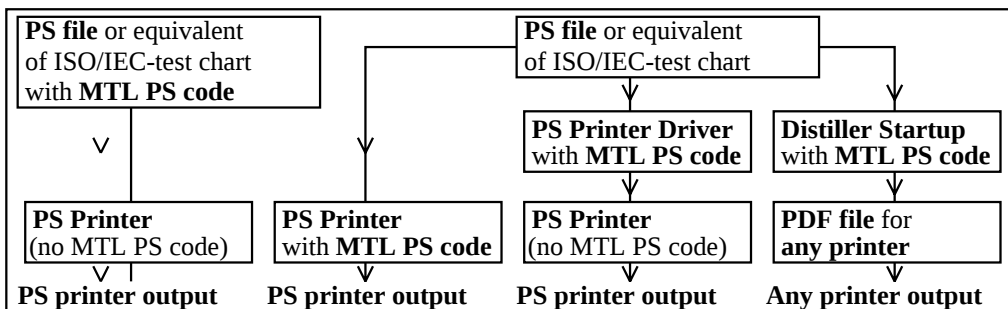
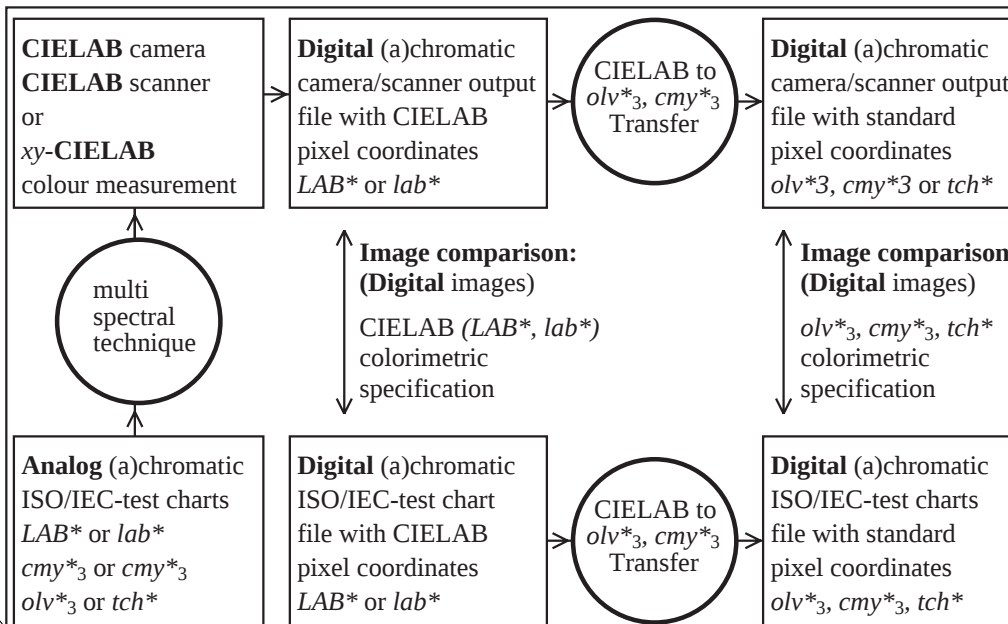


