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Code of practice for the design, construction, installation & maintenance of publicity, decorative and general purpose signs

1 Scope

This document details the requirements for the design, manufacturing, installation, inspection and maintenance of interior or exterior signs compliant with European standards for safety and sustainability. It applies to illuminated and non-illuminated, fixed or portable signs, and to advertising or decorative devices using the same techniques, including “digital displays”. It applies to interior or exterior, permanent, illuminated or non-illuminated sign elements.

For signs require illumination refer to EN 50107 and the relevant national standards and associated annex for electrical standards and procedures.

This document is not applicable to road traffic signs, safety signs or fire safety signs, trackside railway signs or airside airport signs.

2 Normative references

List of referenced documents to be compiled upon completion of the base document.

3 Terms and definitions

3.0 For common terms used in Eurocodes refer to EN1990 section 1.5.1

3.1 Sign

A sign is any permanent and durable word, letter, model, emblem, border, outline, box, device, representation, announcement or direction, fixed or free standing, including a framework, where necessary, with a means of attachment to a building or supporting structure. It can be a complete factory assembly or components delivered to site for final assembly and installation.

3.1.1 Illuminated sign

Sign with means of illumination, such means being either an integral part of the sign or external to the sign An illuminated sign is not a luminaire. A sign is meant to be seen and not to illuminate the surroundings.

3.1.2 Portable Sign

Small self-contained sign which is supplied as a complete unit and is intended to be placed in position and, if illuminated, connected to a mains supply, without the use of tools.

3.2 Installation

Set of components/assemblies used for final assembly by fixing and wiring on site where applicable.

3.3 Parts of signs

3.3.1 Sign face

The part of the sign which conveys the message and is turned towards the observer.

3.3.2 Enclosure

Outer casing intended for indoor or outdoor use to provide a degree of protection against corrosion, dust, rain and to provide safety by preventing access to hazardous parts (e.g. supply voltage live parts).

3.3.3 Structure

Organized combination of connected parts designed to carry loads and provide adequate rigidity.

3.4 Personnel

3.4.1 Design engineer

A general term covering multiple engineering disciplines. Responsible for developing sign products and detailed designs suitable for manufacture and installation, ensuring compliance with European and National Standards for safety and sustainability.

3.4.2 Competent person

Someone who has sufficient training and experience or knowledge and other qualities that allows them to carry out the task properly. The level of competence required will depend on the complexity of the situation and the particular task. Local requirements may apply. See relevant National annex.

3.5 Processes

In any of the following processes attention shall be paid to both structural and electrical safety. If any problems are seen with structural integrity, actions to minimise the risk (e.g. Prevent public access below the sign) shall be taken immediately, and subsequently actions to correct the problem shall be taken as soon as possible. If an unsafe electrical situation is noted, the sign shall be isolated until a repair and test can be carried out.

3.5.1 Inspection

A visual assessment of both the structural and, if applicable, electrical condition of the sign (with or without opening the sign) and documentation of the process, results and recommendations. E.g. Cleaning, maintenance, repair, or electrical isolation (if unsafe).

3.5.2 Cleaning

3.5.2.1 External

Removal of surface dirt and debris using readily available materials.

3.5.2.2 Internal

Opening of the sign by competent persons to remove water, dirt and debris. Clearing of drain holes.

3.5.3 Maintenance

Set of activities performed during the working life of a sign in order to enable it to fulfil the requirements for reliability.

3.5.4 Repair

Activities performed to preserve or restore the function of a sign that fall outside the definition of maintenance.

3.5.5 Risk assessment

Evaluate risks associated with identified hazards and determine appropriate ways to eliminate or control the hazards.

3.6 Sign material examples

3.6.1 Plastic materials

3.6.1.1 Typical thermoplastics

- a) Acrylic - Poly methyl methacrylate (PMMA)
- b) ABS - Acrylonitrile-butadiene-styrene
- c) Nylon (Polyamide)
- d) Polycarbonate
- e) Polypropylene
- f) Polystyrene

3.6.1.2 Typical thermosetting materials

- a) Alkyds / Polyester
- b) Epoxy
- c) Phenolic
- d) Polyurethane
- e) Silicone

3.6.1.3 Typical plastic composite terms

- a) FRP – Fibre reinforced
- b) GRP – Glass fibre reinforced
- c) CRP – Carbo fibre reinforced

3.6.2 Flexible plastic

Plastic material, (typically polyvinyl chloride [PVC]), a flexible fabric requiring a tensioning system when used as a sign face.

