

Technical product documentation (TPD) — Specification for defining, specifying and graphically representing products

ICS 01.100 ; 01.110

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- British Engineers Cutting Tools Association
- British Foundry Association
- British Metal Casting Association
- British Standards Society
- Castings Development Centre
- City of Birmingham Polytechnic
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- Drawing Office Material Manufacturers' Association
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Foreword

This British Standard has been prepared by Technical Committee TDW/4. It supersedes BS 308-1:1993, BS 308-2:1985 and BS 308-3:1990, which are withdrawn.

BS 308 has been the draughtsman's main reference standard since 1927 and was the first of its kind in the world. It has been regularly revised ever since, and in 1972 was reorganized and expanded into three parts, to satisfy industry's need for specifying particular functional requirements.

Every subsequent revision of BS 308 took account of ISO drawing standards, in order to ensure that no conflict existed. However, during the 1980s, the pace of change in the ISO arena, together with the progress of European standardization, made continuous alignment of BS 308 with International and European Standards impractical. As a result, in 1992, BSI decided to depart from the practice of the previous 65 years and to implement ISO drawing standards directly as British Standards, thereby allowing BS 308 to become progressively redundant.

This process has continued, the guidance document, PD 308, being introduced in June 1996, to assist with the transition.

Meanwhile, there was growing awareness in international circles of differences in interpretation between the terms used in ISO drawing standards and those in ISO verification standards, despite their apparent commonality. In response, ISO set up a Joint Harmonization Group (JHG) to investigate the use of these common terms by those who design and those who verify. This investigation confirmed that similar terms were indeed used by both disciplines, but with different meanings, thus causing misunderstanding and, in some cases, conflict between purchaser and supplier. ISO therefore set up a technical committee (TC 213) with the object of rationalizing the terms and definitions used, in order to establish standards that could be used with equal effect by all.

To ensure that United Kingdom views are given due consideration, the UK committee makes every effort to arrange comprehensive expert representation at ISO meetings. Briefing of these UK nominated experts is undertaken by BSI technical panels and by the parent committee TDW/4 to ensure, as far as practicable, that resulting standards are applicable in the UK and do not unnecessarily conflict with UK custom and practice.

BS 308 has been affected, not only by the steady flow of new and revised ISO standards, but also by the fact that some of the principles and techniques being introduced are different from those of BS 308. Some of the new standards continue to provide the user with a choice of techniques, but many are seen as being more prescriptive. BS 308 was essentially a guidance document, whereas many of the replacing standards are normative.

To ensure that the UK is equipped to make optimum use of the ongoing standards, both old and new, it has been decided that the withdrawal of BS 308 alone is insufficient. This new standard, BS 8888, creates a unifying identity for the various recently implemented ISO and EN ISO standards. It also provides information on new concepts and techniques, and, for an interim period, will serve as a means of cross-referencing between BS 308 and the current situation.

It is not the role of BS 8888 to take the place of ISO standards. The principle of implementing ISO standards as British Standards (BS ISO standards) is sound and, in an increasingly global environment, the benefits accruing from universal recognition of a common identity are clear.

With the guidance provided by BS 8888, it is envisaged that UK designers, manufacturers and verifiers will soon become as familiar with the relevant ISO standards as they are with the contents of the withdrawn BS 308.

As reflected in the title of this standard, the preparation of technical drawings, whilst still of the utmost importance, is no longer the sole focus for this area of work. Technical product documentation of all types, including more recent forms of representation and definition, such as digital product definition (3-D modelling), needs to be addressed in a similar way. BS 8888 encompasses all these concepts.

For some time, BS ISO and BS EN ISO standards, have recognized only the comma as a decimal marker, although this convention is not always adopted in practice. In preparing this new specification, it has been decided to confirm the use of the comma for this purpose (see **18.2**).

All linear dimensions shown in the figures in this standard are in millimetres.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 35 and a back cover.

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1 Scope

This British Standard specifies requirements for the preparation of all forms of technical product document. The requirements cross-refer substantially to International and European Standards which have been implemented as British Standards in the BS ISO and BS EN ISO series. The requirements are supplemented by commentary and recommendations.

NOTE Complementary to this standard are three “Standards Kits” under the general heading BS 8888, *Technical Product Documentation*. Each kit comprises a group of the cross-referenced standards relating to a particular aspect of the scope.

Annexes A and B list cross-referenced standards and other documents, normative and informative respectively, and indicate the “kit” (see note) in which they can be found.

