

Technical product documentation (TPD) — An interim report

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Committees responsible for this Published Document

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- Ball and Roller Bearing Manufacturers' Association
- British Foundry Association
- British Metal Casting Association
- British Standards Society
- Brunel University
- Drawing Office Material Manufacturers and Distributors
- GAMBICA
- Gauge and Tool Makers' Association
- Institute of Engineering Designers
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Contents

	Page
Committees responsible	Inside front cover
Foreword	ii
Introduction	1
1 Scope	1
2 Confirmed changes to BS 8888:2000	1
3 Advance information regarding the revision of BS ISO 1101	5
4 Advance information regarding the revision of BS ISO 1302	7
5 The application of mathematical filters in GPS (ISO/TS 16610 series)	10
6 The development of a model for geometric specification and verification (ISO/TS 17540 series)	17
7 Approaches to 3-D modelling	18
8 Design for manufacture	21
Annex A (informative) Additions to the normative list of standards in BS 8888:2000, Annex A	24
Annex B (informative) Additions to the informative list of standards in BS 8888:2000, Annex B	25
Annex C (informative) The relationship between PD 8888:2001, BS 8888:2000 and BS 8888:2002	26
Annex D (informative) The GPS language in future developments	27
Annex E (informative) The role of standards in education	30
Annex F (informative) Corrections and clarification of BS 8888:2000 to be introduced at the time of the first revision	31
Bibliography	32
Figure 1 — Metric reference graduations	3
Figure 2 — Existing symbol configuration	8
Figure 3 — New symbol configuration	8
Figure 4 — Control elements in indication of surface texture requirements on engineering drawings	9
Figure 5 — Output from a Gaussian filter superposed on unfiltered input profile	12
Figure 6 — Output of a cubic spline filter superposed on unfiltered input profile	13
Figure 7 — Output of a morphological operation (erosion) shown as a lower curve	14
Figure 8 — Output of an envelope filter	15
Figure 9 — Alternating sequence filter at increasing scale	16
Figure 10 — Tolerances 2-D representation	19
Figure 11 — Tolerances 3-D representation	20
Figure 12 — Application of limits in 2-D representation	20
Figure 13 — Application of limits in 3-D representation	21
Figure 14 — Model for a design process	23
Figure C.1 — The relationship between PD 8888:2001, BS 8888:2000 and BS 8888:2002	26
Figure D.1 — The basic GPS framework	28
Figure D.2 — The duality principle (ISO 17450-1)	29
Table 1 — Standards that are to be cross-referenced in BS ISO 1302	7
Table 2 — The ISO/TS 16610 series of technical specifications	10
Table A.1 — Additions to the normative list of standards in BS 8888:2000, Annex A	24
Table B.1 — Additions to the informative list of standards in BS 8888:2000, Annex B	25

Foreword

This Published Document has been prepared by Technical Committee TDW/4.

This Published Document is an interim report on the progress towards a first revision of the technical specification BS 8888:2000. In particular this Published Document identifies relevant BS ISO and BS EN ISO standards, new and revised, that have been completed during the year since publication of BS 8888:2000.

In addition this Published Document provides background information on recent developments and new concepts that are influencing the technical requirements of new standards.

Annex A of this document lists revised and newly published standards, destined to become normative references in the main text of BS 8888.

Annex B lists other standards to which reference is recommended.

Annex C contains illustration of the relationship between this report and BS 8888.

Annex D contains a statement of the objectives and methods of operation currently applying to the main Technical Committees working in this field. The two main ISO Technical Committees are as follows.

- ISO/TC 10, Technical product definition.
- ISO/TC 213, Geometric product specification.

The BSI Technical Committee is TDW/4, Engineering drawing, metrology and precision measurement and all related documentation.

Annex E considers the role of standards in education.

Annex F identifies a relatively small number of corrections/clarifications to BS 8888:2000, that will be introduced into the standard at the time of the first revision.

This Published Document is published with a supplementary kit, BS 8888: Supplementary kit 1: Standards added 2000–2001.

This Published Document is not to be regarded as a British Standard.

