chromatic stimuli components of the absolute white colour of the COLOROID colour system and the one hundredth of their sum

X_s, Y_s, Z_s, ε_s are the chromatic stimuli components of the absolute black colour of the COLOROID colour system and the one hundredth of their sum
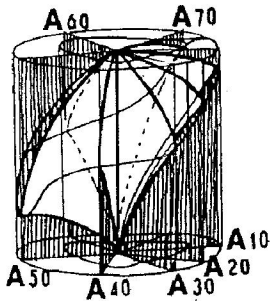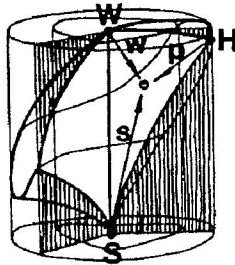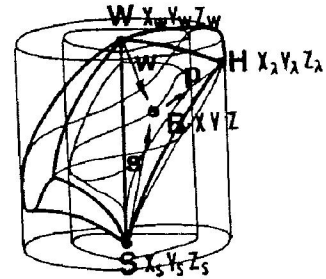

Figure 9.   Figure 10.   Figure 11.

1.2.12 COLOROID-saturation: It is a characteristic feature of the surface colour quantifying its saturation, i.e. its distance from the colour of the same COLOROID achromatic luminosity measured on a scale that is aesthetically near to uniform.

Its denotation is: T.

Notes:
1. COLOROID-saturation of the COLOROID limit colours is equal to 100.
2. The COLOROID-saturation of the absolute white and absolute black colours of the COLOROID colour system and the grey (achromatic) colour made of absolute white and black, is equal to 0.
3. In the COLOROID colour space colours of identical COLOROID saturation are located equidistant to the achromatic axis of the colour space, on a coaxial cylinder (See Figure 12.).
4. The numerical value of the COLOROID-saturation of a colour is proportional to the content of limit colour p, it is the hundredfold of it:

$$T = 100p$$

5. Keeping at a constant value the chromatic stimuli coordinates (x,y) of a COLOROID limit colour and decreasing only its Y component, colours featuring less and less COLOROID saturation T are created, as a decrease of COLOROID luminosity of the COLOROID limit colours means an increase of black content s and a decrease of COLOROID limit colour content p in the COLOROID colour system, keeping the relation $p + s = 1$ valid

1.2.13 COLOROID luminosity: It is a characteristic feature of the surface colour, denoting the distance measured from the absolute black colour of the COLOROID colour system on an aesthetically near uniformly graduated scale.

Denotation: V.

Notes:
1. The COLOROID-luminosity of the absolute black colour of COLOROID colour system is equal to 0.
2. The COLOROID-luminosity of the absolute white colour of COLOROID colour system is equal to 100
3. In the COLOROID colour space the colours of identical COLOROID luminosity are located in planes perpendicular to the achromatic axis of the colour space. (See Figure 13.)
4. Numerical values of the COLOROID luminosity of a surface colour are determined by the expressions below:

$$V = Y^{1/2}$$
$$V = 10 \, (pY_\lambda + 100 \, w)^{1/2}$$

1.2.14 **COLOROID hue:** It is a characteristic feature of the surface colour, denoting its hue on a scale distributed into 48 sections on an aesthetically near uniformly graduated scale. Denotation: A.
Notes:
1. The COLOROID hue of the surface colour is a function of dominant wavelength of the colour.
2. In a COLOROID colour space surface colours having identical COLOROID hues lay in the COLOROID colour planes.
3. The COLOROID hue of the colour is an integer number, provided that the hue agrees with any one of the 48 basic colours. It is a fraction, when its hue is located between the hues of two basic colours. In this case the fractional value of hue is calculated by linear interpolation between the φ angles of two neighbouring basic colours and the φ angle of the given colour. The COLOROID hue scale has an upper and a lower limit, the minimum number is 10, the maximum is 76, thus the neighbour of hue $A = 76$ is hue $A = 10$ because the colour cycle is closed. E.g. the colour $(76.9.T,V)$ can be generated by additive mixing 0,9 part of colour $(76,T,V)$ and 0.1 part of colour $(10,T,V)$.
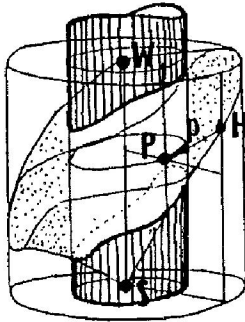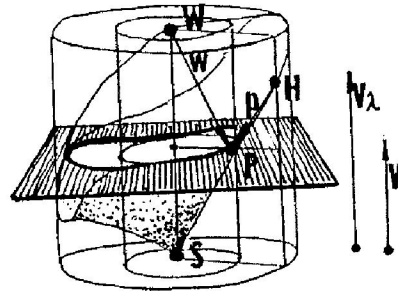
Figure 12.   Figure 13.

