Performance Specification for Low Location Safety Way Guiding Systems, Approved Document B Wayfinding and BS 5499 part 4 & Part 10 signage.

Performance specification for Low location Safety way guiding systems (SWGS) in conjunction with adequate Signage to assist confidence of evacuation in fire and power fail scenarios.

Taking into account amendments to Approved Document B to improved signage above 11 metres in height.

This specification shall be read and understood in satisfying not only the codes and standards and also the requirements of the RRFSO (Regulatory Reform Fire Safety Order (2005).

Low location Way Finding

Way Guiding Rail System

Adopting the standards of BS EN 16069,International Building Code 2009 10.24 and or the New York building code provision 24-RS6-1/A, for this tender is to provide a low location way guiding rail system to incorporate a 50mm photoluminescent rigid or taped system.

The rail must be conforming to an ABS Flame retardant product as a minimum to UL-94 in burn test condition for reduced Flammability.

The Carrier can be colour designed to compliment the building environment to allow a consistent visual flow within the property environment.

The way guiding rail system shall have pre formed internal and external angles of the same conforming product. Under no circumstances will cut ends be accepted to marry into corners.

For the provision of the tender proposal the corners of frames and or right angles associated with the carrier will carry the same detailed profile as each other.

Where the carrier start and end at pre-designated locations it shall have a built end cap to assist aesthetics in the same profile as the carrier and corner details.

The overall width of the way guiding rail system shall be no more than 70mm when a 50mm photoluminescent product is used allowing a 10mm margin either side.

Photoluminescent illumination performance products

The Photoluminescent way finding products shall obtain critical illumination performance criteria within the manufacturing process of the product.

The tender provision shall comply with products accepted within PSPA (Photoluminescent Safety products Association), BSI (British Standards Institute) and Lloyd's register type insured approval.

1. Photoluminescent materials for Safety Way Guidance System components shall be of three or multiple layer laminated construction. The layers shall be internally bonded and fully compatible with excellent resistance to ageing, and common aggressive agents and cleaning fluids. The surface layer or layers shall be optically clear, and have been tested for materials likely to absorb in the activating wavelength of the chosen pigments.
2. The optically active photoluminescent (phosphorescent layer), shall use doubly doped alkali earth aluminate crystals or blends, with particle size optimized for luminance decay performance at ambient temperature, and expected low lighting activation. The pigments used shall be with optimum particle packing characteristics, to give uniform surface brightness and rapid charging. Extremely high purity alumina must be used as precursor.
3. The base layer or layers colour, sand characteristics shall be optimised for reflective power and whiteness, using quality Titanium dioxide pigments.
4. The overall multi-layer composites shall be of optimum thickness for application.

PROPERTIES

Photoluminescent material properties required for use as Safety Way Guidance System components:

1. Materials shall be produced following a Total Quality Assurance programme, and properties shall be continuously followed using Statistical Process Control techniques for control of the process, and identification and separation of defects. Certification to BS ISO 9001:2015 Quality Standard shall be required for all base materials.
2. Materials shall be produced from Poly Vinyl Chloride (PVC) material, or similar that is inherently flame retardant. The minimum classification is self-extinguishing.
3. Materials shall have tensile strength, elongation and modulus, and other physical properties optimised for durability and resistance, and shall depend on whether component products are designed to be rigid or flexible.
4. Rigid materials shall have typical thickness of 1.2-1.4mm, and flexible materials no less than 0.3mm, and typically no greater than 0.5mm.
5. Supplier and client shall agree on requirements, as given in BS ISO 17398:2004 about durability and performance. Typical properties for safety way guidance products are given below:
6.