Annex C provides a list of standard symbols and abbreviations.

Annex D contains explanation and guidance on current trends in geometrical product specification and 3-D modelling.

Annex E relates clauses in each part of the withdrawn BS 308 to corresponding clauses of BS 8888:2000 and to the relevant cross-referenced BS ISO or BS EN ISO standards.

2 References

2.1 Normative references

The normative documents listed in annex A contain provisions which, through reference in this text, constitute provisions of this British Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. For undated references, the latest edition of the publication referred to applies.

2.2 Informative references

This British Standard refers to other publications that provide information or guidance. These informative documents are listed in annex B. Care should be taken to ensure that reference is made to the most recent edition.

3 Terms and definitions

For the purposes of this British Standard, the following terms and definitions apply, together with those given in:

BS EN ISO 10209-1	<i>Technical product documentation — Vocabulary — Terms relating to technical drawings — General and types of drawing</i>
BS EN ISO 10209-2	<i>Technical product documentation — Vocabulary — Terms relating to projection methods</i>
BS EN ISO 10209-4	<i>Technical product documentation — Vocabulary — Terms relating to construction documentation</i>
BS EN ISO 14660-1	<i>Geometrical product specification (GPS) — Geometrical features — General terms and definitions</i>

3.1

technical product document

means of conveying the design definition and specification of a product for manufacturing and verification purposes

4 Expression of the concept

COMMENTARY AND RECOMMENDATIONS

Before specifying a technical product, the broad requirement should be established, and the functions that the product will be expected to fulfil. The design intent can be depicted in the form of a design layout, scheme or simplified computer-generated model, although this will not normally be used in the detailed technical product document for manufacturing purposes.

5 Types of documentation

COMMENTARY AND RECOMMENDATIONS

5.1 General

The technical product document should, if practicable, be of a type listed in one of the following standards, and should be prepared in accordance with any corresponding recommendations in these standards:

- BS 5070-1 *Engineering diagram drawing practice — Recommendations for general principles*
- BS ISO 7573 *Technical drawings — Item lists*
- BS ISO 10209-1 *Technical product documentation — Vocabulary — Terms relating to technical drawings — General and types of drawing*
- BS ISO 10209-2 *Technical product documentation — Vocabulary — Terms relating to projection methods*

5.2 Combined drawing

A combined drawing should display an assembly, item list and constituent details, drawn separately but all on the same drawing.

5.3 Diagram

The function of a system, or the relationship between component parts, may be depicted in a diagram employing simplified representations, as recommended in the following standards:

- BS 5070-1 *Engineering diagram drawing practice — Recommendations for general principles*
- BS 5070-3 *Engineering diagram drawing practice — Recommendations for mechanical/fluid flow diagrams*
- BS 5070-4 *Engineering diagram drawing practice — Recommendations for logic diagrams*
- BS EN 61082-2 *Preparation of documents used in electrotechnology — Function-oriented diagrams*

5.4 Drawing list

A drawing list should consist of a list of drawings associated with an assembly.

6 Relationships

COMMENTARY AND RECOMMENDATIONS

The careful targeting of technical product documents to known or intended users, will greatly assist the accuracy with which the specification is converted into the final product. Whilst precision and avoidance of ambiguity should always be paramount, the means employed to convey this information should always be seen to match the capability, or potential capability, of the available or achievable manufacturing facility. Specification beyond this level is unlikely to produce satisfactory results and will often prove expensive, both in terms of the cost of the over-specification itself and in terms of inadequate or unacceptable product.

7 Presentation media

The presentation of the drawings shall conform to the following standards:

- BS EN ISO 5457 *Technical drawing — Sizes and layout of drawing sheets*
- BS ISO 7200 *Technical drawing — Title blocks*

COMMENTARY AND RECOMMENDATION ON CLAUSE 7

Format

Drawing sheets and other documents should be presented in one of the following formats:

- a) *landscape*: intended to be viewed with the longest side of the sheet horizontal;
- b) *portrait*: intended to be viewed with the longest side of the sheet vertical.

Orientation marks

Any orientation mark should be in the form of a triangular arrowhead located on the centring mark and adjacent to and pointing towards the intended position of the drawing user.

Metric reference graduation

Any metric reference graduation (scale bar) should be figure-less, have a minimum length of 100 mm and be graduated at 10 mm intervals. It should be located symmetrically about a centring mark, near the frame and within the border. It should have a maximum width of 5 mm and the continuous strokes should be of 0,5 mm maximum thickness.

