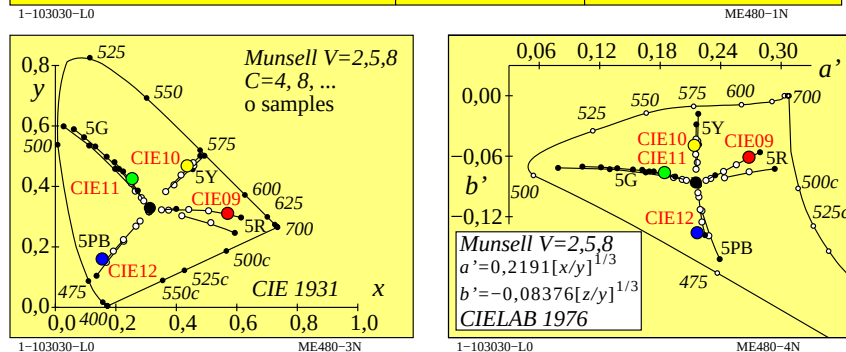
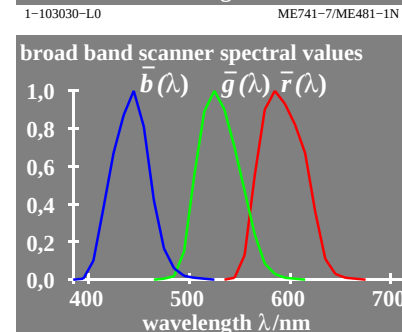
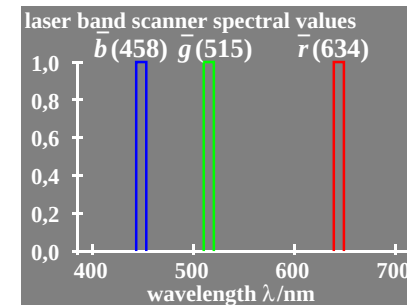
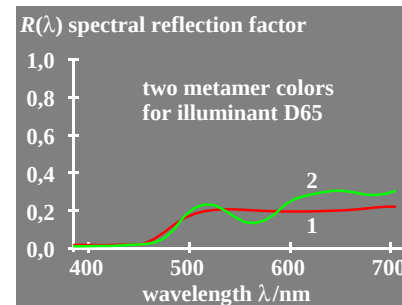


colour attributes of low and high colour metric	mode of colour mixture	dichromatic	trichromatic
low colour- or valence metric	(for $Y_- \geq B_-$)	(for $R_- \geq G_- \geq B_-$)	
white value W	B_-	B_-	
black value N	$100 - Y_-$	$100 - R_-$	
chromatic value C	$Y_- - B_-$	$R_- - B_-$	
high colour- or sensation metric	(for $Y^*_- \geq B^*_-$)	(for $R^*_- \geq G^*_- \geq B^*_-$)	
whiteness W^*	B^*_-	B^*_-	
blackness N^*	$100 - Y^*_-$	$100 - R^*_-$	
chromaticness C^*	$Y^*_- - B^*_-$	$R^*_- - B^*_-$	



colour valence metric (color data: linear relation to CIE 1931 data)		
linear color terms	name and relationship to CIE tristimulus or chromaticity values	notes
tristimulus values	X, Y, Z	
chromatic value	linear chromatic value diagram (A, B)	$n=D65$
red-green	$A = [X/Y - X_n/Y_n] Y = [a - a_n] Y$ $= [x/y - x_n/y_n] Y$	(background)
yellow-blue	$B = -0,4 [Z/Y - Z_n/Y_n] Y = [b - b_n] Y$ $= -0,4 [z/y - z_n/y_n] Y$	
radial	$C_{AB} = [A^2 + B^2]^{1/2}$	
chromaticity	linear chromaticity diagram (a, b)	compare to linear
red-green	$a = X/Y = x/y$	cone excitation
yellow-blue	$b = -0,4 [Z/Y] = -0,4 [z/y]$	$L/(L+M) = P/(P+D)$
radial	$c_{ab} = [(a - a_n)^2 + (b - b_n)^2]^{1/2}$	$S/(L+M) = T/(P+D)$

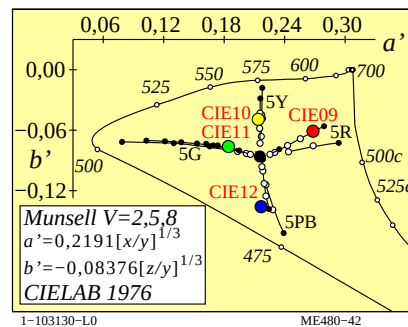
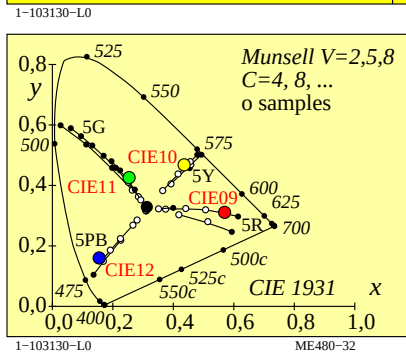