1.2.15 **COLOROID colour cycle:** Circular representation of most saturated surface colours of 48 basic hued colour planes of COLOROID colour space. (See Figure 14.)
Notes:
1. The colours of the COLOROID colour cycle form an aesthetically nearly uniform sequence.
2. Complementary hues are in COLOROID colour planes deflecting at 180° to each other, therefore in the complementary colour plane the complementary colours are placed opposite to each other.
3. The joint existence of the approximately aesthetical uniformness of the sequence of COLOROID colour spaces and of the 180° deflection of complementaries to each other has the result, that the angular differences of the neighbouring hue planes of the COLOROID colour cycles are not identical (see Figure 14.). E.g. the neighbouring basic hues are separated by smaller angles in case of yellow colours, and bigger ones in case of blue colours
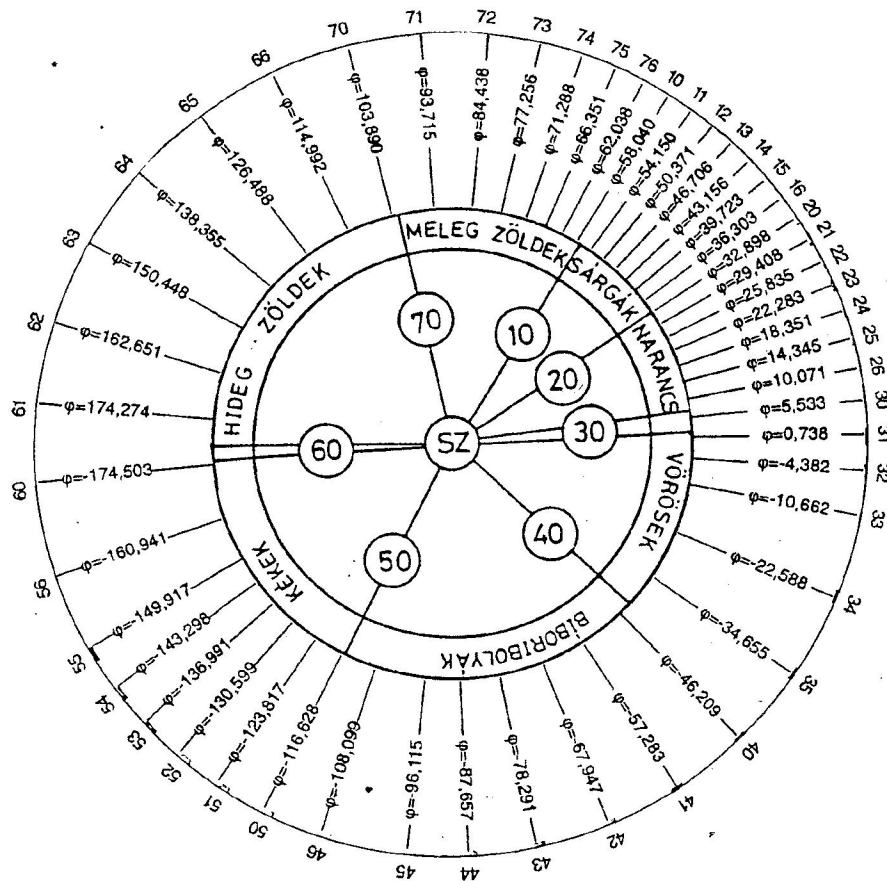
Figure 14.

2. DENOTATION OF COLOURS IN THE COLOROID COLOUR SYSTEM

The denotation contains the three COLOROID colour characteristics in the following order:
COLOROID hue – COLOROID saturation – COLOROID luminosity, i.e.

$$A - T - V$$

For instance, the notation of the colour of 13 COLOROID hue, 22 COLOROID saturation and 56 COLOROID luminosity is:

$$13 - 22 - 56$$

Note: The first number denotes in which COLOROID colour plane the colour exists, the second denotes on which coaxial cylinder surface, at what distance from the achromatic axis it exists, the third one denotes, on which of the planes perpendicular to the achromatic axis it is to be found. (See Figure 15.)
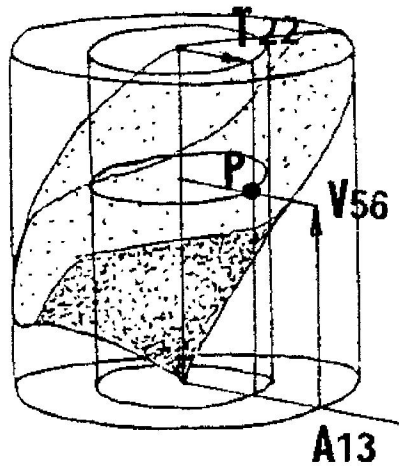
Figure 15.

3. Associating COLOROID-colour characteristics and colour samples

Any colour sample of any colour system or colour set can be associated to the colour characteristics of the COLOROID colour system, if it, as a result of measurement done with equipment, has the colour characteristics of the CIE 1931 chromatic stimuli measuring system, because a mutually unambiguous connection exists between the COLOROID colour system and the CIE 1931 chromatic stimuli measuring system.

3.1 Conversion of CIE colour characteristics to COLOROID colour characteristics

Recalculation is carried out by the help of the following expressions, , if x, y, Y, is given, then:

$$A = f(\text{tg } \varphi) \qquad \text{tg } \varphi = \frac{y-y_0}{x-x_0}$$

$$T = 100\frac{Y(x_0\varepsilon_w - x\varepsilon_w)}{100(x\varepsilon_\lambda - x_\lambda\varepsilon_\lambda) + Y_\lambda(x_0\varepsilon_w - x\varepsilon_w)},$$

$$T = 100\frac{Y(1 - x\varepsilon_w)}{100(y\varepsilon_\lambda - y_\lambda\varepsilon_\lambda) + Y_\lambda(1 - y\varepsilon_w)},$$

$$V = 10\sqrt{Y.}$$

Notes:
1. The COLOROID hue can be determined by using the tables of the Attachment M2.
To define the COLOROID hue of the colour it is to be decided, to which quadrant of the COLOROID colour space it belongs to.
The description of denotations used in the formulas can be found in Attachment M3.
Conversion can also be carried out by COLOROID converting software according to section 1.1.12

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3.2 Conversion of COLOROID-colour-characteristics into CIE- colour-characteristics

