

BRITISH STANDARD

Industrial type flooring and stair treads –

Part 2: Expanded metal grating – Specification

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Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 11 and a back cover.

Foreword

Publishing information

This part of BS 4592 was published by BSI and came into effect on 29 December 2006. It was prepared by Subcommittee B/208/1, *Stairs and walkways – Industrial*, under the authority of Technical Committee B/208, *Stairs and walkways*. A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

This Part of BS 4592-2, together with Part 0, supersedes BS 4592-2:1987, which is withdrawn.

Information about this document

BS 4592 is published in seven parts, as follows:

- *Part 0: Common design requirements and recommendations for installation;*
- *Part 1: Metal open bar gratings – Specification;*
- *Part 2: Expanded metal sections – Specification;*
- *Part 3: Cold formed metal planks – Specification;*
- *Part 4: Glass reinforced plastics (GRP) open bar gratings – Specification;*
- *Part 5: Solid plates in metal and glass reinforced plastics (GRP) – Specification;*
- *Part 6: Glass reinforced plastics (GRP) moulded open mesh gratings – Specification¹⁾.*

The requirements in this part cover areas that are not addressed by BS EN ISO 14122, *Safety of machinery – Permanent means of access to machinery*, which is published in the following parts:

- *Part 1: Choice of fixed means of access between two levels;*
- *Part 2: Working platforms and walkways;*
- *Part 3: Stairways, stepladders and guard-rails;*
- *Part 4: Fixed ladders.*

It has been assumed in the preparation of this British Standard that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is “shall”.

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

¹⁾ In preparation.

Requirements in this standard are drafted in accordance with *The BSI guide to standardization – Section 2: Rules for the structure, drafting and presentation of British Standards*, subclause **11.3.1**, which states, “Requirements should be expressed using wording such as: ‘When tested as described in Annex A, the product shall ...’”. This means that only those products that are capable of passing the specified test will be deemed to conform to this standard.

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

1 Scope

This part of BS 4592 specifies requirements for the design, manufacture, supply and installation of expanded metal gratings intended for use in industrial flooring and stair treads.

It is not applicable in cases where access to machinery is required, in which case the requirements of BS EN ISO 14122 apply.

NOTE 1 Annex A gives additional recommendations for installation of gratings.

NOTE 2 For the common requirements for industrial flooring and stair treads, see BS 4592-0.

In addition to the definitive requirements, this standard also requires the items detailed in BS 4592-0:2006, Clause 4 to be documented. For compliance with this standard, both the definitive requirements and the documented items have to be satisfied.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 4592-0:2006, *Industrial type flooring, walkways and stair treads – Part 0: Common requirements*

BS EN 10025 (all parts), *Hot rolled products of non-alloy structural steels*

BS EN 10258, *Cold-rolled stainless steel narrow strip and cut lengths – Tolerances on dimensions and shape*

BS EN 10259, *Cold-rolled stainless and heat resisting steel wide strip and plate/sheet – Tolerance on dimensions and shape*

BS EN 12020-1, *Aluminium and aluminium alloys – Extruded precision profiles in alloys EN AW-6060 and EN AW-6063 – Part 1: Technical conditions for inspection and delivery*

BS EN 12020-2, *Aluminium and aluminium alloys – Extruded precision profiles in alloys EN AW-6060 and EN AW-6063 – Part 2: Tolerances on dimensions and form*

BS EN ISO 1461, *Hot dip galvanized coatings on fabricated iron and steel articles – Specifications and test methods*

3 Terms and definitions

For the purposes of this part of BS 4592, the terms and definitions given in BS 4592-0 and the following apply.

3.1 expanded metal grating

grating formed by slitting and expanding blank metal plates in a single continuous process

3.2 Grating features

3.2.1 strand

slit section of plate, when expanded, that forms part of the boundary to an open section

NOTE See Figure 1 and Figure 2.

3.2.2 knuckle

deformed section of plate joining strands

NOTE See Figure 1 and Figure 2.

3.3 long way (LW)

distance between centres of knuckles along grating

NOTE See Figure 1.

3.4 short way (SW)

distance between centres of knuckles across grating

NOTE See Figure 1.

3.5 stag

cut knuckle

NOTE See Figure A.5 c).

3.6 framed grating

grating framed with angles, tee bars or flat bars, etc.

NOTE Framing can be used to finish the edge for removable gratings and/or to connect subsidiary support members to increase the load-carrying capacity of the grating.