Colour rendering index R_i of two metameric BAM-scanner test colours		
scanner	TC colour rendering index	colour difference
broad band	1 82	3
	2 84	
laser	1 63	10
	2 69	
ideal	1 100	0
	2 100	

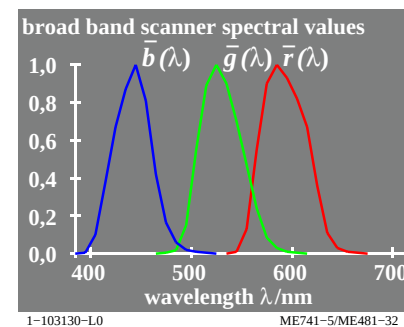
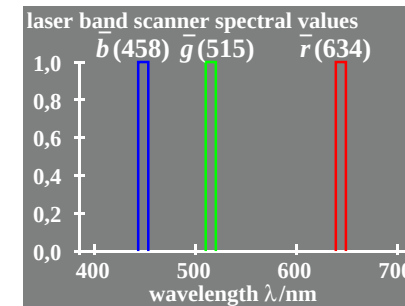
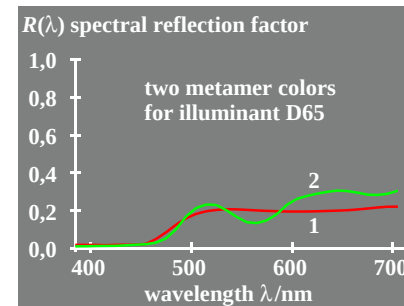
D65, colour adjustment with white paper

higher colour metric (color data: nonlinear relation to CIE 1931 data)		
nonlinear color terms	name and relationship with tristimulus or chromaticity values	notes
lightness	$L^* = 116 (Y/100)^{1/3} - 16 (Y > 0,8)$ approximation: $L^* = 100 (Y/100)^{1/2,4} (Y > 0)$	CIELAB 1976
chroma	nonlinear transform chromatic values A, B	
red-green	$a^* = 500 [(X/X_n)^{1/3} - (Y/Y_n)^{1/3}]$ $= 500 (a' - a'_n) Y^{1/3}$	CIELAB 1976
yellow-blue	$b^* = 200 [(Y/Y_n)^{1/3} - (Z/Z_n)^{1/3}]$ $= 500 (b' - b'_n) Y^{1/3}$	CIELAB 1976
radial	$C^*_{ab} = [a^{*2} + b^{*2}]^{1/2}$	$n=D65$ (background)
chromaticity	nonlinear transform chromaticities x/y, z/y	compare to log cone excitation
red-green	$a' = (1/X_n)^{1/3} (x/y)^{1/3}$ $= 0,2191 (x/y)^{1/3}$ for D65	$\log[L/(L+M)]$
yellow-blue	$b' = -0,4 (1/Z_n)^{1/3} (z/y)^{1/3}$ $= -0,08376 (z/y)^{1/3}$ for D65	$= \log[P/(P+D)]$
radial	$c'_{ab} = [(a' - a'_n)^2 + (b' - b'_n)^2]^{1/2}$	$\log[S/(L+M)]$ $= \log[T/(P+D)]$

colour attributes of low and high colour metric	mode of colour mixture	dichromatic	trichromatic
low colour- or valence metric	(for $Y_{dd} \geq B_{dd}$)	(for $R_{dd} \geq G_{dd} \geq B_{dd}$)	
white value	W	B_{dd}	B_{dd}
black value	N	$100 - Y_{dd}$	$100 - R_{dd}$
chromatic value	C	$Y_{dd} - B_{dd}$	$R_{dd} - B_{dd}$
high colour- or sensation metric	(for $Y^*_{dd} \geq B^*_{dd}$)	(for $R^*_{dd} \geq G^*_{dd} \geq B^*_{dd}$)	
whiteness	W^*	B^*_{dd}	B^*_{dd}
blackness	N^*	$100 - Y^*_{dd}$	$100 - R^*_{dd}$
chromaticness	C^*	$Y^*_{dd} - B^*_{dd}$	$R^*_{dd} - B^*_{dd}$



colour valence metric (color data: linear relation to CIE 1931 data)		
linear color terms	name and relationship to CIE tristimulus or chromaticity values	notes
tristimulus values	X, Y, Z	
chromatic value	linear chromatic value diagram (A, B)	$n=D65$
red-green	$A = [X/Y - X_n/Y_n] Y = [a - a_n] Y$ $= [x/y - x_n/y_n] Y$	(background)
yellow-blue	$B = -0,4 [Z/Y - Z_n/Y_n] Y = [b - b_n] Y$ $= -0,4 [z/y - z_n/y_n] Y$	
radial	$C_{AB} = [A^2 + B^2]^{1/2}$	
chromaticity	linear chromaticity diagram (a, b)	compare to linear
red-green	$a = X/Y = x/y$	cone excitation
yellow-blue	$b = -0,4 [Z/Y] = -0,4 [z/y]$	$L/(L+M) = P/(P+D)$
radial	$c_{ab} = [(a - a_n)^2 + (b - b_n)^2]^{1/2}$	$S/(L+M) = T/(P+D)$

