

**TECHNICAL OPINION OF THE EUROPEAN RAILWAY AGENCY REGARDING:
COLOUR OF SIGNS AS THEY ARE SPECIFIED IN ANNEX N OF THE PRM TSI**

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1. Introduction

Through a letter dated March 8th, 2011 from Mr Maurizio Castelletti, EC DG MOVE, to Mr Jean-Charles Pichant, European Railway Agency, the Agency is requested to give a technical opinion on the colours of signs as they are specified in annex N of the PRM TSI : the specification is felt to be too prescriptive by some sector organisations.

2. References

Ref. N°	Document Reference	Latest Issue
[1]	Commission Decision 2008/164/EC of 21 December 2007 concerning the technical specification of interoperability relating to 'persons with reduced mobility' in the trans-European conventional and high-speed rail system	
[2]	ISO 3864-1 Graphical symbols – Safety colours and safety signs Part 1: design principles for safety signs in workplaces and public areas.	2002-05-15
[3]	Question/Clarification n° QC-INS-008 from NB-Rail	Draft 01a 2010-12-29

3. Question to the Agency

The Agency is requested to give its technical opinion on the specification of colours as they are defined in annex N 4 to N 7 of the PRM TSI. Specifications are as follow:

N.4 International wheelchair sign

<i>Symbol</i>	<i>Background</i>
<i>RAL 9003 Signal white</i>	<i>RAL 5022 Night blue</i>
<i>NCS S 0500-N</i>	<i>NCS S 6030-R70B</i>
<i>C0 M0 Y0 K0</i>	<i>Pantone 274 EC (C100 M100 Y0 K38)</i>

N.5 Inductive loop sign

<i>Symbol</i>	<i>Background</i>
<i>RAL 9003 Signal white</i>	<i>RAL 5022 Night blue</i>
<i>NCS S 0500-N</i>	<i>NCS S 6030-R70B</i>
<i>C0 M0 Y0 K0</i>	<i>Pantone 274 EC (C100 M100 Y0 K38)</i>

N.6 Call for assistance/call for information sign

<i>Symbol</i>	<i>Background</i>
<i>RAL 9003 Signal white</i>	<i>RAL 5022 Night blue</i>
<i>NCS S 0500-N</i>	<i>NCS S 6030-R70B</i>
<i>C0 M0 Y0 K0</i>	<i>Pantone 274 EC (C100 M100 Y0 K38)</i>

N.7 Emergency call sign

<i>Symbol</i>	<i>Background</i>
<i>RAL 9003 Signal white</i>	<i>Green</i>
<i>NCS S 0500-N</i>	<i>according</i>
<i>C0 M0 Y0 K0</i>	<i>ISO 3864-1:2002 chapter 11</i>

Whereas not mentioned in the request for a technical opinion, annex N8 could also be added as it specifies the same colours.

N.8 Priority seating signs

<i>Symbol</i>	<i>Background</i>
<i>RAL 9003 Signal white</i>	<i>RAL 5022 Night blue</i>
<i>NCS S 0500-N</i>	<i>NCS S 6030-R70B</i>
<i>C0 M0 Y0 K0</i>	<i>Pantone 274 EC (C100 M100 Y0 K38)</i>

Specifying a RAL/Pantone/NCS value such as for all symbols and all backgrounds except the emergency call sign is felt as causing problems with the corporate design of some Railway Undertakings when they use slightly different colours for the rest of the signage. A preference is made to the definition of a spectrum such as for the emergency call sign background (N7) defined as “Green according to ISO 3864-1:2002 chapter 11”.

Would it be possible to specify the other colours with boundaries according to the same norm ?

4. Technical analysis

It has not been possible to find a technical justification for the detailed specification of colours during the first drafting of the PRM TSI in the archives of AEIF. The only requirement pre-existing the PRM TSI can be found in UIC 413 that states in its paragraph A.6.8.1:

“For maximum visibility and legibility, ISO/TC 145, SC2 recommends that text and pictograms be produced in white on a dark blue background.” This is probably the reason for a detailed specification of the white and dark blue colours in the PRM TSI.

However, this very detailed reference to three colours only can be perceived as over-specifying and the requirement for some flexibility in the definition of “white” and dark blue” is legitimate.

Defining colours is not easy as they can be defined by a lot of different methods. Additionally, it is not easy to convert a colour definition from one method to another.

4.1 Definition of colour:

The first possibility is to use a palette such as the one proposed by RAL, Pantone or NCS. That is the method used in the PRM TSI for defining “White” and “Night blue”. The following are samples of the colours defined for the background of the signs in the PRM TSI (the colour may be altered on the screen and when printed).