Recalculation is to be carried out by the help of the following expressions, if A, T, V, are given, then:

$$X = \frac{\varepsilon_w X_\lambda (V^2 - TY_\lambda) + 100 T\varepsilon_\lambda X_\lambda}{\varepsilon_w (V^2 - TY_\lambda) + 100 T\varepsilon_\lambda},$$

$$y = \frac{V^2 + 100 T\varepsilon_\lambda y_\lambda - TY_\lambda}{\varepsilon_w (V^2 - TY_\lambda) + 100 T\varepsilon_\lambda},$$

$$Y = \left(\frac{V}{10}\right)^2.$$

Notes:
1. The description of denotations used in the formulas can be found in Attachment M3.
2. Conversion can also be carried out by COLOROID converting software according to section 1.1.12

4. Practical use of the COLOROID colour characteristics

4.1 Specification of colours with COLOROID colour characteristics.

After or instead of the name of colours that are to be indicated unambiguously in official statements, in plan documentation, COLOROID colour characteristics are to be used according to the following example:
16.07 – 22.45 – 68.39, or
A16.07, T22.45, V68.39

Notes:
1. The degree of accuracy of the individual characteristics determines the number of characters after the decimal point.
2. For users where the main aspect is not the visual displaying of the colour, the use of CIE XYZ colour characteristics or their transformations are accepted.

4.2 Specification of colours with COLOROID diagram.

In plan documentation for denoting the interrelations of more colours the COLOROID diagram is to be used.
The COLOROID diagram consists of two parts, namely the schemes of the COLOROID colour cycle and the COLOROID colour plane containing the current colour composition are printed next to each other, into which the colour points in question are to be drawn.
If the members of the colour composition to be displayed belong to more hues, the concerned colour planes can be drawn one above the other as well within the same figure. (See Figure 16.)

	A	T	V	X	Y	Z
1.	65.08	1.92	72.24	48.71	52.19	56.09
2.	23.88	2.94	60.85	36.13	37.03	37.92
3.	10.67	15.76	60.83	33.65	37.00	24.22
4.	60.13	5.37	64.67	38.81	41.82	46.68
5.	15.79	14.61	76.82	57.60	59.01	50.54
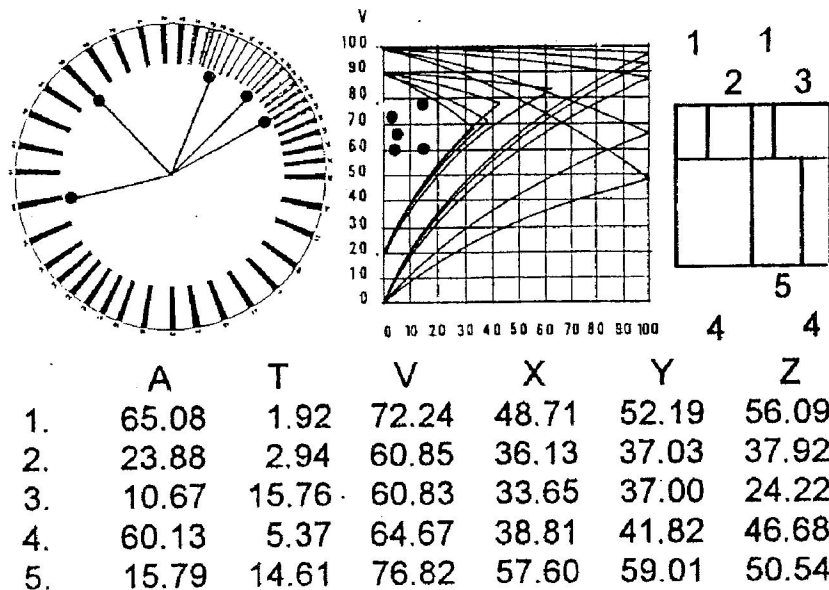
Figure 16.

4.3 Classification of colours by COLOROID colour characteristics.

The tolerance range of a nominal colour can be denoted with COLOROID colour characteristics according to the sample below:

$$\Delta 0.6 - \Delta 1.3 - \Delta 0.9 \quad \text{or}$$
$$\Delta A0.6, \ \Delta T1.3, \ \Delta V0.9$$

Notes:
1. The smooth changes in the COLOROID colour characteristics mean smooth changes in colour quality. This colour qualification mode denotes the deviation from the nominal colour separately for each of the three colour characteristics, that corresponds to the requirements of evaluation by perception of those persons dealing visually with colours.
2. In those fields of industry where the visual evaluation of the deviation from the nominal colour is not required, this can be denoted by one of the ΔE chromatic stimuli formulas published by the CIE.

4.4 Colour delimitation with COLOROID colour characteristics.

The colour ranges required for the colour design of an object or installation are to be delimited by the following way:
1. By utilising the table or tables, selected upon the current requirements, bound to the COLOROID colour characteristics known in the professional literature, in relation to each of the three colour characteristics(A-T-V), the colour ranges proposed for use have to be indicated graphically. (See Figure 17.).
2. The graphs of the various requirements have to be aggregated into colour delimitation diagram for all three COLOROID colour characteristics (A-T-V). (See Figure 17.).