| Elementary colour and CIE illuminant |      | CIELAB data, CIE tristimulus values and CIE chromaticity for the CIE standard illuminant D65 and D50 and the 2 degree observer |        |        |                  |                 |       |       |       |        |        |
|--------------------------------------|------|--------------------------------------------------------------------------------------------------------------------------------|--------|--------|------------------|-----------------|-------|-------|-------|--------|--------|
| CIE-test colour                      | Ill. | L*                                                                                                                             | a*     | b*     | C* <sub>ab</sub> | h <sub>ab</sub> | X     | Y     | Z     | x      | y      |
| 09, Red R                            | D65  | 40,04                                                                                                                          | 58,98  | 28,32  | 65,43            | 25,7            | 20,64 | 11,27 | 4,34  | 0,5693 | 0,3110 |
| 10, Yellow J                         |      | 81,30                                                                                                                          | -2,99  | 71,82  | 71,89            | 92,4            | 54,89 | 59,01 | 12,02 | 0,4359 | 0,4686 |
| 11, Green G                          |      | 52,27                                                                                                                          | -42,40 | 13,64  | 44,54            | 162,2           | 12,15 | 20,38 | 15,34 | 0,2538 | 0,4258 |
| 12, Blue B                           |      | 30,52                                                                                                                          | 1,21   | -46,35 | 46,37            | 271,5           | 6,24  | 6,45  | 27,59 | 0,1550 | 0,1601 |
| 09, Red R                            | D50  | 41,88                                                                                                                          | 62,00  | 31,82  | 69,69            | 27,2            | 23,31 | 12,42 | 3,24  | 0,5982 | 0,3188 |
| 10, Yellow J                         |      | 81,97                                                                                                                          | 1,81   | 71,59  | 71,61            | 88,5            | 58,84 | 60,24 | 9,50  | 0,4576 | 0,4685 |
| 11, Green G                          |      | 51,62                                                                                                                          | -41,12 | 11,52  | 42,70            | 164,4           | 12,10 | 19,81 | 11,95 | 0,2759 | 0,4515 |
| 12, Blue B                           |      | 29,20                                                                                                                          | -5,28  | -49,34 | 49,62            | 263,9           | 5,25  | 5,92  | 21,25 | 0,1621 | 0,1825 |

ZE160-1



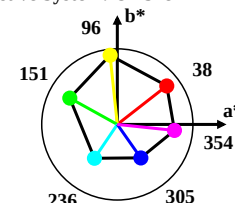
ZE160-3



ZE160-7

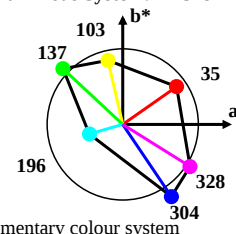
### CIELAB chroma diagrams ( $a^*$ , $b^*$ ) of the systems: ORS18, TLS18, NRS18, SRS18

#### Offset Reflective System: ORS18



Two of many device dependent systems of SC28 standard documents

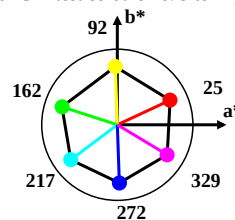
#### Television Luminous System: TLS18



Ongoing experts discussions about a definition of a device independent elementary colour system  
There are advantages and disadvantages of for example:

#### Natural Reflective System: NRS18

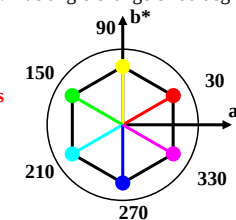
(Hue angles of CIE test colours no. 9 to 12)



Two device independent elementary colour systems under expert discussion

#### Standard Reflective System: SRS18

(Approximation: Hue angle change of 60 degrees)



ZE161-3

CIE standard illuminants and CIE other illuminants according to CIE 15:2004 "Colorimetry"

CIE standard illuminant D65

Basic CIE research and standard work

CIE colour spaces: CIELAB, CIELUV  
Colour order systems: NCS, RAL, DIN 6164, Munsell, OSA  
CIE Colorimetry according to CIE Publ. 15

Application field in Image Technology

Television, Monitors: ITU, IEC 61966-X  
All (mobile) Displays, Data projectors: ISO 9241-300 to 307  
Colour office devices: ISO/IEC 15775  
ISO/IEC TR 24705

Need for many applications

Color Space LMSLAB  
User friendly!  
nce\* -> nch\* -> rgb\*

CIE standard illuminant D65

CIE Colorimetry according to CIE Publ. 170-1

For the case of standardisation CIE 15 recommends to use in application one of the CIE standard illuminants whenever possible.  
DIN V 18599-4:2007, "Illumination" recommends daylight (D65) use in offices

ZE161-7

BAM-test chart no. ZE16; Workflow and CIELAB camera  
Elementary colours, device independent colour  $olv^*$ ,  $cmY^*$ ,  $tch^*$

input:  $rgb$   $setrgbcolor$

output: no change compared to input