BS 7543: 1992: 2003

DURABILITY OF BUILDINGS AND BUILDING ELEMENTS, PRODUCTS AND COMPONENTS

EXTRACTS OF THE ABOVE STANDARD ARE PUBLISHED AS A GUIDE TO THE CLARIFICATION OF DURABILITY OF BUILDINGS AND BUILDING ELEMENTS, PRODUCTS AND COMPONENTS

The extract below is taken from the 1992 BS, which has been adopted as the standard for the design life of buildings, mainly 30, 60 and 120 years.

3 REQUIREMENTS FOR DURABILITY

Requirements for durability vary from building to building and from one component to another. Requirements may be related to intended use, to finance and to periods for maintenance, repair or replacement. The building owner should define the required service life of the building in the initial brief. Life categories for buildings are given in table 1. In addition the owner may wish to specify the required service life for specific components. Life categories for components are given in table 2. The required service life of the component should be given in years and can be related to the categories of building life.

Where the building owner has not specified the conditions that will apply to the building or its parts the designer should record, for the client, what conditions have been assumed.

Requirements for durability may also be given when a component is ordered from a manufacturer either by a designer or by those responsible for maintenance. Again this should be given as a required service life in years and related to component category and building life.

When designers are provide with a clear statement of requirements for durability they are more likely to be able to specify appropriately for all parts of a building and avoid disappointments where, for instance, components require early replacement.

TABLE 1. CATEGORIES OF DESIGN LIFE FOR BUILDINGS

CATEGORY	DESCRIPTION	BUILDING LIFE FOR CATEGORY	EXAMPLES
1	Temporary	Agreed period up to 10 years	Non-permanent site huts and temporary exhibition buildings
2	Short life	Minimum period 10 years	Temporary classrooms; buildings for short life industrial processes; office internal refurbishment, retail and warehouse buildings; (see note 1.)
3	Medium life	Minimum period 30 years	Most industrial buildings; housing refurbishment
4	Normal life	Minimum period 60 years	New health and educational buildings; new housing and high quality refurbishment of public buildings
5	Long life	Minimum period 120 years	Civic and other high quality buildings

Note 1. Specific periods may be determined for particular buildings in any of categories 2 to 5, provided they do not exceed the period suggested for the next category below on the table; for example many retail and warehouse buildings are designed to have a service life of 20 years.

Editors Note

Categories 2, 3, 4 and 5 govern the longevity of the majority of buildings in the UK.

WHITTINGTON ROAD, OSWESTRY,
SHROPSHIRE, SY11 1HZ
TEL: 01691 653251
FAX: 01691 658222
EMAIL: techadvice@jonesofoswestry.com

BS 7543: 1992: 2003 - continued

The extract below is taken from the 1992 and 2003 standard which was adopted as the standard for the design life of components within a building.

TABLE 2. CATEGORIES OF DESIGN LIFE FOR COMPONENTS OR ASSEMBLIES

CATEGORY	DESCRIPTION	LIFE	TYPICAL EXAMPLES
1	Replaceable	Shorter life than the building life and replacement can be envisaged at design stage	Most floor finishes and service installation components
2	Maintainable	Will last, with periodic treatment, for the life of the building	Most external claddings, doors and windows
3	Lifelong	Will last for the life of the building	Foundations and main structural elements

ATMOSPHERIC CORROSIVITY VALUES

The Ministry of Agriculture, Fisheries and Food publishes a map every 5 years illustrating the average atmospheric corrosivity rate for 10 km grid squares of the UK. This map is based on a zinc reference data base but corresponding corrosivity rates for other metals (steel, aluminium, copper and brass) can be approximately assessed using dose responsive function relationships. It should also be remembered that the local microclimate can have a greater effect on durability of building materials than the average corrosivity within a section of a 10 km grid.

Editors Note

Lintels are classed as "lifelong" and "main structural element" and are **not** maintainable, and therefore under category 3 - "will last the life of the building".