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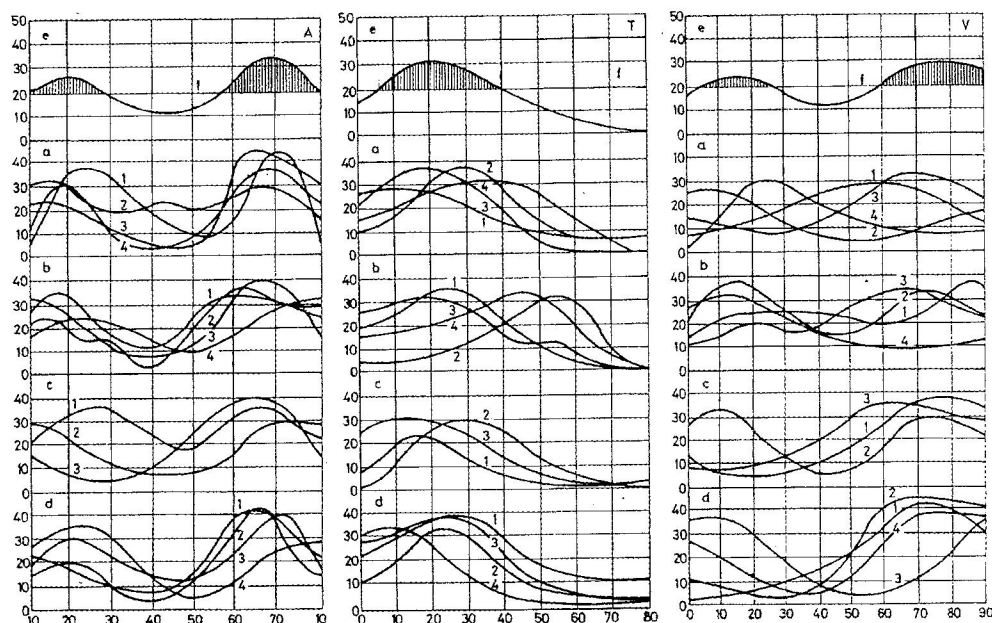
Figure 17.

4.5 Creating harmonic colour compositions by the help of COLOROID-colour characteristics

Those colour compositions are harmonic, the members of which

1. have the same A and T colour characteristics, and their V colour characteristics constitute an arithmetical or geometrical sequence,
2. have the same A and T colour characteristics, and their T colour characteristics constitute an arithmetical or geometrical sequence,
3. Summing the above two special cases the colour characteristics are the same, but their T and V colour characteristics change jointly on one straight line, where the distances of the points of division constitute an arithmetical or geometrical sequence. The (T, V) pairs can be placed on more parallel straight lines as well, in each case according to the same arithmetical or geometrical sequence.
4. The above rules can be equally related to one or more hues as well. Among the many hues the 3-hues or trichrome harmony is of prime importance. The SET of possible trichrome basic colours belonging to the A basic hue are: { A +/- 1.0, A +/- 4.6, A +/- 6.6, Complementary hue (K) K +/- 1.0, K +/- 4.6, K +/- 6.6} hues. From this set, the basic hue A and more two hues selected next to it, constitute a trichrome colour harmony.
5. Any two hues selected from the above set constitute a dichrome hue harmony even if A basic hue is omitted.

Notes:

1. Creating polichrome harmonies, however, can only be done in special cases by the help of the above set. Because of conditions of exclusion by pairs, namely, several possible multi-component hue groups do not create harmonic polichrome hue harmonies.
2. Harmony compositions with different messages are created depending on the angle exhibited by the straight line or straight lines in the current COLOROID colour plane or colour planes in relation to the achromatic axis, where the colour points of the colours participating in the sets are located on..
3. Harmony compositions of different messages are originated depending on that - in the current COLOROID colour plane or colour planes - what ΔT and ΔV distances are between the colour points of the colours participating in the set (See Figure 18.).
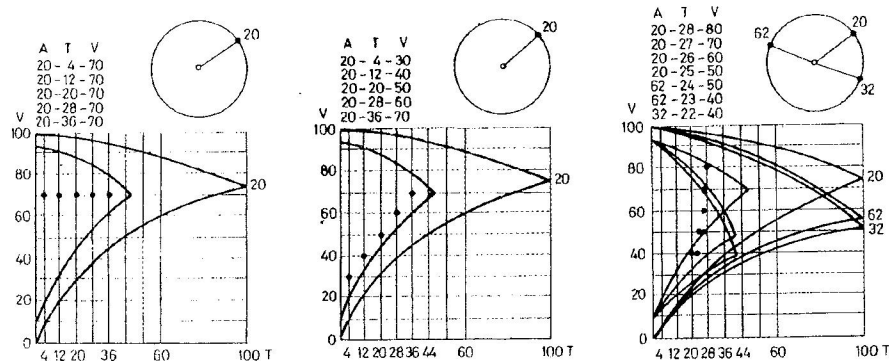
Figure 18.

4.6 Displaying colours using COLOROID colour characteristics

To display the colour determined by COLOROID A-T-V colour characteristics (p_t, w_i, s_t) the colours can be calculated with the functions below:

$$p_t = \frac{T}{T_t},$$

$$w_t = \frac{V^2 - p_t V_t^2 - (1-p_t)\, V_s^2}{V_w^2 - V_s^2},$$

$$s_t = 1 - p_t - w_t.$$

where T and V are the COLOROID colour coordinates of the colour to be displayed, T_t is the saturation of colour surface used for the mix, having identical hue as the colour to be mixed, V_t is the COLOROID luminosity if colour surface used for the mix, having identical hue as the colour to be mixed, V_w is the COLOROID-luminosity of the white surface used for the mix, V_s is the COLOROID-luminosity of the black surface used for the mix.

4.7 Colour design method using COLOROID colour characteristics

4.7.1 Design of certain visual appearance of facilities, building compositions, interiors and exteriors can be implemented expediently by the following steps:

1. Recording of colorimetric data related to the site, environment and the building materials to be used, applying COLOROID colour characteristics.
2. Recording of colour requirements related to future user demand and future functions of the facility.
3. After analysis and consolidation of data and requirements, delimiting colour ranges selected for the facility with COLOROID colour characteristics.
4. Recording with COLOROID colour characteristics, the harmony compositions, colour groups selected from the delimited colour ranges for the different colour appearances of the facility, according to the artistic ideas of the designer.
5. Preparing the colour dynamics design documentation using COLOROID colour characteristics.