3.7 complete mesh

grating formed by cutting through the centres of the knuckles in both directions

4 Information to be supplied

The following items to be agreed between the contracting parties are specified in the clauses referred to and shall be fully documented. For compliance with the standard both the definitive requirements specified throughout this part of BS 4592 and those specified in BS 4592-0:2006, Clause 4 and the following documented item shall be satisfied.

- a) Requirements for protection against corrosion (see 5.3).

5 Material requirements

5.1 Steel

Low carbon steel used for expanded metal sections shall, as a minimum, conform to BS EN 10025.

Stainless steel shall, as a minimum, conform to either BS EN 10258 or BS EN 10259, depending on the size of panel required.

5.2 Aluminium

Aluminium used for expanded metal sections shall, as a minimum, conform to BS EN 12020-1 and BS EN 12020-2.

5.3 Protection against corrosion

Requirements for protection against corrosion shall be agreed between the manufacturer and the purchaser.

NOTE 1 The requirements vary, depending on the end-use and the exposure environment. However, for external protection in particular, hot dip galvanizing is recommended.

NOTE 2 Guidance on the required level of protection should be sought by referring to BS EN ISO 14713.

When hot dip galvanizing is applied to expanded metal sections, it shall conform to BS EN ISO 1461.

6 Size requirements

For unframed gratings, finished sizes shall be half, or whole, multiples of the long way. The short way shall be cut to a complete mesh.

NOTE 1 For unframed gratings, matched panels are required on continuous runs, i.e. all panels are either sheared whole or half multiples of the long way.

NOTE 2 For framed gratings, the long way and the short way can be cut to complete meshes or be random cut.

Treads for expanded metal sections shall consist of framed gratings and shall be at least 25 mm thick.