8 Scales

Scales shall conform to:

BS EN ISO 5455 *Technical drawing — Scales*

9 Lines and arrows

9.1 Lines

Lines shall conform to the following standards, as appropriate:

- | | |
|---------------|---|
| BS ISO 128-20 | <i>Technical drawing — General principles of presentation — Basic conventions for lines</i> |
| BS ISO 128-21 | <i>Technical drawing — General principles of presentation — Lines preparation by CAD systems</i> |
| BS ISO 128-22 | <i>Technical drawing — General principles of presentation — Basic conventions and applications for leader lines and reference lines</i> |
| BS ISO 128-23 | <i>Technical drawing — General principles of presentation — Lines on construction drawings</i> |
| BS ISO 128-24 | <i>Technical drawing — General principles of presentation — Lines on mechanical engineering drawings</i> |
| BS ISO 128-25 | <i>Technical drawing — General principles of presentation — Lines on shipbuilding drawings</i> |

9.2 Arrows

Arrows composed of lines shall conform to:

- | | |
|------------|--|
| BS ISO 129 | <i>Technical drawings — Dimensioning — General principles, definitions, methods of execution and special indications</i> |
|------------|--|

10 Lettering

10.1 General

Lettering shall conform to:

- | | |
|------------------|---|
| BS EN ISO 3098-0 | <i>Technical product documentation — Lettering — General requirements</i> |
|------------------|---|

and to the following standards, as appropriate:

- | | |
|------------------|--|
| BS EN ISO 3098-2 | <i>Technical product documentation — Lettering — Latin alphabet, numerals and marks</i> |
| BS EN ISO 3098-3 | <i>Technical product documentation — Lettering — Greek alphabet</i> |
| BS EN ISO 3098-4 | <i>Technical product documentation — Lettering — Diacritical and particular marks for the Latin alphabet</i> |
| BS EN ISO 3098-5 | <i>Technical product documentation — Lettering — CAD lettering of the Latin alphabet, numerals and marks</i> |
| BS EN ISO 3098-6 | <i>Technical product documentation — Lettering — Cyrillic alphabet</i> |

10.2 Notes

When a landscape-format drawing sheet is used in its normal orientation, with the title block at the bottom right-hand corner, notes shall be lettered parallel to the long side of the sheet. When a landscape-format drawing sheet is used in portrait orientation, the title block shall be located at the left-hand side and notes shall be lettered parallel to the short side of the sheet.

COMMENTARY AND RECOMMENDATIONS ON 10.2

Placement

Notes of a general nature should, wherever practicable, be grouped together and not distributed over the drawing. Notes relating to specific details should appear near the relevant feature, but not so near as to crowd the view.

Underlining

Underlining of notes is not recommended. Where emphasis is required, larger characters should be used.

11 Projections

Projections shall conform to one of the following standards:

BS EN ISO 5456-2 *Technical drawing — Projection methods — Orthographic representations*

BS EN ISO 5456-3 *Technical drawing — Projection methods — Axonometric representations*

BS EN ISO 5456-4 *Technical drawing — Projection methods — Central projection*

NOTE The following standard gives a survey of the various projection methods:

BS EN ISO 5456-1 *Technical drawing — Projection methods — Synopsis*

12 Views

12.1 General

Views shall conform to:

BS ISO 128 *Technical drawings — General principles of presentation*

12.2 Auxiliary views

Where true representation of features is necessary, but cannot be achieved on the orthographic views, the features shall be shown in projected auxiliary views. An example is shown in Figure 1.

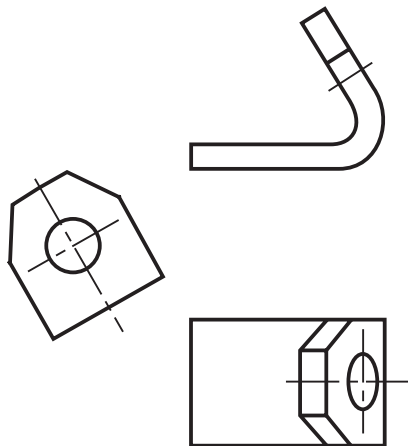


Figure 1 — Auxiliary view showing true shape of inclined surface

13 Sections

Sections shall conform to:

BS ISO 128 *Technical drawings — General principles of presentation*

NOTE Hatching may be omitted where the time and expense involved in including it is not justified and the understanding of the drawing will not be impaired.

