

# Colour Definition Report - RPS

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# Thank you!

Thank you for choosing our NCS Colour Services. Annually we help hundreds of companies to manage their colours. We hope this Colour Definition Report will support you in your colour management process and look forward to assisting you again in the future.

## Included

Instrumental measurement to determine the exact NCS notation of a sample, visual assessment to nearest NCS standard and the colour difference to a Selected standard.

## Report data

### COLOUR DEFINITION

Name/No.	Exact NCS	Nearest NCS S	x	y	z	S	C	$\phi$
NCS 2142-R83B	2142-R83B	S 2040-R80B	28.1	30.8	57.2	21.3	41.9	R82.5B
Texstar sample A order 103268	2342-R84B	S 2040-R80B	25.6	28.1	54.2	23.3	42.9	R83.8B
Texstar sample B from 2017	1943-R83B	S 2040-R80B	29.2	32.2	60.3	19.4	43.3	R83.4B

### COLOUR DIFFERENCE

Name/No.	$\Delta E_{CMC(1:1)}$	$\Delta E_{CMC(2:1)}$
NCS 2142-R83B	Standard	Standard
Texstar sample A	2.2	1.2

## VISUAL ASSESSMENT

Name/No.	Visual assessment	Visual rating
Texstar sample A order 103268	Textile sample is slightly darker and very slightly more blue and more chromatic.	$\phi$ :1B, s: 2, c: 1
Texstar sample B from 2017	Textile sample is very slightly lighter and very slightly more blue and more chromatic.	$\phi$ :1B, s: 1, c: 1

## EXPLANATION

EXACT NCS	Exact NCS Notation determined by colour measurement														
NEAREST NCS S	The closest colour sample available in the SS 19102:2004 NCS Atlas determined by visual colour matching*.														
X, Y, Z	CIE tristimulus values (Y=light reflectance factor) evaluated in CIE standard illuminant D65 and CIE 10 degree standard observer.														
S, c, $\phi$	Exact value of NCS blackness (s), chromaticness (c) and hue ( $\phi$ )														
$\Delta E_{CMC}(k:1)$	CIE colour difference between the Sample and Standard evaluated in CIE standard illuminant D65 and CIE 10 degree standard observer with coefficients 1:1/2:1														
Visual rating	<p>Visual difference rating in close agreement with ISO 3668</p> <table border="1"> <thead> <tr> <th>RATING</th> <th>DEGREE OF DIFFERENCE</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>No perceptible difference</td> </tr> <tr> <td>1</td> <td>Very slight, i.e. just perceptible, difference</td> </tr> <tr> <td>2</td> <td>Slight, but clearly perceptible, difference</td> </tr> <tr> <td>3</td> <td>Moderate difference</td> </tr> <tr> <td>4</td> <td>Considerable difference</td> </tr> <tr> <td>5</td> <td>Very major difference</td> </tr> </tbody> </table>	RATING	DEGREE OF DIFFERENCE	0	No perceptible difference	1	Very slight, i.e. just perceptible, difference	2	Slight, but clearly perceptible, difference	3	Moderate difference	4	Considerable difference	5	Very major difference
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Visual components	<p>NCS uses the visual components blackness (s), chromaticness(c) and hue(<math>\phi</math>) to describe colour differences in close agreement with ISO 3668:1996. Use the visual ratings defined above to describe if the components blackness or chromaticness in the match is larger or smaller (-) compared to the standard. The hue difference is described by notating the positive visual rating followed by one of the NCS primary hues Y, R, B and G in the direction of the difference.</p> <p>Example: A colour difference described in words as <i>Moderate difference towards red, slightly darker and very slightly more chromatic</i> would be described with components and ratings as follows: <math>\phi</math>:3R, s: 2, c: 1</p>														

\*Normal colour vision and the ability to see small colour differences is a fundamental ability for personnel involved in colour control. Please contact us for more information on colour vision testing.

## About NCS

The Natural Colour System<sup>®</sup> (NCS) is a systematic method of denoting and describing colours, and the relationship between them, purely from their perceptual qualities i.e. how humans see and perceive colour. The measured NCS values describe the colour perception of surface colours in a specified viewing condition. The system does not include colours that appear to belong to translucent or luminescent objects (so-called volume colours and luminous colours), nor does it include other visual properties of the surface layer, such as gloss and texture. An NCS Notation does not describe the physical or chemical properties of an object.

## About Colour Difference

The  $\Delta E$  value quantifies the difference between two colour samples.  $\Delta E_{00}(1:1:1)=0$  is a perfect match, i.e. no difference in colour between the measured samples. The limit of visually perceptible colour difference is approximately  $\Delta E_{00}(1:1:1)=0.3$  for a person with normal colour vision.  $\Delta E_{00}(1:1:1)=1$  is in many industries considered a commercially acceptable match. For the calculated  $\Delta E_{00}(1:1:1)$  value to correspond well with what one sees, samples with similar surfaces (texture and gloss) should be compared.