Figure 1 Grating panel terms

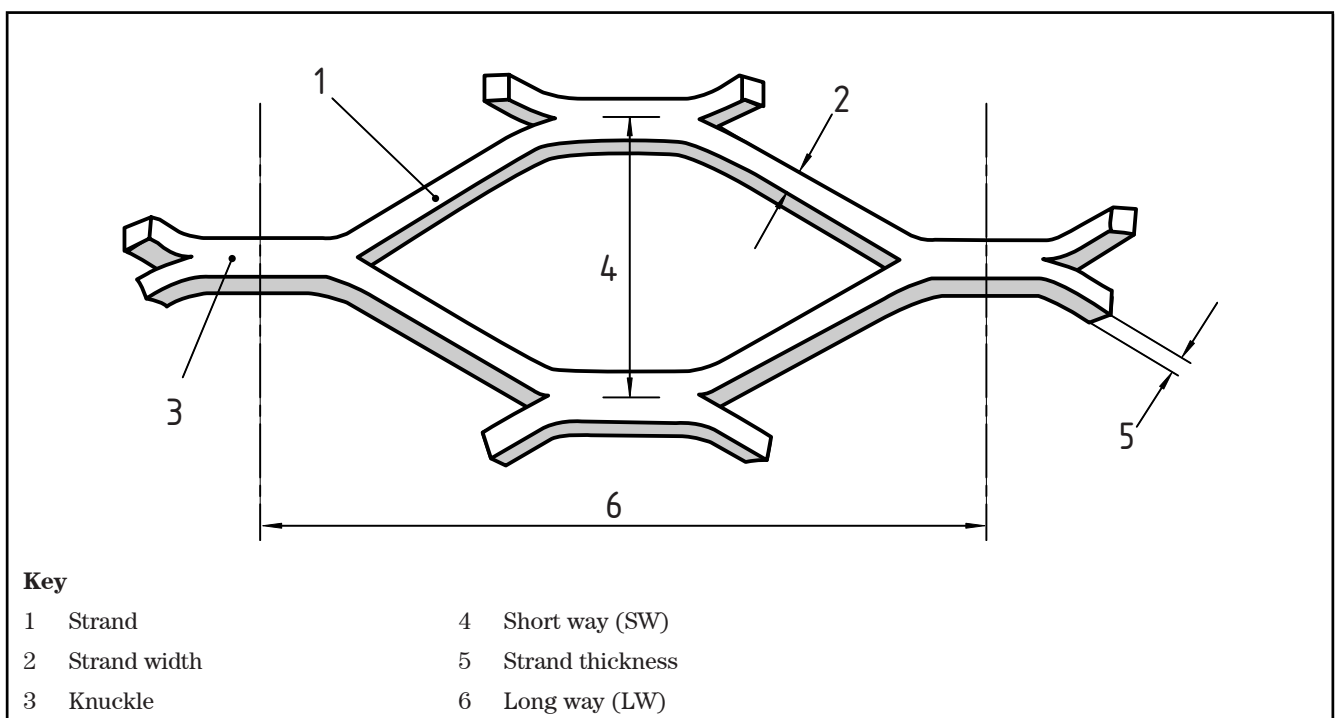
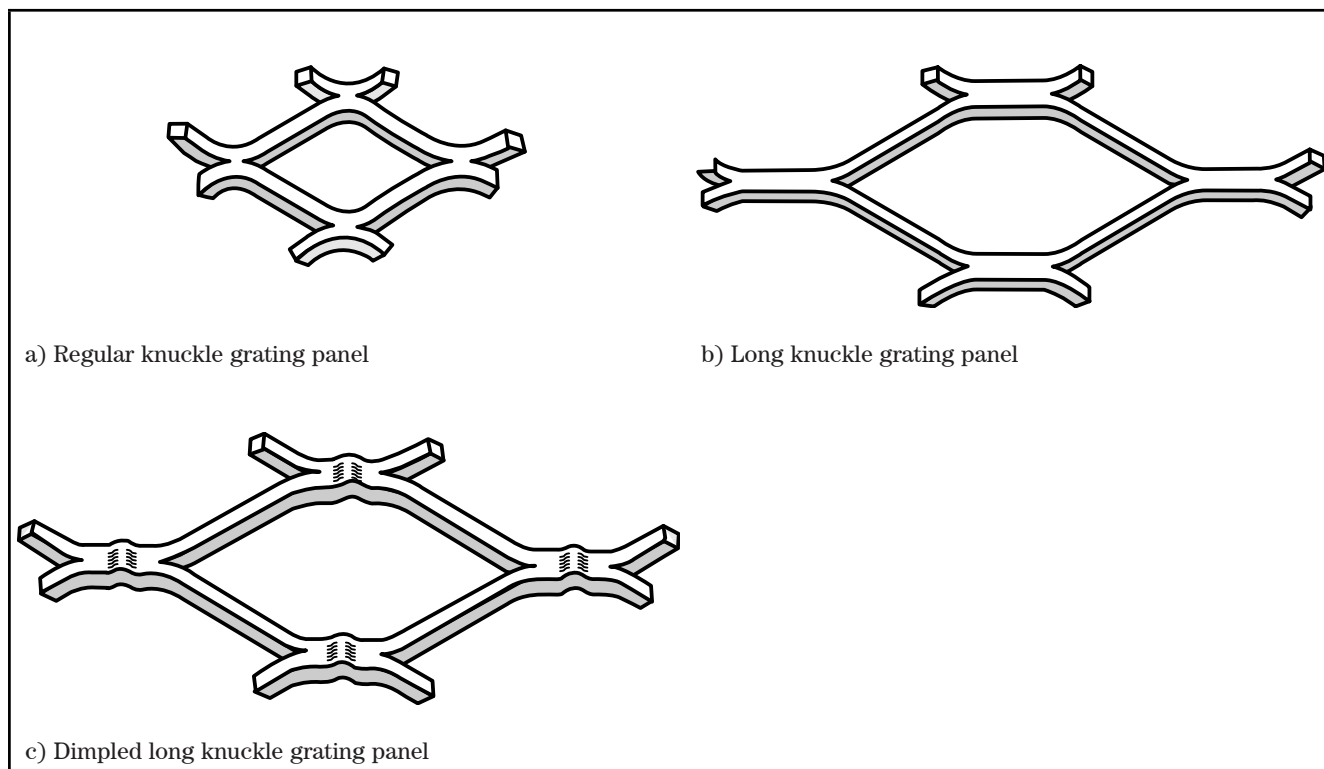


Figure 2 Types of grating panel



7 Tolerance requirements

The maximum permissible deviations from finished sizes of framed gratings shall be as follows:

- a) length of panel, +0 mm to -5 mm;
- b) width of panel, +0 mm to -5 mm;
- c) difference between diagonals, 5 mm (out of squareness of panel).

NOTE Permissible deviations for unframed gratings are not specified, since these panels either overlap (short way) or are cut (long way) when installed on site (see Annex A).

8 Performance requirements

8.1 Gratings

Expanded metal gratings shall conform to the loads specified in BS 4592-0:2006, Clause 5.