14 Item references

Item references shall conform to:

BS EN ISO 6433 *Technical drawings — Item references*

15 Symbols and abbreviations

15.1 General

15.1.1 Abbreviations (text equivalents) shall be the same in the singular and plural. Full stops shall not be used except where the abbreviation forms a word (e.g. NO. as an abbreviation for “number”).

15.1.2 Symbols used for physical quantities and units of measurement shall conform to the following standards, as appropriate:

BS 5775-1	<i>Specification for quantities, units and symbols — Space and time</i>
BS 5775-2	<i>Specification for quantities, units and symbols — Periodic and related phenomena</i>
BS 5775-3	<i>Specification for quantities, units and symbols — Mechanics</i>
BS 5775-4	<i>Specification for quantities, units and symbols — Heat</i>
BS 5775-5	<i>Specification for quantities, units and symbols — Electricity and magnetism</i>
BS 5775-6	<i>Specification for quantities, units and symbols — Light and related electromagnetic radiations</i>
BS 5775-7	<i>Specification for quantities, units and symbols — Acoustics</i>
BS 5775-8	<i>Specification for quantities, units and symbols — Physical chemistry and molecular physics</i>
BS 5775-9	<i>Specification for quantities, units and symbols — Atomic and nuclear physics</i>
BS 5775-10	<i>Specification for quantities, units and symbols — Nuclear reactions and ionizing radiations</i>
BS 5775-11	<i>Specification for quantities, units and symbols — Mathematical signs and symbols for use in physical sciences and technology</i>
BS 5775-12	<i>Specification for quantities, units and symbols — Characteristic numbers</i>
BS 5775-13	<i>Specification for quantities, units and symbols — Solid state physics</i>

15.2 Standard symbols and abbreviations

If the terms listed in Table C.1 need to be abbreviated, only the symbols and abbreviations given in Table C.1 shall be used. These symbols and abbreviations shall not be used to represent any other concept.

COMMENTARY AND RECOMMENDATIONS ON CLAUSE 15

Only commonly used and easily understood symbols and abbreviations should be used; others should be avoided and the intended meaning expressed in words. Where symbols are used by convention to represent a system, method or process, they should conform to the appropriate British Standard.

16 Representation of features

Conventions used for the representation of features shall conform to the following standards, as appropriate:

BS ISO 128	<i>Technical drawings — General principles of presentation</i>
BS EN ISO 6410-1	<i>Technical drawings — Screw threads and threaded parts — General conventions</i>
BS EN ISO 6410-2	<i>Technical drawings — Screw threads and threaded parts — Screw thread inserts</i>
BS EN ISO 6410-3	<i>Technical drawings — Screw threads and threaded parts — Simplified representation</i>
BS ISO 6411	<i>Technical drawings — Simplified representation of centre holes</i>
BS ISO 6413	<i>Technical drawings — Representation of splines and serrations</i>
BS EN ISO 14660-2	<i>Geometrical product specification (GPS) — Geometrical features — Extracted median line of a cylinder and a cone, extracted median surface, local size of an extracted feature</i>

17 Representation of components

Conventions used for the representation of components shall conform to the following standards, as appropriate:

BS ISO 128	<i>Technical drawings — General principles of presentation</i>
BS EN ISO 2162-1	<i>Technical product documentation — Springs — Simplified representation</i>
BS EN ISO 2162-2	<i>Technical product documentation — Springs — Presentation of data for cylindrical, helical and compression springs</i>
BS EN ISO 2162-3	<i>Technical product documentation — Springs — Vocabulary</i>
BS EN ISO 2203	<i>Technical drawings — Conventional representation of gears</i>
BS ISO 6410-1	<i>Technical drawings — Screw threads and threaded parts — General conventions</i>
BS ISO 6410-2	<i>Technical drawings — Screw threads and threaded parts — Screw thread inserts</i>
BS ISO 6410-3	<i>Technical drawings — Screw threads and threaded parts — Simplified representation</i>
BS EN ISO 8826-1	<i>Technical drawings — Roller bearings — General simplified representation</i>
BS EN ISO 8826-2	<i>Technical drawings — Roller bearings — Detailed simplified representation</i>
BS EN ISO 9222-1	<i>Technical drawings — Seals for dynamic application — General simplified representation</i>
BS EN ISO 9222-2	<i>Technical drawings — Seals for dynamic application — Detailed simplified representation</i>

18 Dimensioning and tolerancing

18.1 General

Dimensioning and tolerancing shall conform to the following standards, as appropriate:

BS ISO 129	<i>Technical drawings — Dimensioning — General principles, definitions, methods of execution and special indications</i>
BS ISO 406	<i>Technical drawings — Tolerancing of linear and angular dimensions</i>
BS EN ISO 1660	<i>Technical drawings — Dimensioning and tolerancing of profiles</i>
BS ISO 3040	<i>Technical drawings — Dimensioning and tolerancing of cones</i>
BS EN ISO 5458	<i>Geometrical product specifications (GPS) — Geometrical tolerancing — Positional tolerancing</i>
BS EN ISO 6410-1	<i>Technical drawings — Screw threads and threaded parts — General conventions</i>
BS EN ISO 7083	<i>Technical drawings — Symbols for geometrical tolerancing — Proportions and dimensions</i>
BS ISO 10579	<i>Technical drawings — Dimensioning and tolerancing — Non-rigid parts</i>
BS EN 22768-1	<i>General tolerances — Tolerances for linear and angular dimensions without individual tolerance indications</i>
BS EN 22768-2	<i>General tolerances — Tolerances for features without individual tolerance indications</i>

18.2 Decimal marker

The decimal marker shall be a comma.

COMMENTARY AND RECOMMENDATIONS ON 18.2

It is recommended that each group of three digits, counting from the decimal marker to the left and to the right, be separated from other digits by a small space (e.g. 12 345,067 8). In view of the requirement of 18.2, the use of a comma or a point for this purpose is deprecated. (See BS 5775-0:1993, *Specification for quantities, units and symbols — General principles*.)

18.3 Diameters

18.3.1 Clarity of view

Dimensions of diameters shall be placed on the view that provides the greatest clarity.

NOTE For example, in Figure 2, the dimensions of diameters are placed on a longitudinal view in preference to an end view which consists of a number of concentric circles.

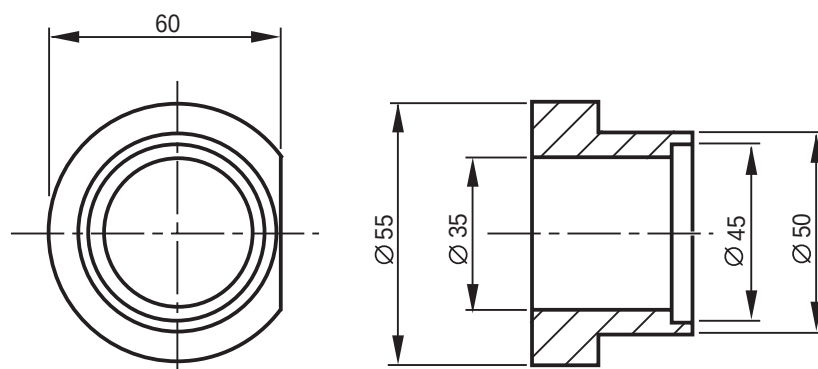


Figure 2 — Dimensions of diameters placed on the view providing greatest clarity

18.3.2 Intersection with other lines

Where dimension lines and other lines (e.g. projection lines) will otherwise intersect, the dimension lines shall be omitted and the diameter dimensions related to the features by leader lines, as shown in Figure 3.

18.3.3 Concentric diameters on partial views

Where the whole of the view is not shown, concentric diameters shall be dimensioned as shown in Figure 4.

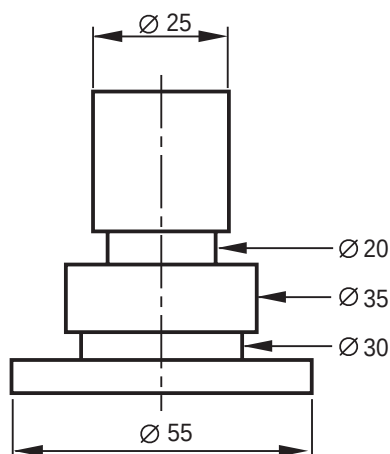


Figure 3 — Diameter dimensions indicated by leader lines

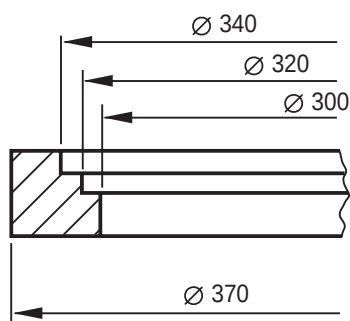


Figure 4 — Dimensioning of concentric diameters on partial views