Summary of pages

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

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Introduction

Documentation for technical products is increasingly required to function in a demanding business environment. Completeness of specification, elimination of ambiguity and universal application are of paramount importance. This is because corporate entities demonstrate an increasing tendency to:

- pursue legal settlement of dispute;
- favour the introduction of quality management systems (e.g. BS EN ISO 9000);
- opt for outsourcing/sub-contracting in preference to in-house manufacture;
- depend upon digitized information transfer and computer aided processes.

These tendencies run alongside a manufacturing environment in which the demand for highly sophisticated functionality of workpieces at a competitive, commercially viable cost is increasing.

The increasing dependence upon computers reduces the opportunity for human interaction. Combined with today's social model, with its encouragement of mobility of labour, this dependence increases the need to build relevant knowledge into computer aided design, manufacturing and quality systems so that products are fully integrated, universally applicable and can be reasonably relied upon to be available when required.

All of these factors bring immense pressure to bear on the design/specification to enhance the detail of its output in order to avoid any ambiguity. The role of the ISO Technical Committees working in the fields of geometric product specification (GPS) and technical product documentation (TPD) is to provide standards that can be applied comprehensively and unambiguously to these rapidly emerging technologies.

The rapid development and application of new technologies is leading to a correspondingly rapid programme of standards development. Given the nature of standardization, based as it is on the concept of consensus, this is not always easy to deliver. However, considerable progress is being made and the number of additional standards which BS 8888 will need to encompass in its first revision in 2002 will almost certainly exceed 30; an increase of some 33 %. The nature of the changes to BS 8888 will involve some of the standards considered to be fundamental to the GPS concept.

Without advance information the process of upgrading to BS 8888:2002 could place immense strain on the resources of the organizations and individuals involved. For this reason PD 8888:2001 is provided during the interim period. The primary objective of PD 8888 is to facilitate the early introduction of relevant changes to workplace practice and to thereby assist users of BS 8888:2000 to make a seamless transition to its successor BS 8888:2002.

1 Scope

This Published Document reports on the progress towards a first revision of the technical specification BS 8888:2000. In particular this Published Document identifies relevant BS ISO and BS EN ISO standards, new and revised, that have been completed during the year since publication of BS 8888:2000. Cross-references to new standards publications (excluding revisions) will not be fully incorporated until the first revision of BS 8888 is published in August 2002. The identification of such standards at this stage is intended to assist users of BS 8888 by providing advance notice of new requirements that will apply at a given future date. In so doing this Published Document enables users of BS 8888 to work towards the integration of new requirements into workplace procedures without undue disruption.

In addition this Published Document provides background information on the recent developments and new concepts that are influencing the technical requirements of new standards. In particular clause 5, clause 6 and clause 7 fall into this category.

2 Confirmed changes to BS 8888:2000

2.1 General

Sub-clause 2.3 to sub-clause 2.22 of this Published Document identify the new and revised BS ISO and BS EN ISO standards published and/or implemented since August 2000. These new and revised standards are scheduled to be incorporated in BS 8888, clause 2, as normative references (see 2.2). Within this Published Document new and revised BS ISO and BS EN ISO standards are referred to in the same order as they are in BS 8888:2000.

2.2 Normative/informative status and the role of PD 8888:2001

British Standards can be presented in a number of differing forms. The more usual form is that of a specification or related test method. In specifications “normative” elements consist of requirements for action or application the observance of which is essential if compliance with the standard is to be claimed. Identification of a requirement (normative element) is conventionally achieved by use of the word “shall”, as in “shall do”. “Informative” text provides information considered relevant and useful. Wholly informative standards publications take the form of “Codes of Practice” or “Guides”. Such documents may consist of a series of recommendations. In a code of practice or guide the word “should” is conventionally used to denote a recommendation. Alongside these conventions the word “can” denotes that something is technically possible and “may” indicates permission.

BS 8888:2000 was conceived and prepared as a specification for the preparation of TPD, e.g. product specifications, irrespective of the medium selected for presentation. As a specification BS 8888:2000 consists largely of clauses that are identified as being normative. BS 8888:2000 also includes a significant amount of text of a purely informative nature.

In BS 8888:2000 not only is the normative text identified by the use of “shall”, but all of the informative text in the main body of BS 8888 is placed under the appropriate process stage in clauses headed “Commentary and recommendation”.