*RAL 5022 “Night Blue”
specified in PRM TSI*



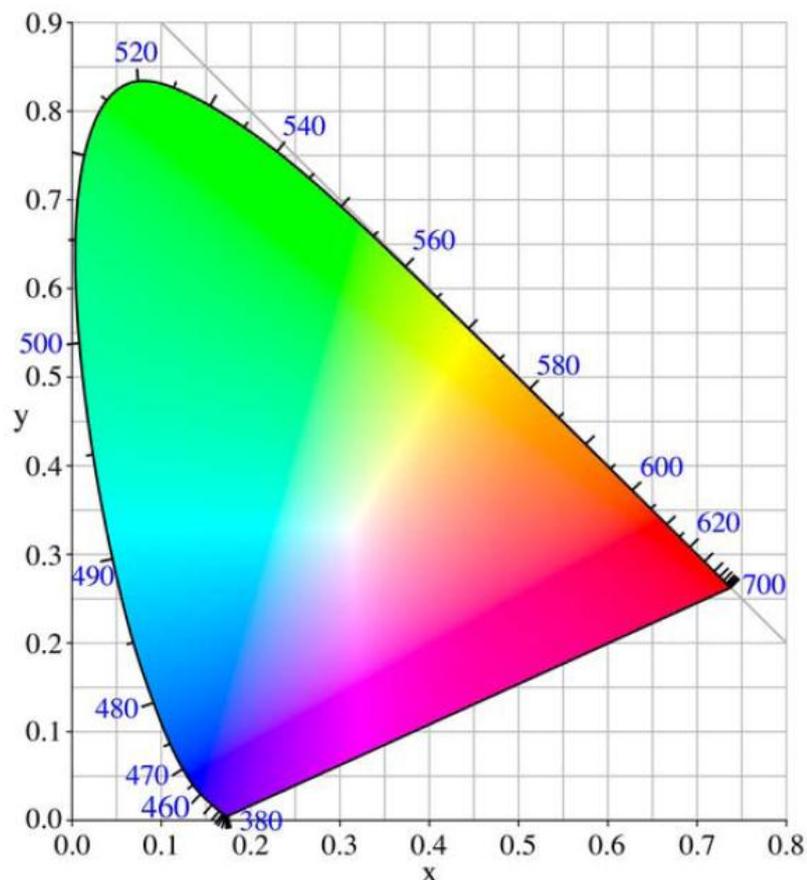
*Pantone 274 EC
specified in PRM TSI*



*NCS 6030 R70B
specified in PRM TSI*

In addition to offering no flexibility, this method has the disadvantage of using proprietary and commercial information, NCS being the colour system from the Scandinavian Color Institute, while Pantone is an American company and RAL belongs to the German Reichsausschuß für Lieferbedingungen und Gütesicherung.

ISO 3864-1 that is referred to in the document from NB-rail [3] uses another method called CIE xyY that is based on the emitting wavelength of the colour. All colours are represented on the “CIE xyY colour space chromaticity diagram” as shown here below. The outer curved boundary is the monochromatic emitting wavelength shown in nanometres. Each colour has unique coordinates (x,y) in the diagram.



In this diagram, ISO 3864-1 defines the coordinates of the corner points that define the contours of the area into which the colour can be called respectively “Red”, “Blue”, “Yellow”, “Green”, “White” and “Black” in the meaning of the standard ISO 3864-1 that is relative to safety signs.

This method of defining colours is the most accurate as it is based on the intrinsic property of a colour that is its wavelength.

4.2 Application to the PRM TSI:

The question is whether the CIExyY definitions can be used also for defining the “White” and “Blue” colour in the TSI.

It can certainly be used for the definition of “White” as there is no distinction between “white” according to the PRM TSI and “white” according to ISO 3864-1. But as far as the “blue” is concerned, the PRM TSI dark blue has nothing to see with the ISO 3864-1 “blue” that is

rather a light blue used for safety signs, to indicate a mandatory action, and always in a circular sign. An example is given herebelow :

*Safety sign – mandatory action
coloured in “blue” according to ISO 3864-1*

However, the method itself could be applied, i.e specifying coordinates of corner points that would define the contours of the area into which the colour could be called “Dark blue”. This task can be assigned to the Working Party in charge of the revision of the PRM TSI, it is certainly not a task for the Agency alone.

5. Conclusions

The current specification of colours to be used for signs can not be considered as an error in the TSI, there is however no technical reason why the TSI definition should be as restrictive as it is.

Therefore, another definition giving some flexibility should be considered during the revision of the PRM TSI.

The best way of specifying a colour independently from commercial colour spectra like RAL, Pantone and NCS is to use the CIE xyY method and to set the coordinates of the corner points that define the area into which the colour should be. This will be considered in the course of the revision of the PRM TSI.

In the meantime, the definition of “white” according to ISO 3864-1 can be used, but not the definition of “blue” since the ISO 3864-1 blue is not a dark blue.

For “blue”, the colour proposed by an applicant shall be compared to the three referenced colours and can be accepted if it corresponds to the common sense definition of “dark blue”. For instance, colours such as RAL 5002 Ultramarine Blue / RAL 5003 Sapphire Blue / RAL 5004 Black Blue / RAL 5011 Steel Blue / RAL 5013 Cobalt Blue or their equivalent colours in the Pantone and NCS systems can all be considered as dark blues.

EUROPEAN RAILWAY AGENCY

The text of annex N of the PRM TSI can then be interpreted as follows until it is revised by the Working Party:

N.4 International wheelchair sign

N.5 Inductive loop sign

N.6 Call for assistance/call for information sign

N.8 Priority seating signs

<i>Symbol</i>	<i>Background</i>
<i>White</i>	<i>RAL 5022 Night blue</i>
<i>according</i>	<i>NCS S 6030-R70B</i>
<i>ISO 3864-1:2002 chapter 11</i>	<i>Pantone 274 EC (C100 M100 Y0 K38)</i>
	<i>Or similar</i>

N.7 Emergency call sign

<i>Symbol</i>	<i>Background</i>
<i>White</i>	<i>Green</i>
<i>according</i>	<i>according</i>
<i>ISO 3864-1:2002 chapter 11</i>	<i>ISO 3864-1:2002 chapter 11</i>