

Guide to the European Standards for engineering drawing in the BS EN series

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Foreword

This Published Document has been prepared by Technical Committee TDE/4. It is a guide to the new European technical drawing standards published by the International Organization for Standardization (ISO) which are being adopted by the Comité Européen de Normalisation (CEN). Adoption of European Standards is obligatory for member bodies of CEN according to CEN rules and BSI publishes the English language versions as BS ENs. The withdrawal of BS 308 : Part 1 : 1993, BS 308 : Part 2 : 1985 and BS 308 : Part 3 : 1990 will be delayed until a majority of the relevant ISO standards have been adopted through CEN as there is no conflict in the technical recommendations of BS 308 and the new BS ENs.

Whereas the superseded national standard BS 308 has always been presented as recommendations founded on accepted good practice, in contrast the relevant ISO standards adopted by CEN are often presented in a more specific and instructional manner. As with BS 308 compliance with the BS EN standards is voluntary unless, for instance, they are quoted in a contract. This has sometimes lead to BS 308 becoming confused with a specification.

Standards on subjects such as engineering drawing practice are fundamental standards, and thereby differ in style from most others, for the subject of draughting is an art and a craft practised by individuals, whether manually or by machine. The aspects of personal interest, preference, style, experience, training and custom both individual and organizational, local and national, national and international cannot be ignored. This guide should assist the British draughtsman, who is accustomed to BS 308, and who may need to comply with the European Standards, to do so on a day to day basis without necessary recourse to the several unfamiliar publications which, due in part to the different presentation, may require a significant degree of time and concentration to absorb.

Because most national drawings standards in the world reflect the ISO standards, drawings from different sources are normally understandable in spite of local styles. This guide draws attention to differences in subject coverage, to variations in the presentation and description of technical features and conventions, and of customary draughting styles between the new European Standards and BS 308 and British practice. It does this by commentary on a subject basis and by providing comprehensive cross-referencing indexes. The ISO policy on technical drawings standards is to produce a separate standard for each identifiable draughting subject; hence BS 308 will be replaced by unsequenced single subject standards with unrelated identifying numbers. To assist the user faced with many unfamiliar standards, the identifier of each BS EN standard will be appended by BS 308 followed by a section number indicating the relevant Part. (This is known as dual-numbering.)

The CEN exercise of adopting the ISO technical drawings standards is broader in subject coverage than that of BS 308 in its three Parts. The development of BS 308 has ceased and so as a means of assembling and recognizing these extra standards within the collective identifier '308', they will be dual-numbered with BS 308, in a Section 4, see annex A.

Comments on this guide and also on the new BS EN standards are welcomed by BSI committee TDE/4. These will assist in forming future policy for participating in the development of the ISO standards and in the development of this guide.

To assist the user this guide reviews and comments on the new European standards following the sequence of presentation of subjects established in BS 308. Thus, in particular, sections 1, 2 and 3 of this guide correspond with the three published Parts of BS 308, and each BS EN standard is dealt with in detail in the sequential subject order found within the relevant superseded Part of BS 308. In this way it should assist the reader with intimate experience of BS 308 to make enquiries in familiar territory.

Guidance on expected future developments as the adoption exercise progresses is given where advance notice should be of benefit to the user.

Introduction

Early in 1992 CEN received proposals from some of its member bodies for establishing European Standards for technical drawing whose adoption would become obligatory. BSI committee TDE/4 considered this unnecessary as world standards published by the International Organization for Standardization (ISO) had been available since 1959 and were widely used, or at least formed the bases of national standards albeit by voluntary choice. A British delegation attended a special advisory working group of the CEN Technical Board in September 1992 called to address the proposal¹⁾ where it was agreed that the widely used ISO standards should be adopted direct as European Standards and that new developments and revisions in the field of technical drawing should be left to the established ISO committee procedure. Those proposals were passed to the CEN Technical Board and subsequently established as the CEN policy. Therefore, ISO will be the source of the standards which will be selected for adoption by CEN and consequently published by BSI as BS ENs.

BSI committee TDE/4 can support the CEN policy which will enable the maintenance and development of engineering drawing standards to continue on an international basis, and not on a European basis as well, as modern engineering drawing practice undertaken to ISO standards is recognizable and understood worldwide. There are of course local preferences in draughting practice, but these rarely create misunderstanding. It has always been the responsible BSI committee's policy to reflect either wholly, or as closely as British practice has allowed, the technical content of international (ISO) standards. Britain has actively participated in ISO committees on engineering drawing practice from their inception in 1947 soon after ISO was formed; and indeed, was influential in the formation and development of these standards as the graphical language of engineering communication. The quality of future BS ENs and our level of influence on ISO standards will continue to be in direct proportion to our effective participation in the ISO committees.