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4.7.2   In case of other colour design tasks planning should be accomplished practically by the following steps:

1. Definition and registration with COLOROID colour characteristics those colours which are to be adapted to or serve as basic data.
2. Registration with COLOROID colour characteristics the colour requirements related to requirements and future functions of future users of the design target.
3. After summarizing and analysing the registered data and requirements the colour ranges chosen for the design target should be delimited with COLOROID colour characteristics.
4. Harmony compositions, colour groups chosen according to the artistic intent of the designer are to be registered, from the selected colour ranges, for the different colour appearances of the design target.
5. Preparation of colour dynamic design documentation, documentation with COLOROID colour characteristics.

Attachments

Because of development of requirements on colour classification, from time to time it might be necessary, that, similar to other colour systems and maintaining the basic relationships of COLOROID colour system, to modify some of its elements. The following tables contain the currently valid data, the basic variant of COLOROID, based on experimental observations in the period of 1970-1995 and based on calculations with high accuracy. New experiments and measurements conducted recently, may result in a modification of tables in the future, keeping the basic principles unchanged. Therefore this two tables indicate the precisely stated values of the official basic version of COLOROID, used even in the past two decades.

M2. A COLOROID-határszínek jellemző adatai

2. táblázat

A táblázat adatai a következők:

- λ, a COLOROID-határszín hullámhossza, nm-ben,
- A, a COLOROID-határszín COLOROID-jele,
- φ, a COLOROID-határszínt D$_{65}$ megvilágítás esetén jellemző szög,
- X$_λ$, a Y$_λ$ és a Z$_λ$, a COLOROID-határszín színinger-összetevői.

A 450 nm-nél kisebb és a 625 nm-nél nagyobb hullámhosszak esetében az XYZ határszín-értékeket a Coloroid bíbor vonalán számítottuk.

A CIE D65-re vonatkozó komplementer hullámhosszak viszont csak akkor negatív előjelűek, ha a CIE 1931 xy diagram bíbor vonalára esnek.

λ	A	φ	X$_λ$	Y$_λ$	Z$_λ$
571	10.090	57.690	77.8543	94.5450	0.2018
572	10.641	55.548	79.4826	93.8499	0.1948
573	11.202	53.385	81.0926	93.1163	0.1890
574	11.779	51.208	82.6825	92.3458	0.1841
575	12.368	49.024	84.2500	91.5400	0.1800
576	12.963	46.841	85.7932	90.7006	0.1766
577	13.575	44.665	87.3082	89.8277	0.1738
578	14.189	42.506	88.7894	88.9205	0.1711
579	14.811	40.371	90.2318	87.9782	0.1683
580	15.426	38.266	91.6300	87.0000	0.1650
581	16.031	36.197	92.9799	85.9861	0.1610
582	16.627	34.170	94.2798	84.9392	0.1564
583	20.203	32.189	95.5278	83.8622	0.1514
584	20.756	30.261	96.7218	82.7581	0.1459
585	21.286	28.388	97.8600	81.6300	0.1400
586	21.793	26.575	98.9386	80.4795	0.1337
587	22.285	24.823	99.9549	79.3082	0.1270
588	22.761	23.133	100.9089	78.1192	0.1205
589	23.198	21.506	101.8006	76.9155	0.1147
590	23.596	19.941	102.6300	75.7000	0.1100
591	23.978	18.438	103.3983	74.4754	0.1069
592	24.338	16.998	104.0986	73.2422	0.1049
593	24.681	15.625	104.7188	72.0004	0.1036
594	25.006	14.321	105.2467	70.7497	0.1021
595	25.294	13.089	105.6700	69.4900	0.1000
596	25.565	11.929	105.9794	68.2219	0.0969
597	25.821	10.834	106.1799	66.9472	0.0930
598	26.060	9.798	106.2807	65.6674	0.0887
599	26.277	8.814	106.2910	64.3845	0.0843
600	26.484	7.874	106.2200	63.1000	0.0800
601	26.682	6.975	106.0735	61.8155	0.0761
602	26.871	6.118	105.8444	60.5314	0.0724
603	30.048	5.305	105.5224	59.2476	0.0686
604	30.208	4.537	105.0977	57.9638	0.0645
605	30.358	3.815	104.5600	56.6800	0.0600
606	30.499	3.139	103.9037	55.3961	0.0548
607	30.632	2.504	103.1361	54.1137	0.0492
608	30.756	1.906	102.2666	52.8353	0.0435
609	30.874	1.343	101.3048	51.5632	0.0383
610	30.985	0.809	100.2600	50.3000	0.0340
611	31.085	0.305	99.1368	49.0469	0.0307
612	31.178	-0.172	97.9331	47.8030	0.0283
613	31.266	-0.622	96.6492	46.5678	0.0265
614	31.348	-1.046	95.2848	45.3403	0.0252
615	31.427	-1.446	93.8400	44.1200	0.0240
616	31.500	-1.823	92.3194	42.9080	0.0230
617	31.570	-2.179	90.7244	41.7036	0.0221
618	31.635	-2.513	89.0502	40.5032	0.0212
619	31.697	-2.828	87.2920	39.3032	0.0202
620	31.755	-3.125	85.4450	38.1000	0.0190
621	31.809	-3.405	83.5084	36.8918	0.0174
622	31.861	-3.670	81.4946	35.6827	0.0156
623	31.910	-3.920	79.4186	34.4777	0.0136
624	31.956	-4.157	77.2954	33.2818	0.0117
625	32.000	-4.382	75.1400	32.1000	0.0100
630	32.154	-5.348	74.7248	31.8170	1.7822

(A táblázat folytatódik)

(A 2. táblázat folytatása)

