

Railway Group Standard

GK/RT0057

Issue One

Date December 2014

Lineside Signal and Indicator Product Design and Assessment Requirements

Synopsis

This document mandates the technical parameters for lineside signalling hardware and displays, and the scope of readability assessment applicable to product certification.

This document contains one or more pages which contain colour

Copyright in the Railway Group Standards is owned by Rail Safety and Standards Board Limited. All rights are hereby reserved. No Railway Group Standard (in whole or in part) may be reproduced, stored in a retrieval system, or transmitted, in any form or means, without the prior written permission of Rail Safety and Standards Board Limited, or as expressly permitted by law.

RSSB Members are granted copyright licence in accordance with the Constitution Agreement relating to Rail Safety and Standards Board Limited.

In circumstances where Rail Safety and Standards Board Limited has granted a particular person or organisation permission to copy extracts from Railway Group Standards, Rail Safety and Standards Board Limited accepts no responsibility for, nor any liability in connection with, the use of such extracts, or any claims arising therefrom. This disclaimer applies to all forms of media in which extracts from Railway Group Standards may be reproduced.

Published by:

**RSSB
Block 2
Angel Square
1 Torrens Street
London
EC1V 1NY**

© Copyright 2014

Rail Safety and Standards Board Limited

Railway Group Standard

GK/RT0057

Issue One

Date December 2014

Lineside Signal and Indicator Product Design and Assessment Requirements

Issue record

Issue	Date	Comments
One	December 2014	Original document. This standard is the result of an analysis of technical compatibility between lineside signalling systems and train operations. The requirements set out in this standard are consistent with the development of products that are capable of being readable, which is a pre-requisite of obtaining an authorisation for placing a new or modified lineside signalling system into service.

Superseded documents

The following Railway Group Standard is superseded, either in whole or in part as indicated:

Superseded documents	Sections superseded	Date when sections are superseded
GK/RT0045 issue three Lineside Signals, Indicators and Layout of Signals	2.1.3; 2.2.1.1; 2.2.1.4a; 2.2.1.4b; 2.2.1.4c; 2.2.1.5a; 2.2.1.5b; 2.2.1.6; 2.2.1.8a; 2.2.1.8b; 2.2.1.8c; 2.2.4.1; 2.2.4.4; 2.2.4.5; 2.2.4.7; 2.2.5.2; 2.2.5.3; 2.2.5.5; 2.2.5.6; 2.2.5.8a; 2.2.5.8b; 2.2.6.1; 2.2.6.3; 2.2.6.4; 2.2.6.5; 2.2.6.6; 2.2.6.8; 2.2.6.8; 2.2.6.9; 2.2.7.2; 2.2.7.3; 2.2.7.5; 2.2.8.3; 2.2.8.5; 2.3.1.2a; 2.3.1.2ab; 2.3.1.2b; 2.3.2.2; 2.3.2.3; 2.3.2.4; 2.3.2.6; 2.3.3.2; 2.3.3.3; 2.4.1.2; 2.4.1.5a; 2.4.1.5b; 2.4.2.2; 2.4.2.4a; 2.4.2.4b; 2.4.2.5a; 2.4.2.5b; 2.4.3.2; 2.4.3.4a; 2.4.3.4b; 2.4.4.2; 2.4.4.3a; 2.4.4.3b; 2.4.4.4; 2.4.5.2; 2.4.5.3; 2.4.5.4; 2.4.6.5; 2.4.6.7; 2.4.6.8; 2.4.7.3; 2.4.7.5; 2.4.7.6; 2.4.8.2; 2.4.8.3a; 2.4.8.3b; 2.5.1.3; 2.5.1.4; 2.5.1.5; 2.5.2.2; 2.5.2.3; 2.5.3.2; 2.5.3.3; A1.1; A2.1; B1.1a; B1.2ab; B1.4; C1.1a; C1.1b; C1.1c; C1.3	07 March 2015

GK/RT0045 issue three Lineside Signals, Indicators and Layout of Signals, ceases to be in force and is withdrawn as of 07 March 2015.

Supply

The authoritative version of this document is available at www.rgsonline.co.uk.
Uncontrolled copies of this document can be obtained from Communications, RSSB, Block 2, Angel Square, 1 Torrens Street, London EC1V 1NY, telephone 020 3142 5400 or e-mail enquirydesk@rssb.co.uk. Other Standards and associated documents can also be viewed at www.rgsonline.co.uk.