The new BS ENs may cause some confusion due to varying styles of text independent of the status and type of standard (e.g. specifying, recommending, rule stating), which contrast with the consistent recommendation style of BS 308.

Several of the ISO standards predate the issue of the joint ISO/IEC directives on the drafting and presentation of international standards which aim to rationalize, unify and control textual style and overcome disparate language usage.

Drawings which conform to either the new European standards or to the superseded BS 308 will be virtually interchangeable and mutually understandable. The former are adopted directly from the ISO standards and the latter are technically comparable with them.

It is worthy of note that in ISO, the generic term 'technical drawing' embraces all drawings of a technical nature; however the terms 'building drawings' and 'construction drawings' are used to identify drawings for those purposes. In contrast no identifying term is used for drawings for industrial manufacture, which in English-speaking countries are known as 'engineering drawings'. In the ISO committee for technical drawing (not just engineering) it has been the intention for many years to unify, as far as practicable, in one set of standards the practices and conventions of all disciplines using technical drawings. In Britain the traditional separation of engineering and building and construction drawings has been maintained and is reflected in BS 308 and BS 1192 respectively.

European practice, and hence ISO, recognizes only the comma as a decimal marker and commas therefore appear in the new BS EN standards. (In contrast, it is mainland Europe practice to mark off thousands by a point and this may be found in preference to leaving a gap, hence care will need to be taken that values are correctly distinguished.)

Particular attention needs to be drawn to the treatment of interpretation of limits of size for the control of form. ISO 8015 defers to the principle of independency and makes only concessionary clausal reference to the commonly accepted relationship where tolerances of size may have influence on the controlling limits of form. In BS 308 both systems are presented with equal status, with the choice of system open to the draughtsman and his organization's company policy (see clause 11 of BS 308 : Part 2 : 1985). Because ISO 8015 gives preference to the independency system and is referred to in associated standards, care will need to be exercised to ensure that only one system is followed on one project, or by one company, or in one product field. BS 308 assumed that the traditional interpretation would normally be followed, as indeed it is believed to be in most of the world, and so it recommended that a special symbol be employed to identify when the independency interpretation is being followed (see clause 14 of Part 2).

¹⁾ The delegation included representation of building and construction drawing practice interests, for BS 1192, and of gauging and measurement instrument interests, whose standards would also be affected.

The ISO standards have been developed, as had BS 308, with attention paid to computer-aided machine draughting and such machines are currently capable of conforming to the standards. Any minor non-conformities due to the limitations of a particular proprietary machine system would not be expected to prejudice the understanding of a drawing when otherwise it conforms to the standards.

Differences between the independent ISO committees' publications across draughting and product specification and on measurement and their inter-relationship particularly in respect of tolerances for size and form, have in recent years been recognized by the relevant committees as an obstruction to the satisfactory inter-relation of engineering manufacturing practices. The situation is currently being addressed in ISO by a joint harmonization group, drawn from TC3, TC10 and TC57, dedicated to technically aligning standards for specifying and measuring size and form, and applying a co-ordinated standards development policy for tolerances. (This group will be superseded in June 1996 by a new technical committee, TC213.) This may well delay the adoption by CEN of some standards which are, as a result, in need of revision.

Listings of BS EN series standards

The ISO standards known to be intended for adoption by CEN, which will replace BS 308 on engineering drawing practice, and are based on the original ISO identifiers are given in list A in that numerical sequence. The corresponding Parts of BS 308 are given in the right hand column.

In order to assist users to identify the BS EN standards they are being dual-numbered by the addition of 'BS 308' with a section number that will relate them, in respect of subject, to the Parts of BS 308 and are given in list B in that numerical sequence.