This Published Document has a wholly informative status. Although this document addresses subjects and standards that will be normative when eventually cross-referenced in BS 8888:2002 the Published Document does not of itself confer normative status. The function of this Published Document is to provide advance notice of changes to BS 8888 that will be introduced at the time of the first revision in 2002.

However, users of BS 8888:2000 should be aware that revisions to existing standards already cross-referenced in BS 8888:2000, clause 2, are a de facto part of BS 8888:2000 and should be applied accordingly.

Annex A of this document lists revised and newly published standards, destined to become normative references in the main text of BS 8888. Annex B lists other standards to which reference is recommended. Annex C provides illustration of the relationship between PD 8888:2001 and BS 8888:2002.

2.3 Terms and definitions (BS 8888:2000, clause 3)

No change at this time.

2.4 Expression of the concept (BS 8888:2000, clause 4)

In the absence of any published standards appropriate for normative citation BS 8888 includes only a recommendation that prior to the preparation of a technical product specification time should be allocated to the determination of:

- the broad requirements of the technical product specification;
- the functions that the technical product specification will be expected to fulfil; and
- a brief comment on how the design intent may be depicted.

The lack of detailed guidance in this critical aspect of the design definition process is considered to be detrimental to the effective application of the overall system. After BS 8888:2000 was published work began on the preparation of a new standard that it is intended will fill this void (see clause 8).

2.5 Types of documentation (BS 8888:2000, clause 5)

No change at this time.

2.6 Relationships (BS 8888:2000, clause 6)

No change at this time.

2.7 Presentation media (BS 8888:2000, clause 7)

BS EN ISO 6428:1999, *Technical Drawings — Requirements for Microcopying*, 3.4, includes the requirement that “All markings figuring on the drawing shall comply with the specifications of ISO 5457”. This requirement draws particular attention to the need for metric reference graduations to be added to BS 8888 to provide a facility for determining the scale of the enlarged reproduction. Unfortunately the most recently revised version of BS EN ISO 5457 does not contain illustration of “metric reference graduations”. To correct this omission the illustration provided here, Figure 1, will be added to clause 7 of BS 8888:2002.

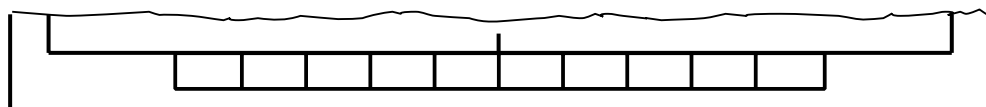


Figure 1 — Metric reference graduations

2.8 Scales (BS 8888:2000, clause 8)

No change at this time.

2.9 Lines (BS 8888:2000, clause 9)

No change at this time.

2.10 Lettering (BS 8888:2000, clause 10)

No change at this time.

2.11 Projections (BS 8888:2000, clause 11)

No change at this time.

2.12 Views (BS 8888:2000, clause 12)

The following standards, relevant to the presentation of views, are to be incorporated in BS 8888 at the first full revision in 2002. It is strongly recommended that users of BS 8888:2000 take note of their content and start to apply their requirements at the earliest opportunity.

BS ISO 128-30:2001 *Technical drawing — General principles of presentation — Part 30: Basic conventions for views.*

BS ISO 128-34:2001 *Technical drawing — General principles of presentation — Part 34: Views on mechanical engineering drawings.*

2.13 Sections (BS 8888:2000, clause 13)

The following standards, relevant to the representation of sections, are to be incorporated in BS 8888 at the first full revision in 2002. It is strongly recommended that users of BS 8888:2000 take note of their content and start to apply their requirements at the earliest opportunity.

BS ISO 128-40:2001 *Technical drawing — General principles of presentation — Part 40: Basic conventions for cuts and sections.*

BS ISO 128-44:2001 *Technical drawing — General principles of presentation — Part 44: Sections on mechanical engineering drawings.*

BS ISO 128-50:2001 *Technical drawing — General principles of presentation — Part 50: Basic conventions for representing areas on cuts and sections.*

NOTE ISO 128-44 and ISO 128-50 contain presentational defects in connection with which the UK Technical Committee voted negatively at the time of the formal vote. In the event the UK view did not prevail and the standards were published unchanged. It is stressed that these UK concerns related to accuracy in presentation of the figures' lettering heights and arrow heads etc. and not to the technical content of the standard. Therefore there is no technical problem in cross-referencing the standards from BS 8888. Users should, however, regard the figures as illustrations only and use the text as the source of definition.