Lineside Signal and Indicator

Product Design and Assessment Requirements

Railway Group Standard
GK/RT0057
Issue One
Date December 2014

Contents

Section	Description	Page
Part 1	Purpose and Introduction	5
1.1	Purpose	5
1.2	Introduction	5
1.3	Approval and authorisation of this document	6
Part 2	Lineside Signalling Product Design Requirements	7
2.1	Colour light signal heads	7
2.2	Position light signals	10
2.3	Banner repeater signals	12
2.4	Semaphore signals	14
2.5	Lineside sign signals	20
2.6	Junction indicators	24
2.7	Alphanumeric indicators and preliminary junction indicators	26
2.8	Coloured light signalling indicators	29
2.9	Loading / unloading indicators	31
Part 3	Light Parameters	34
3.1	Light colours	34
3.2	Light properties	35
Part 4	Product Performance Assessment Requirements	36
4.1	Phantom display performance	36
4.2	Readability performance assessment	36
4.3	Readability performance assessment: pass / fail criteria	36
Part 5	Application of this Document	37
5.1	Scope	37
5.2	Exclusions from scope	37
5.3	General compliance date	37
5.4	Exceptions to general compliance date	37
5.5	Health and safety responsibilities	38
Definitions		39
References		42
Tables		
Table 1	Colour light signal displays	7
Table 2	Colour light signal hardware parameters	8
Table 3	Colour light signal display parameters	9
Table 4	Position light signal displays	10
Table 5	Position light signal hardware parameters	10
Table 6	Position light signal display parameters	11
Table 7	Banner repeater indicator displays	12
Table 8	Banner repeater signal hardware parameters	12
Table 9	Banner repeater indicator display parameters	14
Table 10	Semaphore signal displays	15
Table 11	Semaphore signal hardware parameters	19
Table 12	Semaphore signal display parameters	20

Railway Group Standard

GK/RT0057

Issue One

Date December 2014

Lineside Signal and Indicator Product Design and Assessment Requirements

Table 13	Lineside sign signal displays	20
Table 14	Lineside sign signal hardware parameters	23
Table 15	Lineside sign signal display parameters	23
Table 16	Junction indications	24
Table 17	Junction indicator hardware parameters	25
Table 18	Junction indication parameters	26
Table 19	Alphanumeric indications	26
Table 20	Preliminary junction indications	27
Table 21	Indicator hardware parameters	28
Table 22	Alphanumeric and preliminary junction indication parameters	29
Table 23	Coloured light signalling indications	30
Table 24	Coloured light indicator hardware parameters	30
Table 25	Coloured light signalling indicator display parameters	31
Table 26	Loading / unloading indications	32
Table 27	Loading / unloading indicator hardware parameters	32
Table 28	Loading / unloading indicator display parameters	33
Table 29	Signalling light colour specifications	35

Figures

Figure 1	Colour light signal head: display element spacing	9
Figure 2	Banner repeater indicator parameters	13
Figure 3	Upper quadrant stop arm	16
Figure 4	Upper quadrant distant arm	16
Figure 5	Upper quadrant subsidiary arm	17
Figure 6	Upper quadrant disc	17
Figure 7	Stop board dimensions	21
Figure 8	Fixed distant board dimensions	22
Figure 9	Retro-reflective buffer beam dimensions	22

Lineside Signal and Indicator

Product Design and Assessment Requirements

Railway Group Standard**GK/RT0057****Issue** One**Date** December 2014

Part 1 Purpose and Introduction

1.1 Purpose

1.1.1 This document mandates:

- a) Technical parameter requirements for lineside signalling products, so that the signal aspects and indications they generate are capable of being read when those products are used in accordance with their intended application.

And

- b) The lineside signalling product readability assessment requirements.

1.2 Introduction

1.2.1 Background

1.2.1.1 Lineside signalling systems are provided by infrastructure managers to convey the following types of information to authorised users involved with train operations:

- a) Movement authority information.
- b) Routing information.
- c) Permissible speed information.
- d) Locally monitored infrastructure status information.
- e) Operating instructions.

1.2.1.2 The information is conveyed in the form of signal aspects, route indications, lineside operational signs and other signalling indications.

1.2.1.3 This document specifies the appearance requirements and readability performance assessment requirements for products used as lineside signals and indicators so that the displays they generate are capable of being read by authorised users.

1.2.2 Related requirements in other documents

1.2.2.1 The following Railway Group Standards contain requirements that are relevant to the scope of this document:

GE/RT8037	Signal Positioning and Visibility
GI/RT7033	Lineside Operational Safety Signs
GK/RT0058	Lineside Signal Aspect and Indication Requirements
GK/RT0070	Signalling Layout Design and Assessment Requirements [in preparation, will replace some parts of GK/RT0045]
GO/RT3451	Train Drivers - Suitability and Medical Fitness
GO/RT3452	Train Movement - Medical Fitness Requirements

Railway Group Standard

GK/RT0057

Issue One

Date December 2014

Lineside Signal and Indicator Product Design and Assessment Requirements

1.2.3 Supporting documents

1.2.3.1 The following Rail Industry Guidance Note supports this Railway Group Standard:

GK/GN0657	Guidance on Lineside Signal and Indicator Product Design and Assessment Requirements
-----------	--

1.3 Approval and authorisation of this document

1.3.1 The content of this document was approved by Control Command and Signalling (CCS) Standards Committee on 16 October 2014.