3.6.3 Rigid plastic

Plastic material, (typically Acrylic/ PMMA) which is essentially rigid and does not require a tensioning system when used as a sign face

3.6.4 Aluminium composite material (ACM)

Sheet material comprising an aluminium skin or skins on a rigid or semi-rigid core of a different material

3.6.5 Aluminium used in sheet, extruded sections & profiles.

3.6.6 Steel used in sheet, structural hollow sections & profiles.

4 Service life

4.1 The service life of the sign shall be either:

- a) As specified by the purchaser on the order; or
- b) As agreed between the purchaser and the manufacturer; or
- c) As specified by the manufacturer to the purchaser; or
- d) As specified in a National Annex of this standard; or
- e) if not specified or agreed in accordance with a), b), c), or d) then a period of 7 years.

4.2 The service life shall depend on adequate on going inspection and maintenance of the sign. The continuous inspection and testing of structural and static elements is essential. The maximum duration between inspections shall not exceed 24 months, or as specified in a National Annex.

4.3 The natural ageing of the materials, which can cause the visual appearance to change, shall not be taken into account in the service life.

4.4 Service life shall not be considered as the same as manufacturer's warranty.

5 Sign materials requirements

5.1 General

Materials used in the construction of a sign shall meet the minimum requirements of the service life of the sign (see Clause 4).

The materials shall be selected and used so as to prevent any risk of a fire breaking out and spreading. In addition, sign makers for petrol filling stations shall conform to the purchaser's specification & national requirements.

5.2 Metals

5.2.1 The structural integrity of the sign shall not be adversely affected by corrosion of any part of the sign for the service life of the sign.

5.2.2 All visible and exposed surfaces and edges of the sign shall be corrosion resistant for the service life of the sign.

5.2.3 Metals intended for external use shall:

- a) Be corrosion resistant for the service life of the sign; or
- b) Conform to 6.2.9.

5.2.4 Metals with a significant difference in electrochemical potential shall be insulated from one another to avoid galvanic corrosion.

5.3 Wood and wood laminates

Wood, wood laminates and fibreboard specified in a sign design shall be protected in accordance with EN927.

5.4 Plastics

Plastics used in the construction of a sign shall retain their physical properties for the service life of the sign. In particular, the manufacturer shall ensure that the application of the sign and/or its maintenance does not adversely affect its structural integrity, appearance and function.

5.5 Glass

Glass panels specified in a sign design shall be made of safety glass conforming to EN 12150 and EN 12600.

5.5.1 Safety glass options:

- a) VSG – laminated safety glass,
- b) ESG – toughened glass
- c) TVG – heat-strengthened glass

5.6 Aluminium composite material (ACM)

ACM shall be finished in accordance with EN 1396 for pre-coated aluminium.

6 Sign design and construction

6.1 General

6.1.1 Signs which are to be used out of doors (external signs) and signs that are to be used indoors (internal signs) but are still subjected to wind load shall conform to 6.2.1 and to 6.2.2 to 6.13. Signs which are to be used indoors and are not subject to wind load shall conform to 6.2.2 to 6.13.

6.1.2 Where thickness dimensions are specified for materials such as glass, plastics, wood and metal, these shall be regarded as the nominal dimensions and normal commercial tolerances shall be permitted.

6.2 Structure

6.2.1 Resistance to wind load

The imposed wind load for an external sign or an internal sign that is subjected to wind load shall be calculated in accordance with EN 1991-1-4 such that the sign withstands the wind load at the site of installation.

For signs with two supporting columns, 50% of total load shall be applied and reacted to each column.

In the case of multiple site installations basic wind speed (V_{bmap} m/s), effective type of terrain, elevation and distance to coast or open water, where applicable, shall be agreed with the purchaser.

6.2.2 Execution of steel sign structures

The steel structure shall be designed and manufactured in accordance with EN1993 and EN1090.

EN 1993-1-1 relates to grades S235 to S460 steel. (Ref product standards EN 10210-1 and EN 10219-1)

The Execution class (ref EN1090-2) shall be determined by the design engineer.