2.14 Item references (BS 8888:2000, clause 14)

No change at this time.

2.15 Symbols and abbreviations (BS 8888:2000, clause 15)

No change at this time.

2.16 Representation of features (BS 8888:2000, clause 16)

The following standard relevant to the representation of features is to be incorporated in BS 8888 at the first full revision in 2002. It is strongly recommended that users of BS 8888:2000 take note of the content of this new standard and start to apply its requirements at the earliest opportunity.

BS EN ISO 5261:1999 *Technical drawings — Simplified representation of bars and profile sections.*

2.17 Representation of components (BS 8888:2000, clause 17)

The following standards, relevant to the representation of components, are to be incorporated in BS 8888 at the first full revision in 2002. It is strongly recommended that users of BS 8888:2000 take note of their content and start to apply their requirements at the earliest opportunity.

BS EN ISO 5845-1:1999 *Technical drawings — Simplified representation of the assembly of parts with fasteners — Part 1: General principles.*

BS EN 22553:1995 *Welded, brazed and soldered joints — Symbolic representation on drawings.*

2.18 Dimensioning and tolerancing (BS 8888:2000, clause 18)

No change at this time.

2.19 Geometrical tolerancing (BS 8888:2000, clause 19)

No change at this time.

NOTE Users of BS 8888:2000 should be aware that BS ISO 1101:1983 is currently the subject of significant revision. Please refer to clause 3 for further elaboration.

2.20 Surface texture indication (BS 8888:2000, clause 20)

The following standard, relevant to the indication of surface texture, is to be incorporated in BS 8888 at the first full revision in 2002. It is strongly recommended that users of BS 8888:2000 take note of its content and start to apply its requirements at the earliest opportunity.

BS EN ISO 8785:1999 *Geometric product specification (GPS) — Surface imperfections — Terms, definitions and parameters.*

The full revision of BS ISO 1302 is expected for the autumn of 2001. Users of BS 8888:2000 are recommended to take note of the contents of clause 5 of this Published Document and to give consideration to the standards listed in Annex B as being related to the revised BS ISO 1302.

2.21 Storage and retrieval (BS 8888:2000, clause 21)

No change at this time.

2.22 Marking (BS 8888:2000, clause 22)

The following standard, relevant to marking, is to be incorporated in BS 8888, as additional “Commentary and recommendation”, at the first full revision in 2002. It is suggested that users of BS 8888:2000 make themselves aware of the content of this new standard and where appropriate, start to apply its recommendations at the earliest opportunity.

BS ISO 16016:2001 *Technical product documentation — Protection notices for restricting the use of documents and products.*

3 Advance information regarding the revision of BS ISO 1101

3.1 Introduction

The important international standard BS ISO 1101 is in the process of receiving its first major revision in nearly twenty years. Although the revision has not yet been issued users of BS 8888 should be aware of the changes and improvements that will be introduced by it. In addition to the various technical changes proposed in this revision the figures and the text will be updated. This is to keep BS ISO 1101 up-to-date with the terminology used in other GPS and TPD standards.

NOTE In the absence of approved final text this description of proposed changes to BS ISO 1101 is based upon the final draft of the standard as circulated to the BSI Technical Committee TDW/4. Although these comments may be assumed to be technically correct at the time of publication of PD 8888 users of BS 8888 should take care to review the new edition of BS ISO 1101 at the earliest opportunity following its publication.

3.2 Details of changes and additions

3.2.1 *Normative/informative status*

As with other BS ISO standards BS ISO 1101 has adopted the practice of referring to other standards and publications in a normative and informative manner. In the revised standard all of the text and illustrations within the main body of the document are normative while the annexes are all informative.

3.2.2 *Spherical tolerance zone*

The most obvious change proposed for inclusion in the new edition of BS ISO 1101 concerns the indication of a spherical tolerancing zone. Spherical tolerancing zone will be specified and detailed thoroughly in the new edition of BS ISO 1101. The spherical tolerancing zone principle is one that carries its own abbreviation “S” with the requirement that this abbreviation appear before a diameter symbol in the tolerance frame to indicate that the tolerance zone is spherical.