List A

BS EN ISO 128 :	<i>Technical drawings — General principles of presentation²⁾</i>	1	BS EN ISO 3098 :	<i>Technical drawings — Lettering — Part 1 : Currently used characters²⁾</i>	1
BS EN ISO 129 :	<i>Technical drawings — Dimensioning — General principles, definitions, methods of execution and special indications²⁾</i>	2	BS EN ISO 5455 :	<i>Technical drawings — Scales⁴⁾</i>	1
BS EN ISO 406 :	<i>Technical drawings — Tolerancing of linear and angular dimensions²⁾</i>	2	BS EN ISO 5457 :	<i>Technical drawings — Sizes and layout of drawing sheets</i>	1
BS EN ISO 1101 :	<i>Technical drawings — Geometric tolerancing — Tolerancing of form, orientation, location and run-out — Generalities, definitions, symbols, indications on drawings²⁾</i>	3	BS EN ISO 5458 :	<i>Technical drawings — Geometrical tolerancing — Positional tolerancing²⁾</i>	3
BS EN ISO 1302 :	<i>Technical drawings — Method of indicating surface texture on drawings²⁾</i>	2	BS EN ISO 5459 :	<i>Technical drawings — Geometrical tolerancing — Datums and datum-systems for geometrical tolerances²⁾</i>	3
BS EN ISO 1660 :	<i>Technical drawings — Dimensioning and tolerancing of profiles³⁾</i>	2	BS EN ISO 6410 :	<i>Technical drawings — Conventional representation of threaded parts³⁾</i>	1
BS EN ISO 2162 :	<i>Technical drawings — Representation of springs³⁾</i>	1	BS EN ISO 6411 :	<i>Technical drawings — Simplified representation of centre holes</i>	1
BS EN ISO 2203 :	<i>Technical drawings — Conventional representation of gears</i>	1	BS EN ISO 6413 :	<i>Technical drawings — Representation of splines and serrations⁴⁾</i>	1
BS EN ISO 2692 :	<i>Technical drawings — Geometrical tolerancing — Maximum material principle²⁾</i>	3	BS EN ISO 6433 :	<i>Technical drawings — Item references⁴⁾</i>	1
BS EN ISO 3040 :	<i>Technical drawings — Dimensioning and tolerancing — Cones²⁾</i>	2	BS EN ISO 7083 :	<i>Technical drawings — Symbols for geometrical tolerancing — Proportions and dimensions⁴⁾</i>	3
			BS EN ISO 7200 :	<i>Technical drawings — Title blocks</i>	1
			BS EN ISO 7573 :	<i>Technical drawings — Item lists</i>	1
			BS EN ISO 8015 :	<i>Technical drawings — Fundamental tolerancing principle²⁾</i>	2
			BS EN ISO 8826-1 :	<i>Technical drawings — Rolling bearings — Part 1 : General simplified representation⁴⁾</i>	1
			BS EN ISO 9222-1 :	<i>Technical drawings — Seals for dynamic application — Part 1 : General simplified representation⁴⁾</i>	1

BS EN ISO 9222-2 : <i>Technical drawings — Seals for dynamic application — Part 2 : Detailed simplified representation⁴⁾</i>	1	List B	
		BS 308 : Section 1.1	BS EN ISO 10209-1 ³⁾
		BS 308 : Section 1.2	BS EN ISO 5457
BS EN ISO 10209-1 : <i>Technical product documentation — Vocabulary — Part 1 : Terms relating to technical drawings : general and types of drawings³⁾</i>	1	BS 308 : Section 1.3	BS EN ISO 7200
		BS 308 : Section 1.4	BS EN ISO 5455 ⁴⁾
		BS 308 : Section 1.5	BS EN ISO 128 ²⁾
		BS 308 : Section 1.6	BS EN ISO 3098-1 ²⁾
		BS 308 : Section 1.7	BS EN ISO 10209-2 ³⁾
BS EN ISO 10209-2 : <i>Technical product documentation — Vocabulary — Part 2 : Terms relating to projection methods³⁾</i>	1	BS 308 : Section 1.8	BS EN ISO 6433 ⁴⁾
		BS 308 : Section 1.9	BS EN ISO 6413 ⁴⁾
		BS 308 : Section 1.10	BS EN ISO 6410-1 ³⁾
		BS 308 : Section 1.11	BS EN ISO 6410-2 ³⁾
BS EN ISO 10209-3 : <i>Technical product documentation — Vocabulary — Part 3 : Dimensioning and tolerancing⁵⁾</i>	2, 3	BS 308 : Section 1.12	BS EN ISO 8826-1 ⁴⁾
		BS 308 : Section 1.13	BS EN ISO 8826-2
		BS 308 : Section 1.14	BS EN ISO 9222-1 ⁴⁾
		BS 308 : Section 1.15	BS EN ISO 9222-2 ⁴⁾
BS EN ISO 10578 : <i>Projected tolerance zone concept⁵⁾</i>	3	BS 308 : Section 1.16	BS EN ISO 2203
		BS 308 : Section 1.17	BS EN ISO 2162-1 ³⁾
		BS 308 : Section 1.18	BS EN ISO 2162-2 ³⁾
		BS 308 : Section 1.19	BS EN ISO 2162-3 ³⁾
		BS 308 : Section 1.20	BS EN ISO 6410-3 ³⁾
		BS 308 : Section 1.21	BS EN ISO 5845-1
		BS 308 : Section 1.22	BS EN ISO 5845-2
		BS 308 : Section 1.23	BS EN ISO 6411
		BS 308 : Section 1.24	BS EN ISO 10135
		BS 308 : Section 2.1	BS EN ISO 10209-3 ⁵⁾
		BS 308 : Section 2.2	BS EN ISO 129 ²⁾
		BS 308 : Section 2.3	BS EN ISO 1660 ⁴⁾
		BS 308 : Section 2.4	BS EN ISO 406 ²⁾
		BS 308 : Section 2.5	BS EN ISO 3040 ²⁾
		BS 308 : Section 2.6	BS EN ISO 8015 ²⁾
		BS 308 : Section 2.7	BS EN ISO 1302 ²⁾
		BS 308 : Section 3.1	BS EN ISO 1101 ²⁾
		BS 308 : Section 3.2	BS EN ISO 10578 ⁵⁾
		BS 308 : Section 3.3	BS EN ISO 5459 ²⁾
		BS 308 : Section 3.4	BS EN ISO 2692 ²⁾
		BS 308 : Section 3.5	BS EN ISO 5458 ²⁾
		BS 308 : Section 3.6	BS EN ISO 7083 ⁴⁾