Signs shall be designed to:-

Consequence class (ref EN1990 table B1) CC2

Service category (ref EN1090-2) - SC1

Production category (ref EN1090-2)

- PC1 for sign structures fabricated from steel grades below S355
- PC2 for sign structures fabricated from steel grades S355 and above

6.2.3 CE compliance for steel sign structures

For CE marking of sign steelwork (ref EN 1090-1 and EN ISO 3834-2) a declaration of performance shall be included.

All steel used shall include batch test certification to EN10204/3.1 compliance with EN1090.

EN10204 certification 3.1 requires the mill to produce test results for the steel batch detailing supplied steel properties including weld and impact characteristics.

6.2.4 Timber structure shall be designed in accordance with EN1995.

6.2.5 Aluminium structure shall be designed and manufactured in accordance with EN1999 and EN1090-3

6.2.6 Partial factors

For determination of all partial factors and class refer to relevant Eurocode and related national annex.

A wind partial factor (γ_f) of 1.5 shall be used to calculate the ultimate limited state (ULS). The proof stress of the selected material grade shall not be exceeded. Additional partial factors may be required compliant with the relevant Eurocodes and National Annex.

The serviceability limited state (SLS) shall be taken as a factor of 1.0 and used to calculate the temporary deflection of the sign. The maximum allowable deflection is $\pm 0.02 \times$ sign height subject to there being adequate clearance to other structures. The temporary deflection of the sign or part of the sign shall not cause any part of the sign to fail, be dislodged, exceed the sign material plastic limit or become unsafe during its service life.

6.2.7 Foundations for fixed free standing signs

Foundations shall be specified in accordance with Eurocode 7 (geotechnical structures)

- EN1997-1 for Geotechnical design
- EN1997-2 for ground investigation and testing

When determining the type and dimensions of foundations for a free standing sign consideration shall include, but may not be limited to:

- a) the founding material
- b) ground water depth
- c) existing trees
- d) location of existing buried services
- e) frost depth
- f) Bases may require reinforcing to accommodate bending effects in the concrete.
- g) The maximum bearing pressure is dependent upon specific site ground conditions.
- h) Typically firm clay has a minimum safe bearing capacity of 76kN/m^2 whilst unidentified made up ground could be less than 38kN/m^2 .

- i) Concrete foundations shall be designed for the effects of factored loading.
- j) When calculating foundation bearing stress the eccentric load effect shall be considered.
- k) Where holding-down bolts are used, they shall be designed for the effects of factored loading and be anchored into the foundation by use of suitable anchor plates or by an embedded steel cage compliant with ETAG 001.
- l) Expanding and resin grouted anchors may be used, provided that it can be demonstrated that the required performance can be achieved in accordance with manufactures recommendations
- m) Base plates shall be either tightened down to the top of the foundation or, if raised off the top of the foundation for the purposes of levelling, shall be grouted beneath.
- n) Welded mesh reinforcement to be calculated and specified by design engineer.
- p) Other foundations.

6.2.8 Thickness of cladding materials

The minimum thicknesses of cladding materials shall be calculated in accordance with the relevant Eurocode and National Annex.

6.2.9 Protection against corrosion

The measures taken for protection against corrosion shall be appropriate for the materials and environment.

The sign shall be designed so that it is protected against harmful visual and structural effects of corrosion.

Supporting steel structures shall have a protective treatment conforming to EN 1090-2 Annex F.

Steel substrates shall be protected by an appropriate paint, zinc rich primer, hot zinc application or electrochemical plating to effectively seal and insulate the steel, and/or prevent direct contact with dissimilar metals and fixings that could otherwise result in galvanic corrosion.

Hot dipped galvanized steel components shall conform to EN ISO 1461 with the corrosion class specified by the purchaser.

Any part of an aluminium post that is placed under the ground shall be protected by an appropriate anti-corrosion treatment (eg bitumen or a paint that tolerates alkaline environments)

External signs shall have drainage sufficient to avoid dirt, debris or water entrapment between or within materials and/or components.

Where used, coil-coated aluminium sheet and strip shall conform to EN 1396.