8.2 Stair treads

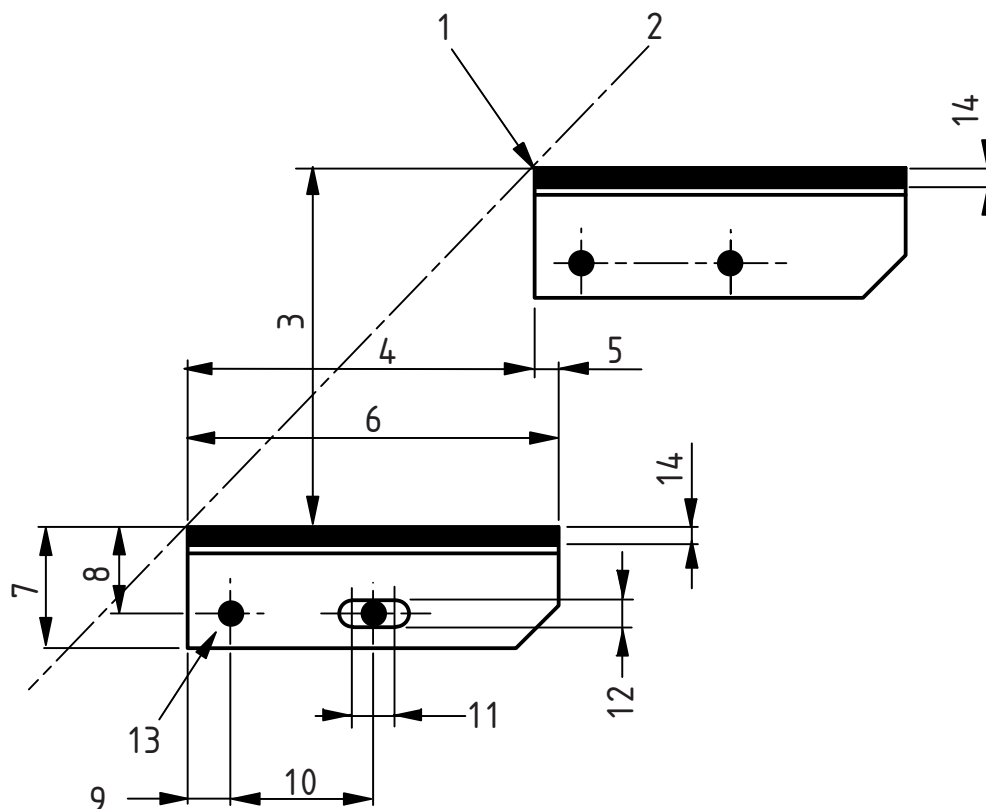
Stair treads for expanded metal sections shall withstand the appropriate loads specified in BS 4592-0:2006, Clause 6.

NOTE 1 Where end supports for stair treads are welded to the treads see Figure A.5.

NOTE 2 Fixing dimensions for tread angle end supports are shown in Figure 3.

NOTE 3 For imposed loads on treads, see BS 4592-0.

Figure 3 Fixing dimensions for tread angle end supports

**Key**

- | | | | |
|---|---|----|--|
| 1 | Leading edge of stair tread fitted with anti-slip nosing | 9 | Dimension from leading edge of tread to centre of first bolt (30 mm) |
| 2 | Pitch line | 10 | Bolt centre dimension (see Notes 1 and 2) |
| 3 | Riser | 11 | Hole centre for dimension of slotted hole (30 mm) |
| 4 | Going | 12 | Dimension for slot width (14 mm for stair treads, 12 mm for ladder treads) |
| 5 | Overlap (= >16 mm) | 13 | Hole diameter for first bolt (14 mm for stair treads, 12 mm for ladder treads) |
| 6 | Tread width | 14 | Depth of suitable expanded metal tread material |
| 7 | Overall depth of end support (50 mm) | | |
| 8 | Dimension from top of end support to centre bolts (30 mm) | | |

NOTE 1 For tread widths (6) of 250 mm to 290 mm dimension 10 is 125 mm.

NOTE 2 For tread widths (6) of 291 mm or more dimension 10 is 175 mm.

NOTE 3 The depth of expanded metal (14) required to suit the design criteria is to be determined by the manufacturer.

Annex A (informative)

Recommendations for installation of gratings

A.1 Fixing

Gratings should be secured to structural steelwork by welding or by using fixing clips.

Fixings for regular knuckle gratings and framed gratings should consist of clamps projecting a maximum of 4 mm, or hook bolts projecting a maximum of 6 mm, above the surface of the grating. Fixing clips for other types of grating should consist of an upper saddle engaging over two knuckles of the grating, with a screw passing through the saddle and tightening into a lower clamping strip. The lower clamping strip is then notched to engage with the bottom edge of a knuckle.