$\Delta E$  is calculated between the CIELAB coordinates from different measurements with the aim that the scale should correlate with small visually perceived colour difference.

The formula commonly used and recommended for textile purposes is the  $\Delta E_{CMC(2:1)}$  formula, standardised in 1988 (British Standard, BS 6923:1988). In this report both  $\Delta E_{CMC(1:1)}$  and  $\Delta E_{CMC(2:1)}$  are given. For best performance of the formula, surfaces with the smallest possible differences in gloss and texture should be compared. Under these criteria, the limit for visually perceived colour difference is around 0.3  $\Delta E$ . For  $\Delta E_{CMC(1:1)}$  values larger than 5 units the correlation should not be trusted.

# About Visual assessment

Reaching a small visually perceived colour difference is normally the most important criteria for accepting a colour match. Even though visual assessments are time consuming, have low repeatability and are difficult to make in an objective way they are of vital importance because it is the method the end customer will use to judge the colour match. Measured colour differences on the other hand are much simpler to perform in an objective and repeatable way but they are limited by the way the instrument simulating a very special visual viewing situation.

The measured colour differences acquired in different measurement geometries or with different instrument settings and calculation methods may differ considerably. In the same way, the visually assessed colour differences can also differ considerably if the viewing situations are changed. For these reasons it is very important to specify the viewing and measurement conditions used to accept the match.

If the colour standard and the match have the same gloss and surface structure, good correlation between the visually assessed and the measured colour differences is normally obtained. If the gloss or surface structure differs, visual and measured colour differences may not correlate well. In this situation, the precedence between visual and instrumental acceptance must be defined and clear specification of measurement and viewing conditions is important.

# Measurement Conditions for Colour Measurement

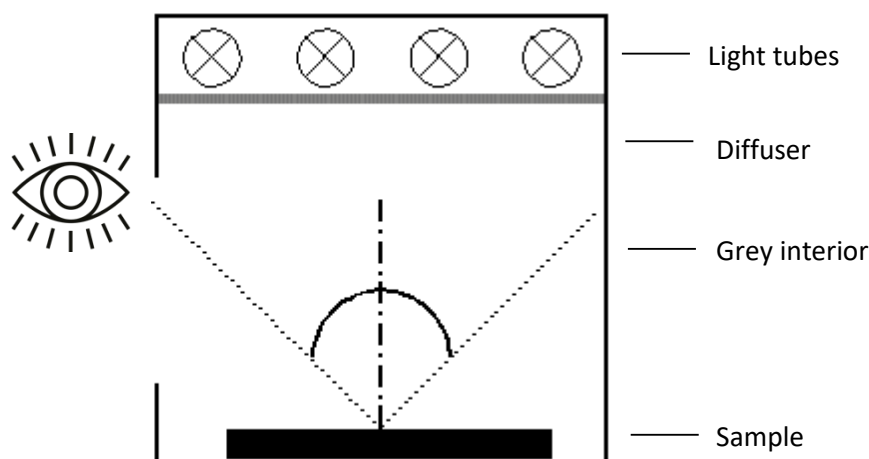
The colour measurement and analysis have been carefully made, checked and certified by NCS Colour AB according to Swedish Standard, SS 01 91 04, in a spectrophotometer traceable to NCS reference instrument, CM3700d. The CIE measurement values in accordance with CIE publ. 15.2018 is based on the following specification:

- Measurement geometry:  $d_i:8^\circ$ , UV component included.
- CIE standard illuminants D65 and CIE 10 degree standard observer.
- Readings every 10 nm from 360 to 750 nm.
- NCS S 0500-N (white) is used as a sample backing for reflectance measurement.

## CONDITIONS FOR VISUAL ASSESSMENT

Viewing conditions - In close agreement with ISO 3668:2017.

- Diffuse illumination
- Illumination type: D65
- Illumination level 1000-4000 lx
- Illumination angle: Normal to the sample
- Viewing angle: 45 degree from the sample normal
- Viewing distance: 0.4-0.5 m
- Medium grey interior of viewing booth



# Services and Solutions

If you want to visually see the nearest standardised NCS colour please order a sample (A4, A6 or A9) of it on our [website](#).

If you want to translate your nearest standardised NCS colour into CMYK or RGB and export it to your architecture or design software, please use NCS Colourpin App.

If your colour should be communicated with accuracy to other parties within your colour process, we can assist you in duplicating the colour into colour standards with our NCS Precise Colour Sample service.

Please note that NCS - Natural Colour System<sup>®</sup> is a registered trademark and may only be used commercially after a license agreement has been signed with NCS Colour AB.

If you have any questions, please, do not hesitate to contact us. We are always glad to be of service.

We look forward to hearing from you again.

With best regards,

NCS COLOUR AB