1.3.2 This document was authorised by RSSB on 24 October 2014.

Lineside Signal and Indicator

Product Design and Assessment Requirements

Railway Group Standard
GK/RT0057
Issue One
Date December 2014

Part 2 Lineside Signalling Product Design Requirements

2.1 Colour light signal heads

2.1.1 Display appearance

2.1.1.1 Each colour light signal head display shall have the appearance of an arrangement of either one or two coloured lights, as shown in Table 1.

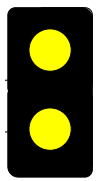
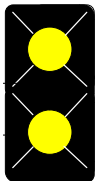
Display type	Description	Example
Red	One red display element	
Single yellow	One yellow display element	
Double yellow	Two vertically aligned yellow display elements	
Flashing single yellow	One flashing yellow display element	
Flashing double yellow	Two vertically aligned flashing yellow display elements	
Green	One green display element	

Table 1 Colour light signal displays

Lineside Signal and Indicator Product Design and Assessment Requirements

2.1.2 Hardware and display parameters

2.1.2.1 Colour light signal heads shall:

- a) Comply with the hardware parameters set out in Table 2.

And

- b) Be capable of generating signal displays that meet the parameters set out in Table 3.

Design parameter		Value
Hardware size	Signal head housing	Unspecified
	Backboard	
Hardware colour	Forward facing surfaces	BS 4800-2011 shade 00-E-53: Black
	All other surfaces	Silver or grey
Hardware shape (signal head with backboard)		Unspecified
Hardware surface gloss		Unspecified

Table 2 Colour light signal hardware parameters

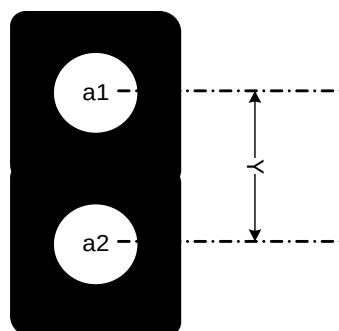
Design parameter		Value
Display element luminous intensity		Unspecified: Simultaneously lit display elements of the same colour shall have a similar intensity
Display element size		Unspecified: All display elements shall be the same radius (-5%, +10%)
Display element contrast		Unspecified
Display element colour (See Part 3)	Red display	Signal red light
	Yellow displays (all types)	Signal yellow light
	Green display	Signal green light
Display element shape		Circular disc appearance from >20 m
Non-flashing (steady) displays		Shall be capable of generating a lit display that has an uninterrupted appearance

Lineside Signal and Indicator

Product Design and Assessment Requirements

Railway Group Standard**GK/RT0057****Issue** One**Date** December 2014

Design parameter		Value
Flashing displays		Shall be capable of generating displays that comply with the flashing aspect parameters set out in GK/RT0058 Appendix A.13
Number of display elements		See Table 1
Arrangement of display elements		See Table 1
Spacing of simultaneously illuminated display elements (see Figure 1)	Vertical spacing (double yellow displays)	$Y \leq 5 r$ (miniature tunnel signals excepted) $Y \leq 8.8 r$ (miniature tunnel signals only) (where r is the display element radius)
	Horizontal spacing	Not applicable

Table 3 Colour light signal display parameters**Notes:**

1. a1 and a2 denote two simultaneously displayed, vertically aligned display elements contained within one signal head assembly
2. Dimension Y denotes the distance between vertically presented display element centres (a1 – a2)

Figure 1 Colour light signal head: display element spacing

Lineside Signal and Indicator Product Design and Assessment Requirements

2.2 Position light signals

2.2.1 Display appearance

2.2.1.1 Each position light signal display shall have the appearance of an arrangement of two coloured lights, as shown in Table 4.

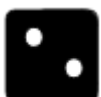
Display type	Description	Example
PLS red ON	Two horizontally aligned red display elements	
PLS yellow ON	Two horizontally aligned yellow display elements	
PLS steady OFF	Two white display elements aligned in the upper quadrant position	
PLS flashing OFF	Two flashing white display elements aligned in the upper quadrant position	

Table 4 Position light signal displays

2.2.2 Hardware and display parameters

2.2.2.1 Position light signals shall:

- Comply with the hardware parameters set out in Table 5.

And

- Be capable of generating signal displays that meet the parameters set out in Table 6.