3.2.3 *Symbols for geometrical characteristics*

The proposed revision to BS ISO 1101 concerning symbols for geometrical characteristics will result in several changes to BS 8888:2000, Table 1 — Symbols for toleranced characteristics. In BS 8888:2002 the title of the table will be changed to “Symbols for geometrical characteristics”. The columns in this table will be re-ordered to simplify the explanation of whether a geometrical tolerance is to be related to a datum feature for the specific application. Users of the new standard BS 8888:2002 will also notice that geometrical tolerances “Profile any line” and “Profile any surface” appear three times in the table. This change has been proposed because tolerance of form, orientation and location of features may all be controlled using one of the two symbols.

3.2.4 *Geometry tolerancing principles*

3.2.4.1 *General*

Many new geometry tolerancing principles have been developed in other standards since the last revision to BS ISO 1101 in 1983. The revision of BS ISO 1101 will bring all of these different principles together and catalogue them in one standard.

3.2.4.2 *Least material requirement*

A requirement for least material will be introduced into BS ISO 1101 by the revision, and although users should be aware of this requirement from their reference to BS ISO 2692, BS ISO 1101 will be fully up-to-date with the principle and its symbology.

3.2.4.3 *Free state condition modifier*

A free state condition modifier will also be incorporated into BS ISO 1101 by the revision. Applicable to flexible parts, this principle is covered by BS ISO 10579, and although this is not a new technique, its inclusion brings BS ISO 1101 fully up-to-date with the principle and its symbology.

3.2.4.4 *“All around” terminology and symbol*

Use of the “all around” terminology and symbol, similar to its use in welding symbology, is a new introduction to BS ISO 1101. This will offer users a useful tool for limiting the amount of information contained on geometrical product specifications, without risk of increasing ambiguity.

3.2.4.5 Envelope requirement

An envelope requirement will be introduced into BS ISO 1101 by the revision, and although users should be aware of this requirement from their reference to ISO 8015, BS ISO 1101 will now be fully up-to-date with the principle and its symbology.

3.2.4.6 Abbreviation for “common zone”

BS ISO 1101:1983 details the principle of “common zone” for several separate features covered by the same tolerance zone. This revision introduces the abbreviation of “CZ” which is to be placed in the tolerance frame replacing the need to append the note “COMMON ZONE” adjacent to the tolerance frame.

3.2.5 Identification of geometric tolerances and datums

The revision to BS ISO 1101 introduces the practice of identifying geometric tolerances and datums by placing an arrow or a datum triangle (solid or open) on a leader line pointing at the required surface. This enables a datum feature or tolerance to be identified when looking at the feature from above rather than having to view the feature from the side.

3.2.6 Screw threads, gears and splines: tolerances and datums

3.2.6.1 General

Tolerances and datums specified for screw threads, gears and splines are to be detailed in the revision to BS ISO 1101. These datums and tolerances carry their own abbreviations of “MD” for major diameter, “PD” for pitch diameter and “LD” for minor diameter. The abbreviations are to appear below the tolerance or datum frame to which they refer.

3.2.6.2 Abbreviated modifiers

The revised ISO 1101 will specify for the first time that abbreviated modifiers are always to be used to specify which feature of a gear or spline they apply to.

3.2.6.3 Screw thread defaults

In the revised ISO 1101 screw threads will have a default, unless otherwise specified, that tolerances and datums be applied to the axis derived from the pitch cylinder.

3.2.7 Interrelationship between geometric tolerances

An important part of geometric tolerancing will be added into BS ISO 1101 by the revision. The interrelationships between different geometric tolerances will now be explained in detail including the implications of choosing the best type of tolerance for the application.

3.3 Details of items removed from BS ISO 1101 by the revision

3.3.1 General

The revision to BS ISO 1101 will remove requirements concerning several practices. Rather than opting to simply delete these requirements and make no further reference to them in the revised standard, every item that will be removed, including explanatory diagrams, will be retained in an informative annex (Annex A) with the title “Former practices”. This will enable the user to quickly see the practices that may still be in use in their specific environment that are not now a part of the new specification. In summary, the following practices are now deprecated:

- attaching geometric tolerance frames or datum frames to a centreline;
- indication of datums within a tolerance frame without indicating any order of preference;
- linking the tolerance frame directly to the datum feature by the use of an appropriate leader line;
- specific parts of the common zone designation for geometric tolerances (see 3.2.4.6).