7. Properties	Test methods	Unit	Typical value
Colour	-	-	Yellow / Green
Thickness	DIN 53370:2011	mm	1.3mm
Shrinkage	DIN 53377:2015 (80°C / 10 min)	%	< 3
Tensile stress at break	ISO EN DIN 527-1-2:2012	%	not applicable
Surface hardness	DIN 53505:2000	Shore D	approx. 72
Scratch resistance	DIN 68861-4:2013 (Erichsen 413)	N	0,9
Abrasion resistance	DIN 68861-2:2013 (Taber 5131)	revolutions	1500 (without change of photoluminescence)
Rigidity test	ISO 17398:2004		Rigid at thickness of ≥1200 mm
De-lamination strength of all layers	ISO 17398:2004	N / 25mm	Not detectable, material breaks
Gloss	ISO 17398:2004	60%	Low / Intermediate
Photoluminescence	ISO 17398:2004	mcd/m^2	See table 1

Fire test	DIN 53438-3:1984	class	K 1
Artificial weathering	EN ISO 105-A02:1993		The exposed areas were slightly darker after exposure. Contrast ratio: grade < 5
Resistance against salt spray test	DIN 50021:1988 Exposure time: 120h		no visible change
Resistance to climatic conditions	ISO 17398:2004		-25°C: no visible change +80°C: no visible change
Resistance to humidity	ISO 17398:2004		no visible change
Water resistance	ISO 17398:2004		no visible change
Resistance to test liquids	ISO 17398:2004	Grade (5 =no vis. change 1=surface destroyed)	Distilled Water (W): 5 Detergent solution (L): 5 General cleaner (K): 5 Transformer oil (T): 5 White spirit (B): 5 Antifreeze (F): 5 Diesel fuel (D): 5
Chemical resistance against cold liquid	DIN EN 12720:2014	Grade (5 =no vis. change 1=surface destroyed)	Acetone: 4 1:1 Butyl-/Ethylacetate: 3-4 Ethanol 48%: 5 Ethanol 96%: 5
Wipe resistance	ISO 17398:2004		No visible change
Volatiles	The ingredients of the different layers have been classified as non-critical for the human being. Moreover, GC-ECD and GC-MS measurements of the material heated to a temperature of 80°C do not show any critical peaks.		

Photometric Optical Properties

Accredited suppliers shall be capable to produce test data for luminance decay performance, using typical illumination to be found in the application, and established during inspection and survey, as required by BS ISO 16069:2017. Test certificates shall be in manufacturers name and for the specified material. Some standard conditions are given below, and typical properties compared to Standards.
The Minimum Photoluminescent Luminance decay properties for Safety Way Guidance Systems shall be according to ISO 17398:2004 Class C, also called PSPA Class C. However to meet requirements for activation with short exposure time and low illumination lux, materials should largely exceed Class C. Below should be considered as minimum typical performance.

Photoluminescent Luminance Performance Data

Excitation: lux level and time	**2 minutes**		**10 minutes**		**30 minutes**		**60 minutes**		**Time to 0.3mcd/m² (min)**	
1000 lux for 5 minutes (DIN 67 510:2009 / PSPA/ISO 16069:2017)	1020	690	195	140	54	45	22	20	2100	>1800

21.5 lux for 120 minutes (NYC RS6-1)	-	-	54	30	-	-	10	7	90 min	
									6	5
25 lux for 24 hours (ISO 15370:2010 & IMO RESOLUTION A.752(18):1993)	-	-	60	15	-	-	11	2	-	-
50 lux for 15 minutes (TEL/231)	250	210	65	50	18.5	15	8.5	7	>900	>900

☐ Wav Guidance Material ☐ Standard

Luminance results are measured in mcd/m^2

N.B. All values at all decay times are evaluated from mean readings of standard production data.

Colour in daylight and in dark condition

Object colour for Photoluminescent materials for Safety Way Guidance Systems according to BS ISO 16069:2017, and IBC Code 2009, and safety signs and materials according to BS ISO 3864-4:2011, BS ISO 7010:2020, and Escape Route Signs according to BS 5499-4:2013.
Special materials for way guidance systems have both phosphorescent and fluorescent characteristics, to enhance visibility in daylight conditions and achieve higher luminance contrast, with safety colours on signs and markings. These products have distinct colour appearance.

For colour in the luminance decay mode, ISO 3864-4:2011 requires that the Luminance decay shall be greater or equal to 500 mcd/m2, 2 minutes after illumination at 200 lux using D65 Daylight Standard light source.