Design parameter		Value
Hardware size		Unspecified
Hardware colour	Forward facing surfaces	BS 4800-2011 shade 00-E-53: Black
	All other surfaces	Silver or grey
Hardware shape		Unspecified
Hardware surface gloss		Unspecified

Table 5 Position light signal hardware parameters

Lineside Signal and Indicator

Product Design and Assessment Requirements

Railway Group Standard**GK/RT0057****Issue** One**Date** December 2014

Design parameter		Value
Display element luminous intensity		Unspecified: Simultaneously lit display elements of the same colour shall have a similar intensity
Display element size		Unspecified: Both display elements shall be the same radius
Display element contrast		Unspecified
Display element colour (See Part 3)	PLS red ON display	Signal red light
	PLS yellow ON display	Signal yellow light
	PLS OFF displays	Signal white light
Display element shape		Circular disc appearance from >10 m
Steady displays		Shall be capable of generating a lit display that has an uninterrupted appearance
Flashing displays		Shall be capable of generating displays that comply with the flashing aspect parameters set out in GK/RT0058 Appendix A.5
Number of display elements		Two
Arrangement of display elements	PLS ON displays	Horizontally aligned
	PLS OFF displays	Aligned 45° above horizontal in a clockwise direction
Spacing of simultaneously illuminated display elements		5 x r (where r is the light source radius)

Table 6 Position light signal display parameters

Lineside Signal and Indicator Product Design and Assessment Requirements

2.3 Banner repeater signals

2.3.1 Display appearance

2.3.1.1 Each banner repeater display shall have the appearance of a black bar displayed against a circular illuminated area, as shown in Table 7.

Display type	Description	Example
Banner ON	A black band, horizontally aligned, displayed against a lit white background	
White banner OFF	A black band, aligned in the upper quadrant position and displayed against a lit white background	
Green banner OFF	A black band, aligned in the upper quadrant position and displayed against a lit green background	

Table 7 Banner repeater indicator displays

2.3.2 Hardware and display parameters

2.3.2.1 Banner repeater indicator heads shall:

- Comply with the hardware appearance parameters set out in Table 8.

And

- Be capable of generating displays that meet the display appearance parameters set out in Table 9 and Figure 2.

Design parameter			Value
Hardware size			Unspecified
Hardware colour	Banner repeater head housing: forward facing surfaces		BS 4800-2011 shade 00-E-53: Black
	Banner repeater head housing: all other surfaces		Silver or grey
	Banner arm		BS 4800-2011 shade 00-E-53: Black
Hardware shape	Banner repeater head housing		Rectangular or circular when viewed from the front
	Display area	Banner arm	Rectangular
		Illuminated background	Circular
Hardware surface gloss (housing)			Unspecified

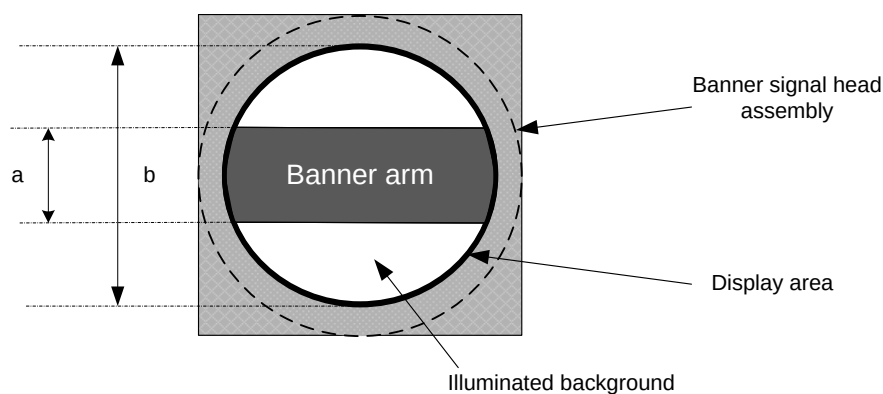
Table 8 Banner repeater signal hardware parameters

Lineside Signal and Indicator

Product Design and Assessment Requirements

Railway Group Standard**GK/RT0057****Issue** One**Date** December 2014

Design parameter		Value
Display element luminous intensity	Illuminated background	Unspecified: Both halves of the illuminated background shall have a similar intensity
Display element size	Banner arm	$a = 0.4b$ (+/-10%)
	Illuminated background	$b =$ Unspecified
Display element contrast		Unspecified

**Figure 2** Banner repeater indicator parameters

Design parameter		Value
Display element colour (See Part 3)	Green background	Signal green light #1
	White background	Signal white light
Display element shape	Illuminated background	Bi-furcated circular disc appearance
	Banner arm	Rectangular appearance
Non-flashing (steady) displays		The banner repeater indicator shall be capable of generating a lit display that has an uninterrupted appearance
Flashing displays		Banner repeater indications shall not appear to flash
Number of display elements		See Table 7