λ	A	φ	X_λ	Y_λ	Z_λ
640	32.377	-6.750	74.1462	31.4226	4.2515
650	32.510	-7.583	73.8147	31.1967	5.6663
660	32.584	-8.047	73.6336	31.0732	6.4393
670	32.621	-8.280	73.5438	31.0120	6.8223
680	32.647	-8.442	73.4817	30.9697	7.0875
690	32.664	-8.553	73.4396	30.9410	7.2670
700	32.669	-8.586	73.4267	30.9322	7.3220
-494	33.084	-11.667	72.3057	30.1681	12.1065
-495	33.459	-16.134	70.8368	29.1669	18.3754
-496	33.813	-20.359	69.5817	28.3115	23.7319
-497	34.143	-24.312	68.4983	27.5730	28.3557
-498	34.447	-27.987	67.5533	26.9289	32.3888
-499	34.729	-31.384	66.7220	26.3623	35.9367
-500	34.988	-34.511	65.9855	25.8603	39.0800
-501	35.235	-37.371	65.3307	25.4140	41.8746
-502	35.460	-39.975	64.7468	25.0160	44.3665
-503	35.666	-42.350	64.2226	24.6587	46.6038
-504	35.854	-44.523	63.7476	24.3349	48.6311
-505	40.029	-46.528	63.3124	24.0383	50.4886
-506	40.197	-48.390	62.9098	23.7639	52.2066
-507	40.353	-50.121	62.5361	23.5092	53.8016
-508	40.499	-51.733	62.1879	23.2719	55.2876
-509	40.635	-53.236	61.8625	23.0501	56.6762
-510	40.761	-54.641	61.5577	22.8423	57.9771
-511	40.880	-55.957	61.2708	22.6468	59.2016
-512	40.992	-57.192	61.0003	22.4624	60.3562
-513	41.100	-58.349	60.7455	22.2887	61.4436
-514	41.202	-59.432	60.5056	22.1252	62.4673
-515	41.297	-60.445	60.2798	21.9713	63.4309
-516	41.386	-61.396	60.0665	21.8259	64.3416
-517	41.470	-62.294	59.8638	21.6878	65.2065
-518	41.549	-63.143	59.6708	21.5562	66.0304
-519	41.625	-63.949	59.4862	21.4304	66.8179
-520	41.697	-64.717	59.3090	21.3096	67.5741
-521	41.766	-65.453	59.1382	21.1932	68.3032
-522	41.833	-66.164	58.9719	21.0798	69.0129
-523	41.898	-66.859	58.8082	20.9683	69.7117
-524	41.962	-67.546	58.6453	20.8573	70.4067
-525	42.027	-68.229	58.4819	20.7458	71.1043
-526	42.093	-68.914	58.3167	20.6333	71.8092
-527	42.160	-69.601	58.1497	20.5195	72.5218
-528	42.226	-70.289	57.9810	20.4045	73.2419
-529	42.293	-70.978	57.8106	20.2883	73.9691
-530	42.360	-71.667	57.6386	20.1711	74.7031
-531	42.426	-72.356	57.4648	20.0526	75.4450
-532	42.493	-73.049	57.2884	19.9323	76.1980
-533	42.561	-73.747	57.1087	19.8099	76.9650
-534	42.629	-74.453	56.9250	19.6847	77.7487
-535	42.698	-75.168	56.7368	19.5564	78.5522
-536	42.768	-75.895	56.5433	19.4245	79.3777
-537	42.840	-76.633	56.3441	19.2888	80.2279
-538	42.913	-77.386	56.1384	19.1485	81.1061
-539	42.987	-78.155	55.9251	19.0032	82.0161
-540	43.070	-78.943	55.7035	18.8521	82.9621
-541	43.156	-79.752	55.4724	18.6946	83.9481
-542	43.245	-80.583	55.2311	18.5301	84.9783
-543	43.336	-81.438	54.9783	18.3578	86.0569
-544	43.430	-82.319	54.7131	18.1771	87.1888
-545	43.527	-83.226	54.4342	17.9869	88.3791
-546	43.627	-84.163	54.1402	17.7865	89.6341
-547	43.730	-85.131	53.8293	17.5746	90.9610
-548	43.837	-86.133	53.4996	17.3499	92.3679
-549	43.948	-87.171	53.1491	17.1110	93.8639
-550	44.070	-88.246	52.7753	16.8562	95.4591
-551	44.202	-89.363	52.3753	16.5836	97.1663
-552	44.339	-90.522	51.9462	16.2911	98.9977
-553	44.481	-91.725	51.4845	15.9765	100.9679
-554	44.629	-92.974	50.9863	15.6369	103.0941
-555	44.782	-94.272	50.4468	15.2691	105.3970
-556	44.941	-95.620	49.8599	14.8691	107.9015

(A táblázat folytatódik)

(A 2. táblázat folytatása)