²⁾ Subject of revision by ISO.

³⁾ In process of adoption.

⁴⁾ Adopted and published.

⁵⁾ In preparation by ISO.

Section 1. General principles

1.1 General

This section covers the basic principles and conventions of engineering drawing: drawing sheets, scales, lines, lettering, projection, views, sections and conventional and simplified representations, thus covering the scope of BS 308 : Part 1 : 1993. The European Standards concerned are identified by a 1 in the right hand column in list A.

1.2 BS EN ISO 10209-1 (vocabulary)

1.2.1 General

BS EN ISO 10209-1 defines drawing terms relating to types of drawings in the broad technical field, in an attempt to standardize terminology across engineering and other disciplines such as building and construction. Generally the definitions are minimal and care is needed to distinguish when a term is suited, or customary, to one or other discipline. This is revealed where some definitions are not quite what would be expected due to having been written with another discipline bias. (Part 2 of 10209 covers projection terms, see 1.6.3.)

1.2.2 Types of engineering drawings

The terms covered are more numerous than the fundamental types of drawings defined in BS 308. There are no contradictions but some require comment. The design layout drawing is not included and its concept is not clearly identified in any term.

Detail and part drawings appear synonymous, but the definition of the former appears biased towards building and construction interpretation. The definition of tabular drawing fails to identify or include the essential feature of a tabulation. The concept of the combined drawing is not included. Again the definition of arrangement drawing is biased to building and construction.

1.3 BS EN ISO 5457 (drawing sheets)

1.3.1 General

The scope of this standard states that it 'specifies sizes of blank and pre-printed drawing sheets for use with all technical drawings in any field of engineering'. (The limitation implied in this instance by the use of the word 'engineering' is not significant.) The BS EN standard is divided into two sections: sizes and graphical features.

1.3.2 Sizes

BS 308 only gives the basic ISO-A series of sizes, but BS EN ISO 5457 also gives a table of elongated sizes and a table of exceptional elongated sizes. The English colloquially descriptive terms for format 'landscape' and 'portrait' are not used in the BS EN; the terms 'type X' and 'type Y' sheets are substituted.

1.3.3 Graphical features

Whilst the concept of a filing margin is not included in BS 308, the texts discussing trimming marks, borders, frames, grid systems, centring marks and orientation marks are virtually identical with that of BS EN ISO 5457. The scale bar is included in BS EN ISO 5457 but is called 'metric reference graduation'. Print folding marks are not addressed in the BS EN and in BS 308 the reader is referred for these to BS 1192 : Part 1, clause 22.

1.4 BS EN ISO 7200 (title blocks)

The scope of this standard 'gives guidance by laying down appropriate rules and recommendations ...'

It gives detailed instruction on the arrangement and contents of the main and secondary zones (boxes). It covers all the necessary items but does not present them in simple listings.