Editors Note

The above refers to the Agricultural Development Advisory Service map (ADAS) as published also by the Galvanisers Association, titled the "Millennium Map" and as published in this manual

JONES OF OSWESTRY
WHITTINGTON ROAD, OSWESTRY,
SHROPSHIRE, SY11 1HZ
TEL: 01691 653251
FAX: 01691 658222
EMAIL: techadvice@jonesofoswestry.com

BS EN 845-2:2003

(Superseeding BS 5977-2 1983 Lintels)

SPECIFICATION FOR ANCILLARY COMPONENTS FOR MASONRY - PART 2: LINTELS

EXTRACTS OF THE ABOVE STANDARD ARE PUBLISHED AS A GUIDE TO THE CLARIFICATION OF STEEL COMPONENTS FOR MASONRY

1. SCOPE

This European Standard specifies requirements for prefabricated lintels for spans over clear openings in a masonry wall up to a maximum of 4.5 m and made from steel, autoclaved aerated concrete, manufactured stone, concrete, fired clay units, calcium silicate units, natural stone units, or using a combination of these materials.

Prefabricated lintels can either complete lintels or the prefabricated part of a composite lintel.

This European Standard is not applicable to:

a) Lintels completely made on site;
b) Lintels, the tensile parts of which are made on site;
c) Timber lintels;
d) Natural stone lintels, not reinforced

Linear components spanning clear openings greater than 4.5m in masonry walls and linear components intended for use in a structural role (e.g. beams) are not covered by this standard.

4. MATERIALS

4.1. Steel lintels shall be fabricated from carbon steel conforming to EN 10025, EN 10142, EN 10147, EN 10130, EN 10111, or from stainless steels conforming to EN 10088.

5.4. DURABILITY

5.4.2. Steel lintels, other than those made from austenitic stainless steel, shall be protected against corrosion in accordance with the requirements of table C.1

NOTE: The corrosion protection required in any application will depend on the type of lintel, whether a separate damp proof system is used, the degree of exposure and the climate conditions and therefore several grades of protection are given.

C.1. CORROSION PROTECTION SYSTEMS

Steel lintels shall be provided with one of the protective coating systems in accordance with Table C.1. Organic coatings where used as part of the protective coating system shall be as given in Table C.2 and the measurement of coating thickness of Type 1 coatings shall be in accordance with ISO 1461.

TABLE C. 2 - ORGANIC COATINGS FOR PROTECTIVE COATING SYSTEMS FOR STEEL LINTELS

COATING	DESCRIPTION
Type 1	a) A bituminous solution of minimum 25 μm dry film thickness; or b) A one pack chemical resistant paint modified to give adequate adhesion to the zinc coated lintel and of minimum dry film thickness of 25 μm.
Type 2	A system which meets the requirements given in 6.2 a) 6.2 b) and 7.2 a) or 7.2 b) of EN 846-13:2000 for impact, abrasion and corrosion resistance.

WARNING: Other requirements and other EU directives, not effecting the fitness for intended use(s), can be applicable to the construction product falling within the scope of this European Standard.

Editors Note: (Re: above warning)
This standard cannot be taken in it's own right, but in conjunction with other standards for longevity of products i.e. BS 7543.

Editors Note:
BS EN 845-2:2003 provides strict guidelines for the various grades of corrosion protection required across the UK. The specifier is responsible for the said compliance and must take into account local exposure categories and microclimates. The correct level of protection in conjunction with BS 7543 guidelines for longevity of building components (i.e. 30, 60 and 120 years minimum) must be specified and is essential to present day building practices.

WHITTINGTON ROAD, OSWESTRY,
SHROPSHIRE, SY11 1HZ
TEL: 01691 653251
FAX: 01691 658222
EMAIL: techadvice@jonesofoswestry.com

JONES OF OSWESTRY

04/05

ANNEX C: CORROSION PROTECTION SYSTEMS

C.1 STEEL LINTELS. Steel lintels shall be provided with one of the protective coating systems in accordance with Table C.1. Organic coatings where used as part of the protective coating system shall be as given in Table C.2. and the measurement of coating thickness of Type 1 coatings shall be in accordance with ISO 1461.