Safety Way Guidance System materials, adopted for luminous stairwell egress path markings to meet IBC Code 2009 Section 10.24, shall meet luminance decay performance as required, illuminated with only 2 hours 10.6 lux of fluorescent source, at 4500 degK colour temperature.

They shall also be tested according to requirements of the Material Acceptance Department, New York City Building Department, as required by Law in New York City.

Accreditations:

Typical Accreditations from supplier of Safety Way Guidance materials components and safety signs:
Users are advised to audit suppliers and establish capability, to carry out at least systematic testing for luminance decay performance, and to be capable of producing test certificated for materials supplied.
ISO 9001:2015

These products shall be provided with certificates of conformity and placed within files to assist with the regulation 38 element of the fire safety manual on building handover.

Within the design and selection process of a Low Proximity way guiding system attention should be drawn to the lighting levels to assist in photoluminescent charging rates and attention given based on PSPA guidelines on singular or dual bands.

Based on the Photoluminescent codes stated references should support installations of photoluminescent around exit doors to assist on the evacuation and egress pathways.

Signage assisting a Low Location Photoluminescent system

As part of the provision for this tender the Low Location carrier and Way guiding system shall also include the floor and stairway positions for the deployment of FRS in the deployment of their duties.

These signs will be based on the illumination performance characteristics of the previously quoted photoluminescent standard. The identification signs shall conform to the wording of the new and improved ADB (Approved document B) for new builds above 11m and the Scottish regulations for directional signage.

A selection of left and or right handed directional decals (Direction of travel) signs must be affixed to the carrier and placed along at the most pertinent points along the evacuation or egress pathways.

Each property or flat within the designated building shall be provided with a low location door number that will conform to the same characteristic of illumination performance mentioned in the previous paragraph's.

This determines the ease of property identification for FRS and shall be determined in a 150mm x 150mm size sign for visual application on viewing distance.

This sign shall be mounted within an ABS Flame retardant frame and match the profile of the Low Location carrier system for aesthetics.

Photoluminescent Stair Nosing Product

For the provision of tendering purposes the Stair Nosing's will assist the low location way finding solution to compliment this system for step edge identification purposes in power failed or fire evacuation scenarios. Dependent on stairway-constructed material, the fixings of the product must comply with the manufacturers installation recommendations to that particular product.

Fluorescent Illumination performance criteria shall conform to 20 lux @4000k to a 30-minute charge to allow 3 hours of visibility in poorly lit areas.

Fluorescent Illumination performance criteria shall conform to 300 lux @4000k to a 30-minute charge to allow 8 hours of visibility in well-lit areas.

The photoluminescent element of this stair nosing must contain at least a 15mm front facing band (step Edge) and conform to the relevant standard.

The stair nosing insert shall comply with an internal and external environment, complying with a wet/dry and heavy traffic environment with a (PTV) pendulum test values and slip resistance >76 dry and >67 wet.

The material content must be made up of Aluminum Alloy and adhering to the UKSRG, HSE and CIRIA guidelines on pedestrian slip risk assessment, using the pendulum test (BS7976-2 Test Certificate).

External inserts along with external waterproof adhesive tape are used within external applications. Internal inserts and internal tapes are used within internal applications.

All stair nosing treads shall comply and exceed the minimum requirement as per BS 8300:2:2018, 2009 and HSE Publication.

The Stair nosing inserts at all times shall highlight and reference, BS 8300:2:2018, BS9266 & BS5395 in association with 30 points of (LRV) Light reflective values ranging from 5 to 81.

The recommended dimensions of the stair nosing shall comply with BS 8300:2:2018, BS9266 & BS 5395.

The choice of stair nosing products shall be in conjunction with the stair design as in square edge, rake back, and bullnose or as per the manufacturers recommendations for particular stair type.

Allowance shall be made for double channel for very heavy footfall and or it retains the clear ladder effect and the stair is safe.

Product fixing systems

Manufacturers shall be consulted and fully adhered to within suggestion to fixing of chosen products to all varying substrates.