λ	A	φ	X_λ	Y_λ	Z_λ
-557	45.076	-97.021	49.2192	14.4324	110.6358
-558	45.197	-98.476	48.5171	13.9539	113.6324
-559	45.323	-99.985	47.7443	13.4271	116.9307
-560	45.454	-101.550	46.8894	12.8444	120.5794
-561	45.589	-103.173	45.9380	12.1959	124.6399
-562	45.729	-104.852	44.8737	11.4705	129.1819
-563	45.874	-106.587	43.6752	10.6536	134.2968
-564	46.033	-108.379	42.3154	9.7268	140.1004
-565	46.249	-110.226	40.7593	8.6661	146.7417
-566	46.472	-112.126	38.9614	7.4407	154.4147
380	46.593	-113.159	37.8858	6.7076	159.0050
390	46.598	-113.202	37.8389	6.6756	159.2054
400	46.606	-113.264	37.7720	6.6300	159.4908
410	46.619	-113.377	37.6482	6.5456	160.0194
420	46.642	-113.571	37.4347	6.4001	160.9304
430	46.699	-114.064	36.8768	6.0198	163.3116
440	46.808	-114.993	35.7700	5.2654	168.0351
450	50.000	-116.628	33.6200 ·	3.8000	177.2110
451	50.030	-116.847	33.3198	3.9847	176.8259
452	50.062	-117.076	33.0041	4.1768	176.4039
453	50.096	-117.317	32.6636	4.3766	175.8944
454	50.131	-117.570	32.2887	4.5843	175.2466
455	50.168	-117.838	31.8700	4.8000	174.4100
456	50.208	-118.121	31.4025	5.0244	173.3559
457	50.249	-118.420	30.8884	5.2573	172.0858
458	50.293	-118.736	30.3290	5.4981	170.5937
459	50.339	-119.068	29.7258	5.7459	168.8737
460	50.388	-119.416	29.0800	6.0000	166.9200
461	50.439	-119.781	28.3970	6.2602	164.7529
462	50.492	-120.166	27.6721	6.5278	162.3413
463	50.549	-120.577	26.8918	6.8042	159.6022
464	50.611	-121.020	26.0423	7.0911	156.4528
465	50.678	-121.505	25.1100	7.3900	152.8100
466	50.753	-122.043	24.0848	7.7016	148.6111
467	50.836	-122.640	22.9851	8.0266	143.9522
468	50.928	-123.299	21.8407	8.3667	138.9880
469	51.031	-124.025	20.6811	8.7233	133.8736
470	51.147	-124.815	19.5360	9.0980	128.7640
471	51.274	-125.672	18.4214	9.4918	123.7422
472	51.411	-126.607	17.3327	9.9046	118.7824
473	51.562	-127.628	16.2688	10.3367	113.8761
474	51.727	-128.751	15.2283	10.7885	109.0148
475	51.910	-129.989	14.2100	11.2600	104.1900
476	52.119	-131.358	13.2179	11.7532	99.4198
477	52.355	-132.872	12.2570	12.2674	94.7347
478	52.617	-134.545	11.3275	12.7993	90.1453
479	52.907	-136.396	10.4298	13.3453	85.6619
480	53.230	-138.440	9.5640	13.9020	81.2950
481	53.588	-140.697	8.7300	14.4676	77.0517
482	53.983	-143.190	7.9308	15.0469	72.9445
483	54.399	-145.940	7.1718	15.6462	68.9914
484	54.856	-148.963	6.4581	16.2718	65.2105
485	55.213	-152.266	5.7950	16.9300	61.6200
486	55.538	-155.844	5.1862	17.6243	58.2329
487	55.887	-159.694	4.6282	18.3558	55.0416
488	56.212	-163.809	4.1151	19.1274	52.0338
489	56.533	-168.170	3.6413	19.9418	49.1967
490	56.870	-172.742	3.2010	20.8020	46.5180
491	60.264	-177.465	2.7917	21.7120	43.9925
492	60.690	177.748	2.4144	22.6734	41.6184
493	61.111	172.985	2.0687	23.6857	39.3882
494	61.511	168.333	1.7540	24.7481	37.2946
495	61.895	163.866	1.4700	25.8600	35.3300
496	62.247	159.641	1.2162	27.0185	33.4858
497	62.571	155.688	0.9920	28.2294	31.7552
498	62.872	152.013	0.7967	29.5051	30.1337
499	63.151	148.616	0.6296	30.8578	28.6169
500	63.410	145.489	0.4900	32.3000	27.2000
501	63.647	142.629	0.3777	33.8402	25.8817
502	63.862	140.025	0.2945	35.4686	24.6484

(A táblázat folytatódik)

(A 2. táblázat folytatása)