1.5 BS EN ISO 5455 (scales)

The scope of this standard states that it 'specifies recommended scales and their designation for use on all technical drawings in any field of engineering'. (The limitation implied in this instance by the use of the word 'engineering' is not significant.) The technical content of this standard and that of BS 308 : Part 1 : 1993 is identical. The BS EN does not preface the designation of scale with 'original'.

1.6 BS EN ISO 128 (general principles)

NOTE. BS EN ISO 128 has not yet been adopted by CEN and is under revision in ISO.

1.6.1 General

The scope of this standard 'specifies the general principles of presentation to be applied to technical drawings following the orthographic projection methods'. This standard covers most of the scope of BS 308 : Part 1 : 1993 dealing with the basic principles of orthographic draughting. (The ISO technical committee is currently drafting a detailed and comprehensive standard on lines, developing the theme from fundamentals to dedicated lines to cater for any form of technical drawing. This will be a specific standard and will supersede aspects of lines in existing standards such as ISO 128.)

1.6.2 Lines

The technical content of BS EN ISO 128 and BS 308 : Part 1 : 1993 on lines is identical. This includes types of lines, their use, their thickness, their spacing and their priorities when in coincidence, the styles of leader lines and their application and their terminations. BS 308 gives more detailed recommendations on leader lines. The illustrative table and associated drawings are technically identical.

BS 308 : Part 1 : 1993 includes a clause giving recommendations on arrowheads and arrows with sizes and proportions; ISO 128 does not cover this. However, in clause 4.3.1 of BS EN ISO 129 on dimensioning (see section 2 of this guide), four types of arrowhead and the oblique line are specified for dimension terminations.

1.6.3 BS EN ISO 10209-2 (projection terms)

Terms relating to the different projection methods: orthographic, as used in engineering drawings, and other additional methods also used in building and construction (see BS 1192 : Part 1) are fully covered.

1.6.4 Projections and views

As stated in 8.1 of BS 308 : Part 1 : 1993 both first and third angle orthographic projection methods are approved internationally and the subjects of views and projections are dealt with in clause 2 of ISO 128. The requirement in 2.5 that direction of view arrows shall be used when a view is not placed in projection is an accepted convention, but referring to figure 7 as an example is unfortunate for it does not illustrate the point, whereas figure 8 does so. (Compare with figures 10 and 11 of BS 308.)

In the 1993 revision of BS 308 : Part 1 the presentation of views (auxiliary and incomplete) was overhauled. In ISO 128 all such variants on views, including repetitive features, enlarged features and developed views (initial outlines) are covered, except auxiliary views. The assumption can be made from figures 53 and 54 of ISO 128 that the zig-zag type D1 line can be used indiscriminately as a choice with the type C1 line. In British practice, the zig-zag line is normally reserved for large and non-cylindrical parts/areas.

1.6.5 Sections and sectional views

The technical content of ISO 128 is identical with BS 308 : Part 1 with respect to hatching and sectioning and all the accepted variations and conventions. Sections are addressed in 4.4, in general, and the variations are dealt with in the remainder of clause 4. However clause 4 of ISO 128 commences with three subclauses on hatching and thin sections and allows for the use of different types of hatching to identify different materials.

Note that in figure 35(b) of BS 308 : Part 1 the removed sections are not placed in relationship with the cutting planes. In the ISO standard the vertical centre lines of the removed sections are extensions of the cutting plane, thus the relationship is established and in this case identifying letters are superfluous.

1.6.6 Conventional and simplified representation of features

In ISO 128 and BS 308 the technical conventions etc. are identical, but the individual subjects are not similarly grouped. ISO 128 does not include knurling. The representation of transparent material is the same. Plane faces on cylindrical parts, whilst technically the same, is treated with restriction to shaft ends in ISO 128, due to the clause also covering the conventions for building and construction. Screw threads are the subject of a separate standard (BS EN ISO 6410).

1.7 BS EN ISO 3098 (lettering)

ISO 3098 deals with lettering and is published in four Parts. Part 1 covers the Latin alphabet and Arabic notation numerals and constitutes the totality of British draughting needs for virtually all engineering drawings. Its scope 'specifies the characteristics of lettering...'. Part 2 deals with Greek characters and may be useful for physical quantities. Part 3 presents variations in the Latin alphabet, for example diacritical marks and accents. Part 4 covers characters of the Cyrillic alphabet.

These standards are not specific to engineering drawing and are intended for any technical usage. Guidance on orientation of lettering and the location of notes on drawings is not included; neither is guidance on proportions of lettering to size of drawing.