TABLE C. 1 - MATERIALS AND CORROSION PROTECTION SYSTEMS FOR STEEL LINTELS

MATERIAL	SPECIFICATION FOR MATERIAL (a)	MINIMUM COATING SPECIFICATION			ORGANIC COATING THICKNESS	MATERIAL COATING REFERENCE (d)
		Mass Per g/m^2	mass per two sides (b) g/m^2	thickness (c) μm	μm	
Austenitic stainless steel (chrome nickel alloys)	EN10088	-	-	-	-	L3
Zinc coated steel component	EN ISO 1461 zinc coated steel	710	-	100	-	L10
Zinc coated steel component	EN ISO 1461 zinc coated steel	460	-	65	-	L11
Zinc coated steel component with all surfaces in Figure C. 1 organic coated	EN ISO 1461: zinc coated steel organic coating type 1	460	-	65	25	L11.1
Zinc coated steel component with all surfaces in Figure C. 1 organic coated	EN ISO 1461: zinc coated steel organic coating type 2	460	-	65	(e)	L11.2
Zinc coated steel strip or sheet with organic coating over all outer surfaces of finished component	EN 10142/EN 10147: zinc pre-organic coating type 1	-	600	42	25	L12.1
Zinc coated steel strip or sheet with organic coating over all outer surfaces of finished component	EN 10142/EN 10147: zinc pre-organic coating type 2	-	600	42	(e)	L12.2
Zinc coated steel strip or sheet with all cut edges organic coated	EN 10142/EN 10147: zinc pre-organic coating type 1	-	600	42	25	L14
Zinc coated steel strip with organic coating over all outer surfaces of finished component	EN 10142/EN 10147: zinc pre-organic coating type 1	-	275	19	25	L16.1
Zinc coated steel strip with organic coating over all outer surfaces of finished component	EN 10142/EN 10147: zinc pre-organic coating type 2	-	275	19	(e)	L16.2

(a) Except where specified the manufacturer may choose an appropriate grade of steel for zinc-coated products.
(b) Coating weight is of zinc and given for two sides for pre-galvanised sheet products. The mean one side figure will be 50% of the two side figure but not necessarily evenly distributed.
(c) Coating thickness refers to the minimum thickness of metallic protective coating on any uncut surface of a product or any surface of a post-fabrication galvanised product.
(d) This number is given to allow unambiguous materials specification and gives no indication of relative performance or quality.
(e) Organic coating type 2 is specified by performance testing and not by thickness.

Editors Note:
The highlighted coatings above are Hot dip Galvanised after manufacture to BS 1461. (see note (c)).
Thinner coatings than those highlighted do not conform to all areas covered by BS 7543 = i.e. 42 microns in the highest zinc coating corrosion category will at best last 17 years.
Editors Note:
The warning given in this British Standard on the previous page highlights the importance of the above - the specifier is required to consider every relevant British Standard.

JONES OF OSWESTRY
WHITTINGTON ROAD, OSWESTRY,
SHROPSHIRE, SY11 1HZ
TEL: 01691 653251
FAX: 01691 658222
EMAIL: techadvice@jonesofoswestry.com

EXTRACTS OF THE ABOVE STANDARD ARE PUBLISHED AS A GUIDE TO THE CLARIFICATION OF HOT DIP GALVANISED COATINGS ON FABRICATED STEEL ARTICLES - SPECIFICATIONS AND TEST METHODS

1 SCOPE

This standard specifies the general properties of and methods of test for coatings applied by hot dipping in zinc (containing not more then 2% of other metals) on fabricated iron and steel articles. It does not apply to:

a) sheet and wire that are continuously hot dip galvanized;

b) tube and pipe that is hot dip galvanized in automatic plants;

c) hot dip galvanized products for which specific standards exist and which may include additional requirements or requirements different from those of this European Standard.

3 TERM(S) AND DEFINITION(S)

For the purposes of this standard, the following definitions apply together with those given in EN ISO 2064.

3.1 Hot Dip Galvanizing

Formation of a coating of zinc-iron alloys on iron and steel products by dipping prepared steel or cast iron in molten zinc.

3.3 Coating mass

Total mass of zinc-iron alloys per area of surface (expressed in grams per square metre. g/m^2)

3.4 Coating thickness

Total thickness of zinc and/or zinc-iron alloys (expressed in micrometres, μm).