6.2.10 Protection from damage by birds and rodents

Unless otherwise specified by the purchaser, where the issues of potential damage by birds is prevalent, measures including, spikes and wires across perch surfaces shall be applied to prevent fouling of birds. Appropriate methods of protection against damage by rodents shall be applied.

6.2.11 Thermal expansion and contraction

Where sign components are made from a combination of different materials (such as plastics and metal) with different values of linear thermal expansion, provision shall be made for movement between the components and for the means of accommodating that movement to ensure that:

- a) Gaps do not occur between adjacent panels at the minimum temperature specified in 6.4.1;
- b) There is adequate room within the sign frame to allow for the maximum expansion at the highest temperature within the sign or the surface of the face panel specified in 6.4.2.

6.2.12 Joints in signs

Joints shall meet the visual requirements specified by the purchaser and the service life of the sign (Clause 4).

Welding, brazing or soldering of joints in metallic signs shall be carried out in accordance with the recommendations of the suppliers of the welding, brazing or soldering systems.

6.2.13 Mechanical properties

Where structural components are made from materials that deteriorate over the service life of the sign, the designer shall obtain relevant life data from the supplier of those materials. This shall include details of the deterioration of mechanical properties through life. The minimum value of the mechanical properties occurring during the service life and the minimum and maximum temperatures specified in 6.4.1 and 6.4.2, respectively, shall be used in the design calculations referred to in 6.2.1. Structural plastic materials used in signs shall be ultraviolet (UV) stabilized or protected from UV deterioration by other means.

6.2.14 Adhesives

Where adhesives are part of the structural integrity of the sign, the sign designer shall obtain from the adhesive supplier written confirmation of performance over the service life of the sign (Clause 4) in respect of the following criteria:

- a) The minimum and maximum temperatures specified in 6.4.1 and 6.4.2, respectively;
- b) The wind load specified in 6.2.1;
- c) The structural loading of the sign as specified by the sign design engineer. The minimum value of bond strength occurring over the specified service life at the minimum and maximum temperatures specified in 6.4.1 and 6.4.2, respectively, shall be used in the design calculations referred to in 6.2.1.
- d) For design engineering calculations a minimum material partial factor of 3.0 should be used. (ref EN1999-1-1 Table 8.1)
- e) When using adhesives for bonding aluminium refer to EN1999-1-1 Annex M for additional guidance
- f) Adhesives, including double sided tapes, shall be applied in accordance with the supplier recommendations, compliant with the criteria as detailed above

6.2.15 Bolts and Nuts

- a) Mechanical strength of bolts to be in accordance with ISO 898-1
- b) Mechanical strength of nuts to be in accordance with ISO898-2
- c) Bolts shall be grade 8.8 unless otherwise specified
- d) Ref EN 1993-1-8 Table 3.1 – Characteristic values of f_{yb} and f_{ub} for bolts

Bolt classes	4.6	5.6	8.8
f_{yb} (N/mm ²)	240	300	640
f_{ub} (N/mm ²)	400	500	800

- e) Bolted connection design to comply with EN1993 for steel substrates and EN1999 for aluminium substrates

- f) Bolted fabrication to be carried out in accordance with EN1090

6.2.16 Welding

- a) Weld design shall comply with EN1993-1-8
- b) Weld fabrication shall be carried out in accordance with EN1090

6.2.17 Support of face panels

Face panels of rigid plastics materials shall have their edges supported, and, if necessary, the whole panel shall be supported, by means of anti-deflection props (fixed to the sign face and the sign structure), to ensure that the deflection of the panel at any point does not exceed 5 times the thickness of the panel when subjected to the pressure and suction forces calculated in accordance with 6.2.1.

Spacing between anti-deflection props shall not exceed 1 m.

6.3 Protection against ingress of dust and water

6.3.1 General

Enclosures shall provide a suitable level of protection to prevent the accumulation and stagnation of water, and accumulation of dust and other solid bodies inside the sign.

6.3.2 Enclosures and casing (boxes, enclosed letters, pylons, etc.)

The enclosures of enclosed signs shall meet the following requirements:

6.3.2.1 Ventilation

The enclosures shall be sufficiently ventilated to prevent condensation and overheating issues.