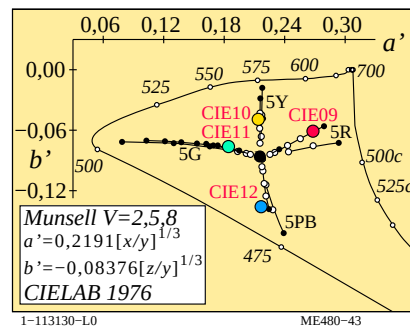
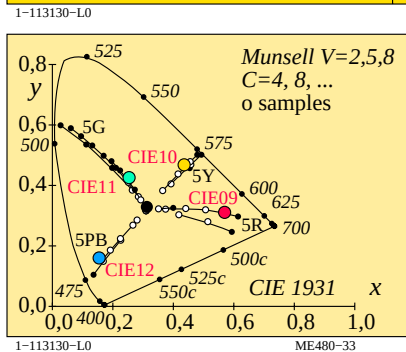


Colour rendering index R_i of two metameric BAM-scanner test colours		
scanner	TC colour rendering index	colour difference
broad band	1	82
	2	84
laser	1	63
	2	69
ideal	1	100
	2	100

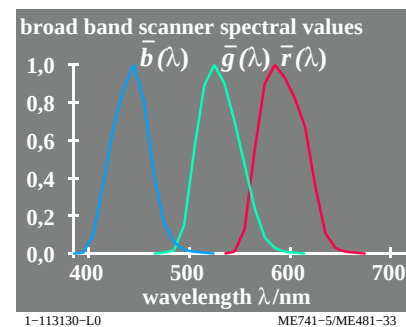
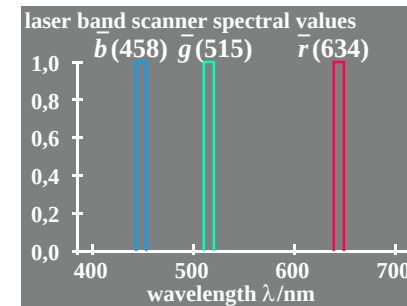
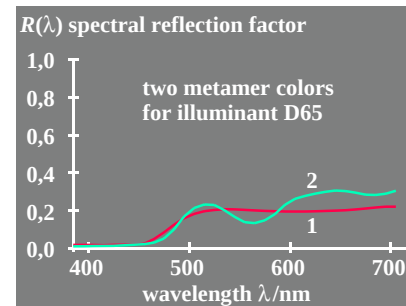
D65, colour adjustment with white paper

higher colour metric (color data: nonlinear relation to CIE 1931 data)		
nonlinear color terms	name and relationship with tristimulus or chromaticity values	notes
lightness	$L^* = 116 (Y/100)^{1/3} - 16 (Y > 0,8)$ approximation: $L^* = 100 (Y/100)^{1/2,4} (Y > 0)$	CIELAB 1976
chroma	nonlinear transform chromatic values A, B	
red-green	$a^* = 500 [(X/X_n)^{1/3} - (Y/Y_n)^{1/3}]$ $= 500 (a' - a'_n) Y^{1/3}$	CIELAB 1976
yellow-blue	$b^* = 200 [(Y/Y_n)^{1/3} - (Z/Z_n)^{1/3}]$ $= 500 (b' - b'_n) Y^{1/3}$	CIELAB 1976
radial	$C^*_{ab} = [a^{*2} + b^{*2}]^{1/2}$	$n=D65$ (background)
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red-green	$a' = (1/X_n)^{1/3} (x/y)^{1/3}$ $= 0,2191 (x/y)^{1/3}$ for D65	$\log[L/(L+M)]$
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colour attributes of low and high colour metric	mode of colour mixture	
	dichromatic	trichromatic
low colour- or valence metric	(for $Y_{de} \geq B_{de}$)	(for $R_{de} \geq G_{de} \geq B_{de}$)
white value W	B_{de}	B_{de}
black value N	$100 - Y_{de}$	$100 - R_{de}$
chromatic value C	$Y_{de} - B_{de}$	$R_{de} - B_{de}$
high colour- or sensation metric	(for $Y^*_{de} \geq B^*_{de}$)	(for $R^*_{de} \geq G^*_{de} \geq B^*_{de}$)
whiteness W^*	B^*_{de}	B^*_{de}
blackness N^*	$100 - Y^*_{de}$	$100 - R^*_{de}$
chromaticness C^*	$Y^*_{de} - B^*_{de}$	$R^*_{de} - B^*_{de}$



colour valence metric (color data: linear relation to CIE 1931 data)		
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yellow-blue	$B = -0,4 [Z/Y - Z_n/Y_n] Y = [b - b_n] Y$ $= -0,4 [z/y - z_n/y_n] Y$	
radial	$C_{AB} = [A^2 + B^2]^{1/2}$	
chromaticity	linear chromaticity diagram (a, b)	compare to linear
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radial	$c'_{ab} = [(a' - a'_n)^2 + (b' - b'_n)^2]^{1/2}$	$\log[S/(L+M)]$ $= \log[T/(P+D)]$