3.6 Control sample

The article or group of articles from a lot is selected for testing.

3.7 Reference area

The area within which a specific number of single measurements has to be made.

3.8 Local coating thickness

The mean value of coating thickness obtained from the specified number of measurements within a reference area for a magnetic test or the single value from a gravimetric test.

3.9 Mean coating thickness

The average value of the local thicknesses either on one large article or on all the articles in the control sample.

3.13 Inspection lot

Single order or single delivery load.

5 SAMPLING

A control sample for thickness testing shall be taken randomly from each inspection lot (see 3.13) selected for testing. The minimum number of articles from each inspection lot that forms the control sample shall be in accordance with Table 1.

TABLE 1. CONTROL SAMPLE SIZE RELATED TO LOT SIZE

NUMBER OF ARTICLES IN THE LOT	MINIMUM NUMBER OF ARTICLES IN THE CONTROL SAMPLE
1 to 3	All
4 to 500	3
501 to 1200	5
1201 to 3200	8
3201 to 10,000	13
over 10,000	20

WHITTINGTON ROAD, OSWESTRY,
SHROPSHIRE, SY11 1HZ
TEL: 01691 653251
FAX: 01691 658222
EMAIL: techadvice@jonesofoswestry.com

6. COATING PROPERTIES

6.2 Thickness

6.2.1 General

Coatings applied by hot dip galvanizing are designed to protect the iron and steel products against corrosion (see annex C). The length of time of corrosion protection by such coatings (whether light or dark grey) is approximately proportional to the coating thickness. For extremly aggressive conditions and/or an exceptionally long service life, thicker coatings than those specified here may be required.

The specification of these thicker coatings shall be subject to agreement between the galvanizer and the purchaser concerning the means of implementation (e.g. grit blasting, steel chemical composition).

6.2.3 Reference areas

The number and position of reference areas and their sizes for the magnetic or gravimetric test shall be chosen with regard to the shape and size of the article(s) in order to obtain a result as representative as possible of mean coating thickness or mass per unit area as applicable. On a long article in the control sample, the reference areas shall be cut approximately 100mm from each end and at the approximate centre and shall comprise the whole cross-section of the article.

The number of reference areas, dependent upon the size of the individual articles in the control sample, shall be as follows.

a) For articles with significant surface area greater then $2m^2$ ("large articles"): At least three reference areas shall be taken on each article in the control sample. On each article (taken separately) in the control sample the mean coating thickness within the reference areas shall be equal to ot greater than the mean coating thickness values given in table 2 or table 3.

b) For articles with significant surface area over $10,000mm^2$ and up to $2m^2$ (inclusive): On each article in the control sample, there shall be at least one reference area.

c) For articles with significant surface area between $1000mm^2$ and $10,000mm^2$ (inclusive): On each article in the control sample, there shall be one reference area.

d) For articles with less than $1000mm^2$ significant surface area: Enough articles shall be grouped together to provide at least $1000mm^2$ surface for an individual reference area. The number of reference areas shall be as given in the last column of Table 1. Hence, the total number of articles tested equals the number of articles required to provide one reference area multiplied by the appropriate number from the last column of table 1 related to the size of the lot (or the total number of articles galvanized if that is less). Alternatively, sampling procedures selected from ISO 2859 shall be used.

TABLE 2. COATING MINIMUM THICKNESS ON SAMPLES THAT ARE NOT CENTRIFUGED

ARTICLE AND ITS THICKNESS	LOCAL COATING THICKNESS (minimum) (a) μm	MEAN COATING THICKNESS (minimum) (b) μm
Steel ≥ 6mm	70	85
Steel ≥ 3mm to < 6mm	55	70
Steel ≥ 1.5mm to < 3mm	45	55
Steel < 1.5mm	35	45
Casting ≥ 6mm	70	80
Casting < 6mm	60	70

(a) See 3.8
(b) See 3.9

NOTE 2: Table 2 is for general use: individual product standards may include different requirements including different categories of thickness. A requirement for thicker coatings or additional requirements can be added without otherwise affecting conformity to this standard.