Fixings should be spaced at regular intervals and staggered on opposite sides of the walkway.

Gratings should be fixed or contained positively so that they cannot move laterally or away from their supporting members. Otherwise, the minimum extension of flooring over supports should be 30 mm.

A.2 Installation procedure

A.2.1 Arrange adjacent gratings so that the strands slope in the same direction to ensure correct lapping (see Figure A.1).

A.2.2 Place the gratings with the flat, straight edged mesh intersections uppermost (see Figure A.2).

A.2.3 Place the ends of each assembly on structural supports (see Figure A.3).

A.2.4 Clamp and fix with clips (see Figure A.4). Alternatively, weld gratings together, using butt welding [see Figure A.5 a)] or overlapping and welding [see Figure A.5 b)], or a support welded to the gratings beneath the joint. Then weld each fourth stag to the structural support [see Figure A.5 c)].

A.2.5 Where it is necessary to cut holes in the grating, e.g. for pipes or structural members, weld a bar at the contact points to form an edge for the cut-out (see Figure A.6).

Figure A.1 Alignment of grating panels

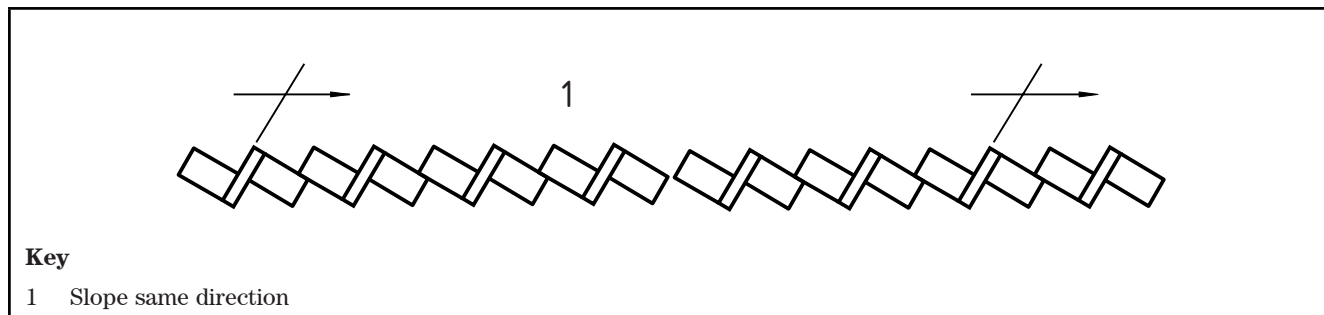


Figure A.2 Positioning of grating panels

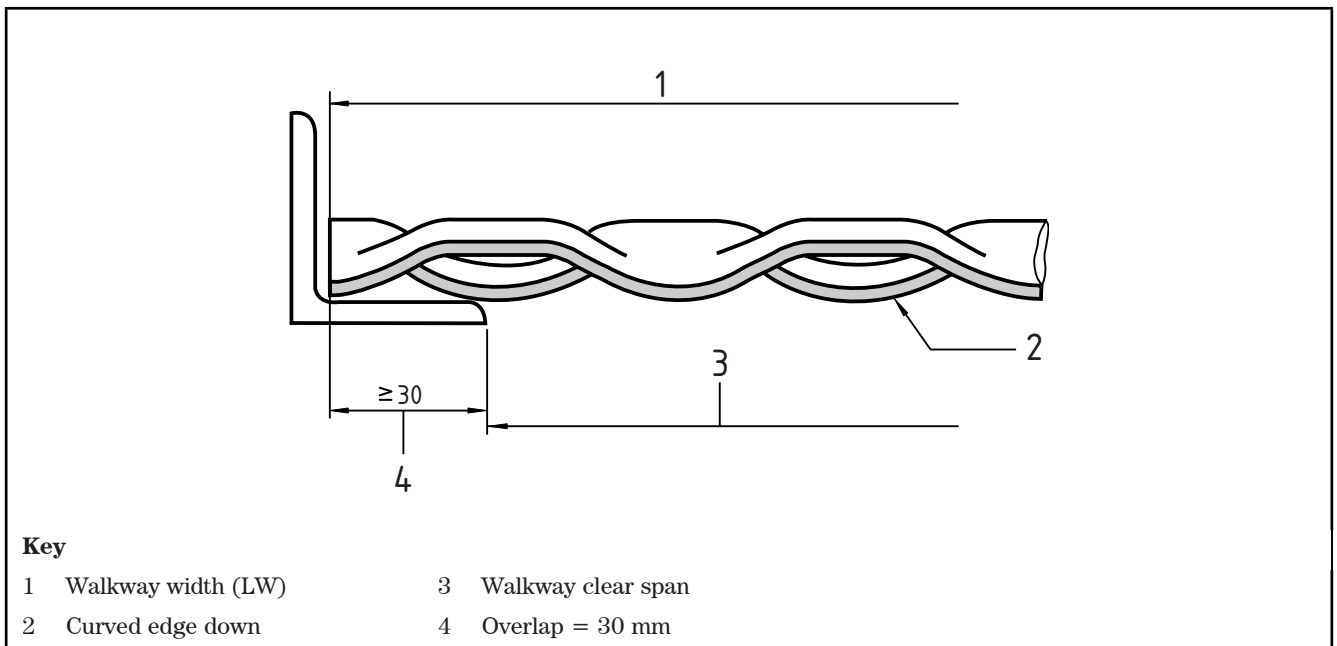


Figure A.3 Structural supports

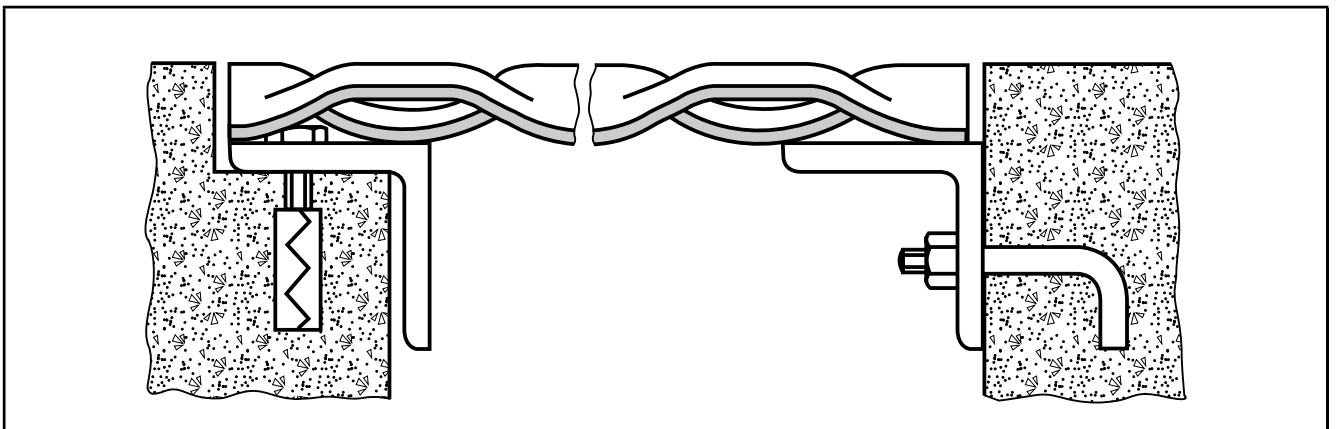


Figure A.4 Fixing gratings using clips or hook bolts

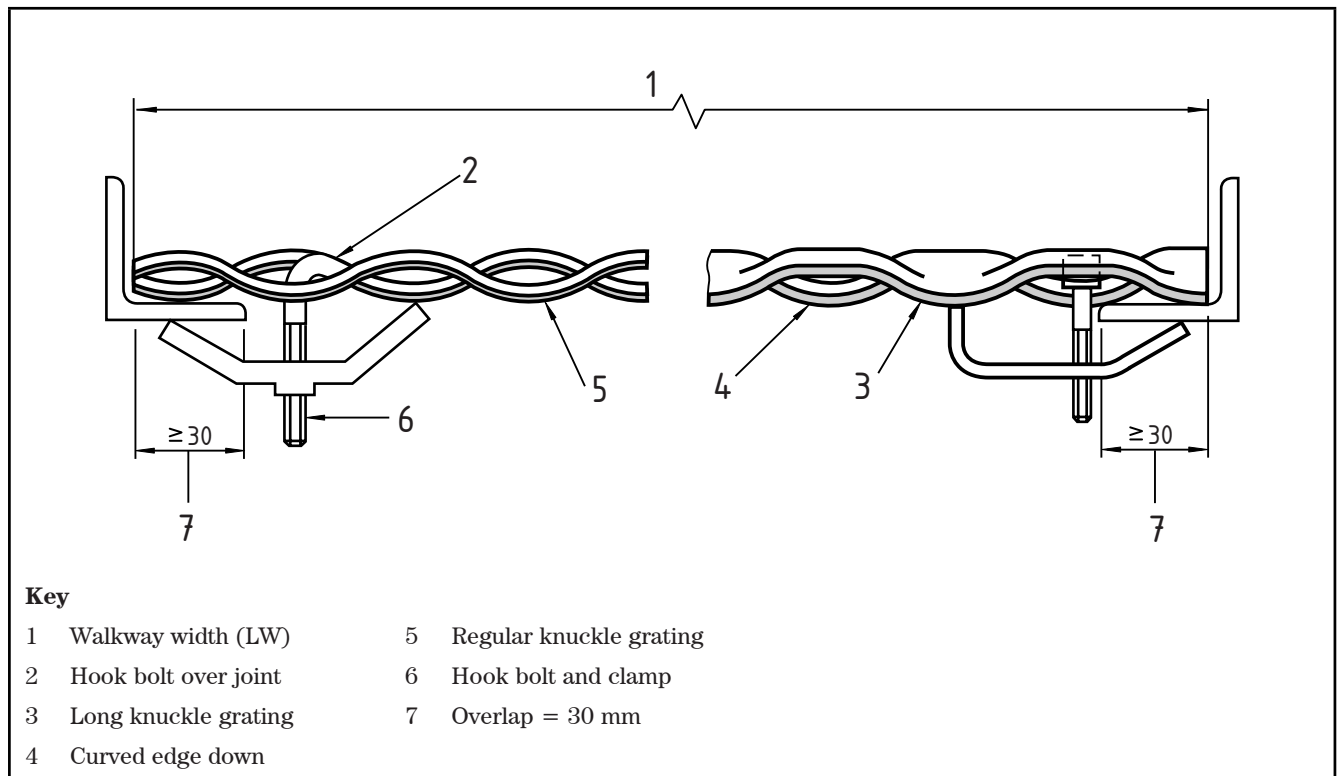
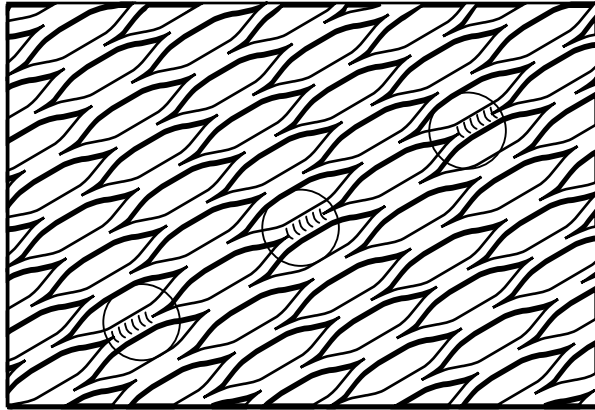
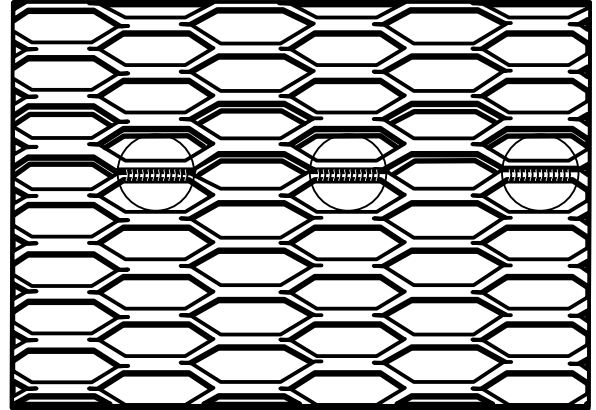


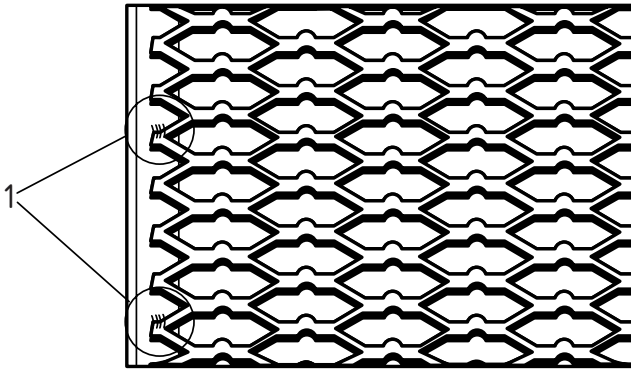
Figure A.5 Fixing grating panels by welding