NOTE; The installation of filters is recommended to avoid the ingress of dust and insects

6.3.2.2 Drain holes

The enclosures of signs for outdoor use shall be sufficiently drained to avoid water accumulation and stagnation. The drain holes or similar openings used for this purpose shall be sufficiently large, with a diameter greater than or equal to 5 mm, first, to ensure that they do not get clogged up with dust or debris between maintenance inspections, and second, to maintain their degree of protection.

NOTE 1; National requirements may apply. Refer to National annex.

NOTE 2; The number of drainage holes required depends on the shape of the device, the letter or the box, and on the number of locations where water can build up. For example, the letter "S" only needs one drainage hole, while the letter "M" needs three.

6.4 Heating of components

The minimum temperature shall be as specified by the purchaser of the sign, or, if no minimum temperature is specified by the purchaser, shall be $-20\text{ }^{\circ}\text{C}$ for external signs and $0\text{ }^{\circ}\text{C}$ for internal signs or as specified by the material/component suppliers.

The maximum temperature within the sign shall not exceed the maximum service temperature of any materials or components in its construction, as specified by the suppliers of the materials or components. Ventilation shall be provided if service temperatures might be exceeded.

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Materials used in the construction of signs shall be protected from heated parts of the installation which could raise the material to its ignition temperature or cause the material to be deformed or decomposed.

6.5 Fixings

Metal used for fixings shall conform to 5.2 and comply with 6.2.15

Plastics materials used for fixings shall conform to 5.4.

Screws used for the assembly of a sign, other than self-tapping or thread forming screws, shall be provided with lock washers or thread locking devices.

6.6 Means of attachment

6.6.1 Suspended signs

Suspended signs having a flexible means of suspension shall be provided with at least two means of attachment. The two means of attachment shall operate independently of each other and shall be such that should one fail, the strength of the remaining means of attachment ensures that the sign remains suspended.

Safety bolts or other means of locking shall be fitted to the hooks of a suspended sign to prevent accidental unhooking.

Where hanging hooks are fastened to the top of a sign, the load shall be spread by using washers both inside and outside the body of the sign. The diameter of these washers shall be not less than 3 times the diameter of the bolt. Where the weight of the sign is greater than 11 kg, the hanging bolts shall be fixed directly into a reinforcing plate within the sign.

6.6.2 Individual letters, backing panels for signs and individual components of a sign shall be provided with a minimum of two means of attachment to a wall or supporting structure.

6.6.3 Conductors carrying the electrical supplies to a sign shall not be used as means of suspension or attachment for that sign, unless specifically designed to carry the weight of the sign, e.g. low voltage busbars, low voltage suspension cables.

6.7 Finishing

If paints or other finishing treatments are to be used, such treatments shall only be used if the supplier is able to provide written evidence of the satisfactory performance of their products over a period corresponding at least to the service life of the sign (see Clause 4).

Pre-treatment, paint application and curing, inks, vinyl graphics and vitreous enamel shall be used in accordance with the recommendations of the material supplier.

The quality and thickness of any anodic oxidation coating to be applied to aluminium shall be agreed between the sign supplier and the purchaser in accordance with EN 12373-1.

Powder coatings applied to aluminium or galvanized steel shall conform to EN 13438.

Where paints, vinyl graphics or similar are applied to non-flammable materials, such as metals, the resulting surface type shall be tested by the supplier in accordance with EN13501-1. Where paints and inks are applied to the surfaces

of flammable materials, e.g. acrylics, the resulting surface type shall have a spread of flame of not worse than that of the underlying substrate.

Where paints, vinyl graphics or similar are to be used on plastics materials, the sign manufacturer shall obtain from the supplier written evidence that they are compatible with the plastics materials to be painted and that they will not cause surface crazing.

Where plastics materials are formed prior to decoration, the materials shall be annealed in accordance with the recommendations of the suppliers of the plastics materials so as to avoid surface crazing after the application of paints or inks.

Flux residues remaining after soldering, brazing or welding operations carried out during the construction of a sign shall be either removed or effectively neutralized before a finish is applied.

6.8 Documentation

Technical Construction file.

A Technical Construction File (TCF) shall be made and retained by sign manufacturer for 10 years. If requested by sign owner a copy of TCF should be supplied.