Signage Requirements incorporating new and improved Floor and Stairway identification.

For the provision of tendering purposes the property shall as a requirement of a HRRB (High Rise Residential Building) property, the tenderer shall adopt a new and improved stairway, floor and flats identification signage system in buildings above 11m,however it may be at the discretion of the client to adapt the system to below 11m in height.

These shall be in accordance with the recently updated Approved Document B amendments to signage in new dwellings above 11m.

The Building Regulations 2010

Approved Document B: Fire safety Volume 1 – Dwellings
2019 edition

List of amendments

May 2020

These signs shall be determined in product to the same photoluminescent standard in previous paragraphs and installed as previously mentioned within an ABS Flame retardant frame to compliment the low location carrier.

Stairway and Floor numbering signs shall be joined as a singular sign to portray two elements of information held on a singular sign.

All signs must conform in text, type and legend to BS 5499 parts 4 and parts 10 and have fully accredited conformance with the HSSA (Health and Safety sign association).

Particular attention shall be taken to determine the BS 5499 Part 10 elements of signage standards, general hazards and warnings in association within the characteristic of the built environment.

All signage presented at this stage must contain a certificate of conformance to the standard and registered within the Regulation 38 document on property Fire safety.

A choice of signage must be to the conforming standard however the manufacturers recommended viewing distances can depict sign sizes. These must be selected based on Health and Safety requirements and under no circumstances be led by anybody without the necessary competence to do so.

Clear, concise and identifiable Signage must retain its intrinsic information within a power-failed environment and within the HRRB environment support a BS 5266/1 system.

Correct selection of signs shall be adhered and conformance to the standard must at all times be achieved.

The selection of signage process shall also require attention and not over sign an area to assist confusion or sign blindness, once again adopting the guidance standards.

Fire Safety and Fire Fighting Equipment

Particular attention shall be observed towards fire safety and fire safety signage within all properties and any other Health and Safety signs requiring attention of BS 5499 part 10.

Attention shall be placed upon sign siting and attention drawn to BS ISO 3864-1 for the correct placement in accordance to size and viewing distance.

These signs should also marry the luminance performance criteria set out in previous paragraphs to determine an absolute marriage of all products to the said standard.

Fire Action Notices

Fire Action Notices form an intrinsic reference to residents in a “what to do in the event of Fire” scenario.

Fire action notice signs must be placed in accordance to the guidance or at the specific requirements of the client, however correct size and siting must be in accordance to the standard.

Within this tender document it is requested that the provision of a QR (Quick Response) code shall be placed within the design of the fire action notice to allow a quick reference via a mobile device to allow translation into a comprehensive set of languages to determine successful understanding for Non English speaking residents.

The language translation software will be installed through a securely hosted platform, that will be updated accordingly to provide the best and most comprehensive set of translations based on the type and content of each sign. Each type of sign will look familiar however will be representative of the fire safety strategy of that building.

The software will be flexible allowing new signs and translations to be added should the requirement arise. And or a new translation is requested within a particular property.

The fire action notice shall as previously stated be determined by a frame of the same visual characteristic of the low location carrier system.

Sustainability and Environmental impact

Within this tender proposal, attention shall be drawn to the energy efficiency within the built environment, and back illuminated electrically powered luminaires shall be replaced at the design stage to adequately sign the egress pathways with the assured and proven Photoluminescent signage to the standard set out, however attention should be placed on the correct siting of luminaires and emergency element (BS 5266/1) within close proximity to the sign in a HRRB environment. This will include lux level recordings of lighting levels in the means of escape to comply with the recommended values set out by CIBSE guidance. Also if back illuminated signs are to be replaced to attain a conforming and robust signage strategy, it will be expected that the BS 5266/1 Emergency lighting element conform to the recommended standard.

Adequate illumination levels shall be achieved within the design process along the evacuation and egress pathways to assist in the illumination of the photoluminescent charging regimes.

A reference to BS 5266/1 for evacuation pathways and installations in accordance with BS 7671 should support adequately the charging regimes for the Low location way guiding systems.