Whereas BS 308 : Part 1 : 1993 limits its recommendations to ensure clarity and consistency without stipulating any particular style and recommends character size proportional to drawing sheet size, all parts of ISO 3098 concentrate more on the regimentation of structure, shape and dimensions of characters.

1.8 BS EN ISO 6433 (item references)

This standard 'gives general rules for the application and presentation of item references on technical drawings'. Technical content is similar to BS 308 : Part 1, but BS EN ISO 6433 allows either individual leaders with regard to associated components such as nuts and bolts or single leaders and grouped reference numbers.

1.9 Symbols and abbreviations

Symbols and abbreviations in common use in engineering drawings are listed in clause 12 of BS 308 : Part 1 : 1993; items with international recognition are identified. No such listing is found in the BS ENs. Most of the listed abbreviations in BS 308 are based on English words and therefore cannot be expected to enjoy international acceptance other than in English-speaking countries.

1.10 BS EN ISO 6413 (splines and serrations)

The scope of this standard states that it specifies 'the rules and graphical symbols for the representation of splines and serrations on technical drawings'. The technical content of this standard and that of **13.6** of BS 308 : Part 1 : 1993 is similar, but the latter treats only briefly the fundamentals. BS EN ISO 6413 includes a designation system which indicates by symbol whether the spline is straight-sided or involute, followed by the relevant standard, i.e. ISO 14, and the dimensions. It includes 'complete representation' of spline joints, i.e. showing teeth etc., which is not found in BS 308 : Part 1. All the illustrations show splines/serrations where the major diameters equate with the shaft diameters.

1.11 BS EN ISO 6410-1 and BS EN ISO 6410-2 (screw threads and threaded parts)

The scope of Part 1 of this standard states that it 'specifies methods for representing screw threads and threaded parts on technical drawings'. The technical content of this standard and that of **13.7** of BS 308 : Part 1 : 1993 is identical. In both the EN and BS standards the full representation of threads is treated as exceptional. BS EN ISO 6410 : Part 2 states that it 'specifies methods for the representation of screw thread inserts on technical drawings'. This is more detailed than **14.3** of BS 308 : Part 1 : 1993 and includes detail variations of design and designation. (See below for BS EN ISO 6410 : Part 3.)

1.12 BS EN ISO 8826-1 (rolling bearings)

This standard 'specifies the general simplified representation for rolling bearings' with which **14.4** of BS 308 : Part 1 aligns technically. Part 2 of ISO 8826 has been published and is intended to provide for detailed indication by symbolism of the several varieties of rolling bearing. It is listed for adoption by CEN but its adoption has not yet been initiated. This level of detailed symbolic representation is not covered in BS 308.

1.13 BS EN ISO 9222-1 and BS EN ISO 9222-2 (seals)

Part 1 of this standard 'specifies the general simplified representation for seals' and aligns technically with **14.5** of BS 308 : Part 1 : 1993 but gives more detailed instruction. Part 2 specifies detailed representation by symbolism to indicate the type of seal and its mode of operation. This level of detailed symbolic representation is not covered in BS 308.

1.14 BS EN ISO 2203 (gears)

The scope of this standard states that it 'establishes the conventional representation of the toothed portion of gears ...'. Its technical content is identical with **14.6** of BS 308 : Part 1 : 1993. However, it is to be noted that 'pitch line' is called 'pitch surface' in BS EN ISO 2203.

1.15 BS EN ISO 2162-1, BS EN ISO 2162-2 and BS EN ISO 2162-3 (springs)

The scope of Part 1 of this standard states that it 'gives rules for the simplified representation of compression, extension, torsion, disc, spiral and leaf springs...'. It gives some instruction on indication of springs and illustrates a comprehensive variety of types and variations. **14.7** of BS 308 : Part 1 aligns technically but with less text and fewer illustrations. (Part 2 of ISO 2162 covers presentation of data for cylindrical helical compression springs and Part 3 covers terms in a vocabulary.)

1.16 BS EN ISO 6410-3 (simplified representation of threaded fasteners)

The scope of this Part of the standard states that it 'establishes rules for the simplified representation of threaded parts'. It actually provides simplified representation of a variety of types of screws and nuts, with which **14.8** of BS 308 : Part 1 : 1993 corresponds, and methods of indication and designation of small tapped holes.

1.17 BS EN ISO 6411 (centre holes)

The 1993 revision of BS 308 : Part 1 included the simplified representation of centre holes in annex B, taken from ISO 6411, but the annexes in that standard on dimensions of preferred centre holes and on the details of proportions and dimensions of the symbols employed on the drawing were not included.