The Technical Construction File shall contain a copy of relevant documents, such as, but not limited to:

- a) Description of the sign
- b) Name and address of manufacturer
- c) Installation date
- d) Name and address of installer
- e) Structural calculations
- f) Method of fixing details
- g) Certificate(s) of Conformance
- h) Circuit diagram
- i) Inspection recommendations
- j) Maintenance recommendations

7 Sign Installation

7.1 Design criteria

Design considerations shall include, but may not be limited to, the following key elements:

- a) Ensure that the type and size of fixing is suitable for the application and substrate.
- b) Fixing selection and positioning shall be based on a degree of redundancy (where the failure of one fixing results in load sharing by adjacent fixings).
- c) The tensile, bearing and shear forces that the fixing and substrate can sustain.
- d) All potential imposed loads and the required reactions.
- e) That all Eurocode criteria are met and partial factors applied
- f) The requirement for the production of method statements and risk assessments to ensure that due diligence has been performed.

7.2 Statutory and authorities permissions

Consideration shall be given to all local authorities and permissions required, including, but not limited to:

- a) Planning regulations.
- b) Building regulations.
- c) Listed Building legislation
- d) Conservation area legislation.
- e) Refer to National Addenda for specific requirements

7.3 General safety obligations

Adequate preparation of site is essential to a successful installation. Key elements of safe installation include, but may not be limited to:

- a) A risk assessment shall be carried out and the resultant method statement shall indicate the preventative precautions that must be observed to minimise any hazard.
- b) The senior installation engineer or site supervisor shall also make any additional risk assessments that may not have been apparent at the design stage, or to adjust those already laid down.
- c) All equipment shall be thoroughly checked before use, and the area cordoned off from any person not involved in the installation.
- d) Only when it is safe to do so shall the actual 'fixing' commence.
- e) Accurate drilling and preparation of the fixing holes are crucial to the overall performance of the fixing.
- f) The hole size, depth and cleanliness shall all be in accordance with the sign designer and fixing manufacturer's instructions.
- g) The condition of the background material is not always known. The installation engineer shall determine suitability of substrate at the designed fixing positions.
- h) If the background substrate is unsuitable it shall be brought up to the required standard defined in the design or alternative fixing methods and/or positions found.
- i) In the case of the latter the engineer shall be sure that the revised positions are suitable for the intended load. Where ever possible guidance shall be sought from the sign designer who will be able to confirm that the alterations to the design are satisfactory.
- j) Where electrical works are required these shall be in accordance with the relevant current national/European wiring regulations (eg BS7671, IEC 60364)
- k) Refer to the Use of Work Equipment Directive (currently EU DIRECTIVE 2009/104/EC) to confirm the minimum safety and health requirements for the use of work equipment by workers at work (second individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC)

7.4 Access equipment

Any work at height shall be carried out from a platform with suitable edge protection, this may be in the form of mobile elevated work platforms, mechanical access, aluminium tower access, traditional steel tube, and scaffold, fitting scaffold or steel system scaffold of which there are several types.

- a) Scaffold needs to be strong enough to take the weight of those working on it, their tools and, where applicable, the signs. There shall be adequate workspace for safe movement.
- b) Protection shall be provided for members of the public who pass close to the installation
- c) Operators shall be properly trained in the use of the equipment

7.5 Road transportation

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Consideration shall be given to local regulations regarding the transport of new signs for installation and the removal of old signs for recycling or waste disposal.

7.6 Cold weather working

Consideration shall be given to the forecast precipitation and temperatures before laying concrete and protection during the curing process

7.7 Sign installation on fascia

Consideration shall be given, but may not be limited to:

- a) The sign fixing shall be capable of sustaining and transmitting to the building support structure all dead, imposed and wind loads
- b) The sign fixing shall comprise both vertical support and horizontal restraint
- c) Where necessary provision shall be made to accommodate differential movement between the sign and building support structure
- d) The sign and its fixings shall be corrosion resistant appropriate to the local environment
- e) The number, type and size of fixings to be defined by sign manufacturer in written installation instructions
- f) When fixing to existing timber based support structure the moisture level within the timber/plywood shall be checked with a proprietary moisture meter. No installation shall proceed when fixing to timber type substrates if the moisture level exceeds 20%.