a) Grating panels joined by butt weld



b) Grating panels joined by overlap and weld

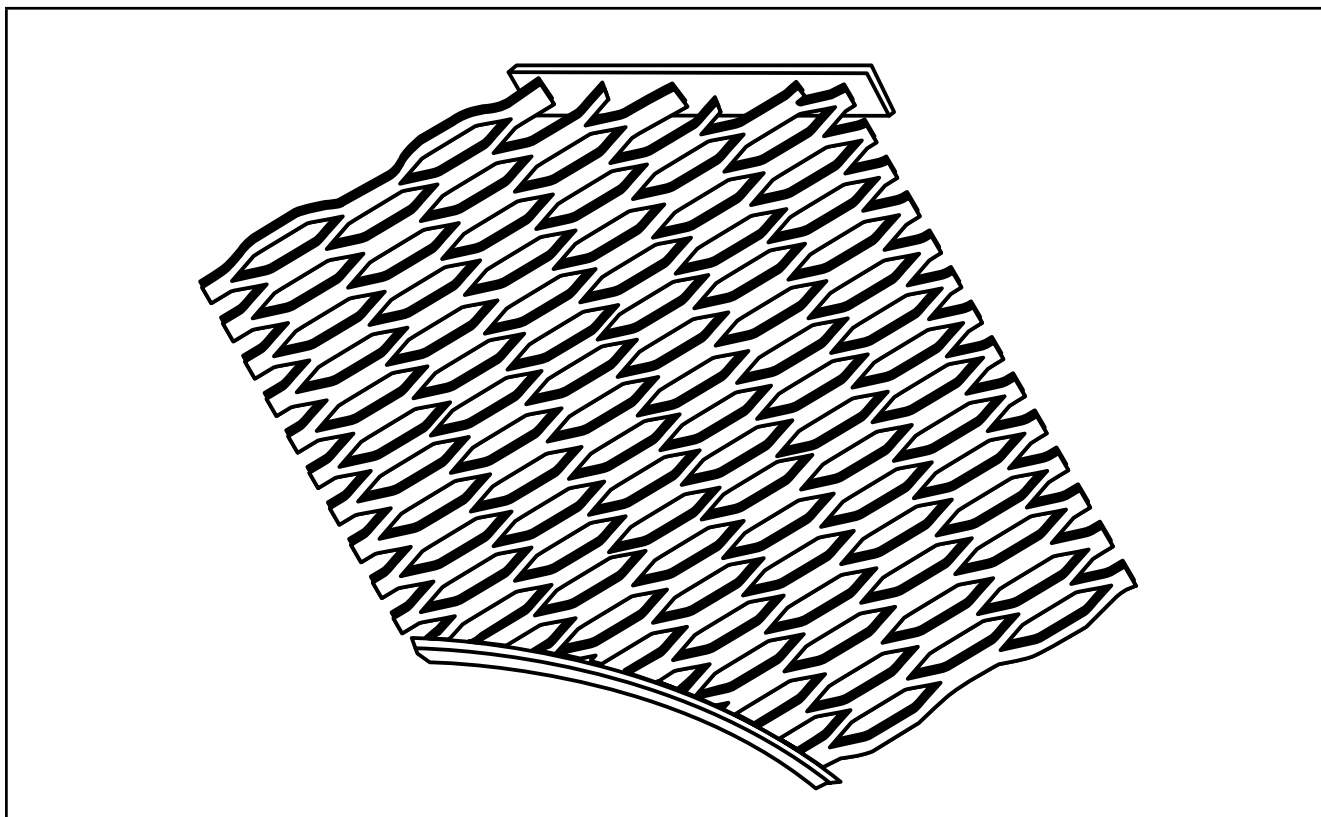


c) Welding grating panels to structural supports

Key

1 Weld each fourth stag

Figure A.6 Banding of cut edges



Bibliography

Standards publications

For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS EN ISO 14122, *Safety of machinery – Permanent means of access to machinery*

BS EN ISO 14713, *Protection against corrosion of iron and steel in structures – Zinc and aluminium coatings – Guidelines*

Further reading

BS 5395-1:2000, *Stairs, ladders and walkways – Part 1: Code of practice for the design, construction and maintenance of straight stairs and winders*

BS 5950-1:2000, *Structural use of steelwork in building – Part 1: Code of practice for design – Rolled and welded sections*

BS 5950-2:2001, *Structural use of steelwork in building – Part 2: Specification for materials, fabrication and erection – Rolled and welded sections*

BS 6100-1, *Glossary of building and civil engineering terms – Part 1: General and miscellaneous*

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