λ	A	φ	X_λ	Y_λ	Z_λ
503	64.059	137.650	0.2425	37.1699	23.4772
504	64.243	135.477	0.2236	38.9288	22.3453
505	64.411	133.472	0.2400	40.7300	21.2300
506	64.568	131.610	0.2926	42.5630	20.1169
507	64.714	129.879	0.3837	44.4310	19.0120
508	64.850	128.267	0.5175	46.3394	17.9225
509	64.977	126.764	0.6982	48.2940	16.8561
510	65.098	125.359	0.9300	50.3000	15.8200
511	65.213	124.043	1.2149	52.3569	14.8138
512	65.320	122.808	1.5536	54.4512	13.8376
513	65.421	121.651	1.9478	56.5690	12.8994
514	65.515	120.568	2.3993	58.6965	12.0075
515	65.603	119.555	2.9100	60.8200	11.1700
516	65.686	118.604	3.4815	62.9346	10.3905
517	65.764	117.706	4.1120	65.0307	9.6667
518	65.838	116.857	4.7985	67.0875	8.9983
519	65.908	116.051	5.5379	69.0842	8.3845
520	65.975	115.283	6.3270	71.0000	7.8250
521	66.040	114.547	7.1635	72.8185	7.3209
522	66.104	113.836	8.0462	74.5464	6.8678
523	66.167	113.141	8.9740	76.1969	6.4568
524	66.229	112.454	9.9456	77.7837	6.0788
525	66.290	111.771	10.9600	79.3200	5.7250
526	66.352	111.086	12.0167	80.8110	5.3904
527	66.414	110.399	13.1115	82.2496	5.0747
528	66.476	109.711	14.2368	83.6307	4.7753
529	66.538	109.022	15.3854	84.9492	4.4899
530	66.600	108.333	16.5500	86.2000	4.2160
531	66.662	107.644	17.7257	87.3811	3.9507
532	66.724	106.951	18.9140	88.4962	3.6936
533	66.787	106.253	20.1169	89.5494	3.4458
534	66.851	105.547	21.3366	90.5443	3.2089
535	66.915	104.832	22.5750	91.4850	2.9840
536	66.981	104.105	23.8321	92.3735	2.7712
537	70.051	103.367	25.1067	93.2092	2.5694
538	70.125	102.614	26.3992	93.9923	2.3787
539	70.201	101.845	27.7102	94.7225	2.1989
540	70.278	101.057	29.0400	95.4000	2.0300
541	70.358	100.248	30.3891	96.0256	1.8718
542	70.440	99.417	31.7573	96.6007	1.7240
543	70.524	98.562	33.1438	97.1261	1.5864
544	70.610	97.681	34.5483	97.6022	1.4585
545	70.699	96.774	35.9700	98.0300	1.3400
546	70.791	95.837	37.4084	98.4092	1.2307
547	70.887	94.869	38.8640	98.7418	1.1302
548	70.985	93.867	40.3378	99.0313	1.0378
549	71.095	92.829	41.8311	99.2812	0.9529
550	71.211	91.754	43.3450	99.4950	0.8750
551	71.332	90.637	44.8795	99.6711	0.8035
552	71.457	89.478	46.4336	99.8098	0.7382
553	71.586	88.275	48.0064	99.9112	0.6785
554	71.721	87.026	49.5971	99.9748	0.6243
555	71.861	85.728	51.2050	100.0000	0.5750
556	72.008	84.380	52.8296	99.9857	0.5304
557	72.203	82.979	54.4692	99.9305	0.4900
558	72.406	81.524	56.1209	99.8325	0.4534
559	72.616	80.015	57.7821	99.6899	0.4202
560	72.834	78.450	59.4500	99.5000	0.3900
561	73.072	76.827	61.1221	99.2601	0.3623
562	73.353	75.148	62.7976	98.9743	0.3371
563	73.644	73.413	64.4760	98.6444	0.3141
564	73.944	71.621	66.1570	98.2724	0.2935
565	74.307	69.774	67.8400	97.8600	0.2750
566	74.691	67.874	69.5239	97.4084	0.2585
567	75.099	65.923	71.2059	96.9171	0.2439
568	75.562	63.925	72.8828	96.3857	0.2309
569	76.039	61.884	74.5519	95.8135	0.2197
570	76.559	59.804	76.2100	95.2000	0.2100

M3. A szövegben és az ábrákon használt betűjelek

A COLOROID-színezet,

A_{20} konkrét COLOROID-alapszín, -színezet vagy -színpont,

H COLOROID-határszín,

hg COLOROID-határgörbe,

p COLOROID-színtartalom,

s COLOROID-feketetartalom,

S a COLOROID abszolút fekete színe,

T COLOROID-telítettség,

T_λ a COLOROID-határszín és a COLOROID-alapszín telítettsége,

V COLOROID-világosság,

V_λ a COLOROID-határszín és a COLOROID-alapszín világossága,

w COLOROID-fehértartalom,

W a COLOROID abszolút fehér színe,

x a vizsgált felületszín színinger-koordinátája,

x_o a CIE 1931 színdiagram D_{65} pontjának színinger-koordinátája,

x_w a COLOROID abszolút fehér színének színinger-koordinátája,

x_s a COLOROID abszolút fekete színének színinger-koordinátája,

x_λ a COLOROID-határszín és a COLOROID-alapszín COLOROID-alapszín színinger-koordinátája,

X a vizsgált felületszín színinger-összetevője,

X_λ a vizsgált felületszín domináns hullámhosszával azonos hullámhosszú COLOROID-határszín és COLOROID-alapszín színinger-összetevője,

X_s a COLOROID abszolút fekete színének színinger-összetevője,

X_w a COLOROID abszolút fehér színének színinger-összetevője,

y a vizsgált felületszín színinger-koordinátája,

y_o a CIE 1931 színdiagram D_{65} pontjának színinger-koordinátája,

y_s a COLOROID abszolút fekete színének színinger-koordinátája,

y_w a COLOROID abszolút fehér színének színinger-koordinátája,

y_λ a COLOROID-határszín és a COLOROID-alapszín színinger-koordinátája,

Y a vizsgált felületszín színinger-összetevője,

Y_λ a vizsgált felületszín domináns hullámhosszával azonos hullámhosszú COLOROID-határszín és COLOROID-alapszín színinger-összetevője,

Y_s a COLOROID abszolút fekete színének színinger-összetevője,

Y_w a COLOROID abszolút fehér színének színinger-összetevője,

Z a vizsgált felületszín színinger-összetevője,

Z_λ a vizsgált felületszín domináns hullámhosszával azonos hullámhosszú COLOROID-határszín és COLOROID-alapszín színinger-összetevője,

Z_s a COLOROID abszolút fekete színének színinger-összetevője,

Z_w a COLOROID abszolút fehér színének színinger-összetevője,

β fénysűrűségi tényező,

ε a vizsgált felületszín színinger-összetevői összegének századrésze,

ε_λ a vizsgált felületszín domináns hullámhosszával azonos hullámhosszú COLOROID-határszín és COLOROID-alapszín színinger-összetevői összegének századrésze,

ε_s a COLOROID abszolút fekete színe színinger-összetevői összegének századrésze,

ε_w a COLOROID abszolút fehér színe színinger-összetevői összegének századrésze,

φ a CIE 1931 színingerdiagram D_{65} pontjából kiinduló félegyenesnek az x tengellyel bezárt szöge. Nagysága, valamint iránytangense jellemző a COLOROID-színezetre,

λ hullámhossz,

λ_d domináns hullámhossz.

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MSZ 9620-3	Fénytechnikai terminológia. Színmérés
MSZ 9620-4	Fénytechnikai terminológia. Emisszió, az anyag optikai tulajdonságai