8 Sign inspection cleaning and maintenance

8.1 General

The sign manufacturer shall inform their customer that the signs and fixings supplied and/or installed meet the required standards in accordance with current legislation. See 6.8.

The sign manufacturer shall inform their customer that the customer's legal obligations may require them to have a maintenance and inspection programme in place.

NOTE Sign buyers are not obliged to take any maintenance contract offered but must engage a suitably qualified company to undertake maintenance and safety checks.

The Sign manufacturer shall recommend a maintenance regime and state the assumptions made on loading in the design. See 6.8.

The relevant sections of Paragraph **7 Sign installation** also apply to Inspection, cleaning and maintenance. They include, but are not limited to:

- Statutory and authorities permissions
- General safety obligations
- Access equipment
- Road transportation
- Cold weather working

8.2 Sign inspection

This shall include, but not necessarily be limited to:

- a) A visual inspection of the structural condition. This may include, but not be limited to:
 - a. Support structure
 - b. Check previous inspection report for any potential issues
 - c. Check for any signs of corrosion &/or erosion
 - d. Check welds are smooth and consistent in depth
 - e. Check for cracks and comment.
 - f. Cracks in the paint could indicate that the steel is also cracked.

- b) Bolts/fasteners:
 - a. Confirm the bolts/fasteners are the size and type specified in the Technical Construction File.
 - b. Confirm bolts/fasteners are installed in all holes of a connection and are tight.
 - c. Confirm all fasteners are protected from dirt and moisture as required in The Technical Construction File.
 - d. Confirm bolts are installed with a washer under the bolt head or nut, whichever is the element being turned.

- c) Painting:
 - a. Check damaged areas are cleaned, repaired, and painted as detailed in the Technical Construction file
 - b. Check surface preparation and cleaning sequence being followed as detailed in the Technical Construction File
 - c. Check for any paint runs or sags and repair as required
 - d. Check paint thickness is a minimum of 75µm.

- d) Sign panels & cladding:
 - a) Check for a build-up of dirt and debris
 - b) Check for build-up of fungal growth
 - c) Check for physical damage and surface coating breakdown. Assess extent of damage or breakdown
 - d) Check for loose or faulty fasteners.

- e) If appropriate, a visual inspection of the electrical condition. This may include, but not be limited to:
 - a) Electrical components e.g. Any signs of overheating
 - b) Fixings of electrical components

- f) Generation of a written report including
 - a) Process
 - b) Results
 - c) Conclusions
 - d) Recommendations (e.g. cleaning, repair)

- g) If an unsafe condition is recognised, action shall be taken to prevent harm. E.g. Faulty wiring – electrical isolation of the sign.

8.3.1 External

Surface dirt and debris shall be removed using readily available materials.

8.3.2 Internal

This shall include, but not necessarily be limited to:

- Opening of the sign by competent persons to remove water, dirt and debris
- Clearing of drain holes.

8.4 Sign Maintenance

8.4.1 Design criteria

Design considerations shall include, but may not be limited to, the following key elements:

- a) Design sign structures based on Eurocode compliance
- b) Create inspection access when designing signs
- c) Carry out risk assessment on structural members
- d) consider risk to health and safety from any foreseeable failure
- e) consider site environment; temperature, corrosion, weather
- f) define protective treatment to structural members

8.4.2 Create a Technical Construction File/sign specification which may include, but not be limited to:

- a) general assembly details
- b) wind load calculations
- c) structural calculations
- d) foundation calculations
- e) Structural inspection schedule
- f) Electrical inspection schedule

9 Sign lighting design

9.1 General

NOTE; There is an environmental impact created by badly positioned, poorly designed or overly bright signs. Considerately and effectively illuminated signs will create a better overall effect and will preserve the general amenity of the surrounding area whilst promoting the clients requirements and improving neighbouring site relations.

9.2 Specifics

Where appropriate, signs shall utilise design characteristics which may include, but not be limited to the:

- a) Avoidance of the use of powerful uplighters – down lighters of the correct lumen output are more appropriate
- b) Correct alignment and spacing of external illumination luminaires

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- c) Use of light sensors, time switches and passive Infra-red movement detectors (PIRs)
- d) Use of shields and cowls
- e) Correct selection and population of LED modules in internally illuminated boxes or letters.