The local coating thickness in table 2 shall only be determined in relation to reference areas in accordance with 6.2.3.

JONES OF OSWESTRY
WHITTINGTON ROAD, OSWESTRY,
SHROPSHIRE, SY11 1HZ
TEL: 01691 653251
FAX: 01691 658222
EMAIL: techadvice@jonesofoswestry.com

7. CERTIFICATE OF COMPLIANCE
When required, the hot dip galvanizer shall provide a certificate of compliance with the requirements of this standard (ISO 10474) is relevant).

Editors Note
Individual product labels guaranteering the conformity of testing to comply with the criteria of the standard, are attached to every product, as examples shown in the front of this manual.

ANNEX C (INFORMATIVE)

C.1.3 The influence of steel surface roughness on the hot dip galvanised coating thickness

The surface roughness of the steel has an influence on the thickness and the structure of the coating. The effect of surface unevenness of the basis metal generally remains visible after galvanising.

A rough steel surface as obtained by grit blasting, coarse grinding etc. prior to pickling gives a thicker coating than a surface that is obtained by pickling alone.

LINTEL INSTALLATION / SITEWORK

STORAGE AND HANDLING

Lintels are to be stored on site on a level dry surface. Lintels damaged in transit or on site must not be used.

INSTALLATION

Lintels should be installed with at least 150mm end bearings, be fully bedded on bricklaying mortar and levelled along and across. Bearing areas should be properly prepared using full bricks or blocks. If using limited bearings, please consult our Techncal Department.

Inner and outer leaves supported by the lintel must be raised together to avoid excessive eccentricity of loading. Masonry above lintels should be allowed to cure properly, before applying floor or roof loads. The lintel toe should project past the window head and have a flexible sealing compound between the underside of the lintel and the window head to prevent water prevention.

SUPPORT DURING INSTALLATION

All single skin lintels e.g. SWHB lintels, must be propped during construction to counter any rotational forces which may occur whilst the masonry is in a green condition. Props should be removed only when full restraint is achieved. It is also important to ensure brick/blockwork is built againset the vertical web of the lintel to limit these forces.

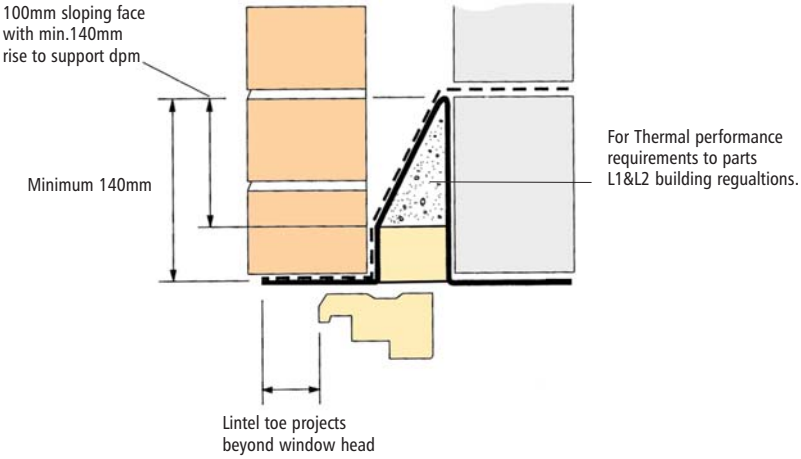
COMPATABILITY WITH OTHER BUILDING MATERIALS

Mortar used must comply with the requirement of BS 5628.

GOOD BUILDING PRACTICE

1. During installation of steel lintels, it is essential that the loadings on outer and inner flanges do not exceed the ratio stated, e.g. 1:3. 1:5 without prior consultation with our Technical Department.

2. For outer: inner flange load ratios of 1:3, 1:5 or above, it is essential that inner leaf blockwork is built againset the inner web of the lintel wherever possible.



JONES OF OSWESTRY
WHITTINGTON ROAD, OSWESTRY,
SHROPSHIRE, SY11 1HZ
TEL: 01691 653251
FAX: 01691 658222
EMAIL: techadvice@jonesofoswestry.com

04/05