3.4 Ease of use: summary

Those familiar with BS ISO 1101:1983 will notice the dramatic enhancement to the table “explanation of geometric tolerances”, introduced by the revision. Every tolerancing characteristic will be identified and use of the tolerances will be elaborated. The result will be a table with more explanation, more examples and less ambiguity, making the whole document much more detailed and user friendly.

4 Advance information regarding the revision of BS ISO 1302

4.1 Introduction

The first revision of BS ISO 1302, “Geometrical product specification (GPS) — Indication of surface texture in technical product documentation”, is scheduled to be published towards the end of 2001, replacing the 1992 version which carried the more restricted title “Technical Drawings — Method of indicating surface texture”.

As the title implies the scope of the new version has been broadened and the standard will now specify rules for surface texture indication in all technical product documentation in terms of both graphical symbols and textual indications.

4.2 Expression

BS ISO 1302 provides for the expression of surface characteristics by means of roughness, waviness and structural parameters (R , W and P profiles), roughness and waviness motifs and taking into account the material ratio curve. The definitions for these terms are given in an extensive list of ISO standards that are to be cross-referenced in BS ISO 1302. They can also be found in Table 1.

Table 1 — Standards that are to be cross-referenced in BS ISO 1302

Standard identifier	Title	Kit availability
BS ISO 129	<i>Technical drawings — Dimensioning — General principles, definitions, methods of execution and special indications.</i>	Kit 1
BS EN ISO 3274	<i>Geometric product specifications (GPS) — Surface texture: Profile method — Nominal characteristics of contact (stylus) instruments.</i>	Supplementary
BS EN ISO 4287	<i>Geometrical product specification (GPS) — Surface texture: Profile method — Terms, definitions and surface texture parameters.</i>	Kit 2
BS EN ISO 4288	<i>Geometric product specification (GPS) — Surface texture: Profile method — Rules and procedures for the assessment of surface texture.</i>	Supplementary
BS EN ISO 8785	<i>Geometrical product specification (GPS) — Surface imperfections — Terms, definitions and parameters.</i>	Supplementary
BS ISO 1101	<i>Technical drawings — Geometrical tolerancing — Tolerancing of form, orientation, location and run-out — Generalities, definitions, symbols, indications on drawings.</i>	Kit 2
BS ISO 10135	<i>Technical drawings — Simplified representation, moulded cast and forged parts.</i>	Supplementary
BS ISO 10209-1	<i>Technical product documentation — Vocabulary — Part 1: Terms related to technical drawing.</i>	Supplementary
BS EN ISO 11562	<i>Geometric product specifications (GPS) — Surface texture: Profile method — Metrological characteristics of phase correct filters.</i>	Supplementary
BS EN ISO 81714-1	<i>General principles for the creation of graphical symbols.</i>	Supplementary
BS EN ISO 12085	<i>Geometric Product Specification (GPS) — Surface texture: Profile method — Motif Parameters.</i>	Supplementary
BS EN ISO 13565-1	<i>Geometric Product Specification (GPS) — Surface texture: Profile method — Surfaces having stratified functional properties — Part 1: Filtering and general measurement conditions.</i>	Kit 2
BS EN ISO 13565-2	<i>Geometric Product Specification (GPS) — Surface texture: Profile method — Surfaces having stratified functional properties — Part 2: Height characterization using the linear material ration curve.</i>	Kit 2

Table 1 — Standards that are to be cross-referenced in BS ISO 1302 (continued)

Standard identifier	Title	Kit availability
BS EN ISO 13565-3	<i>Geometric Product Specification (GPS) — Surface texture: Profile method — Surfaces having stratified functional properties — Part 3: Height characterization using the material probability curve.</i>	Kit 2
BS EN ISO 14253-1	<i>Geometrical product specifications (GPS) — Inspection by measurement of workpieces and measuring equipment — Part 1: Decision rules for proving conformance or non-conformance with specifications.</i>	Supplementary
BS EN ISO 14660-1	<i>Geometrical Product Specifications (GPS) — Geometrical features — Part 1: General terms and definitions.</i>	Kit 1

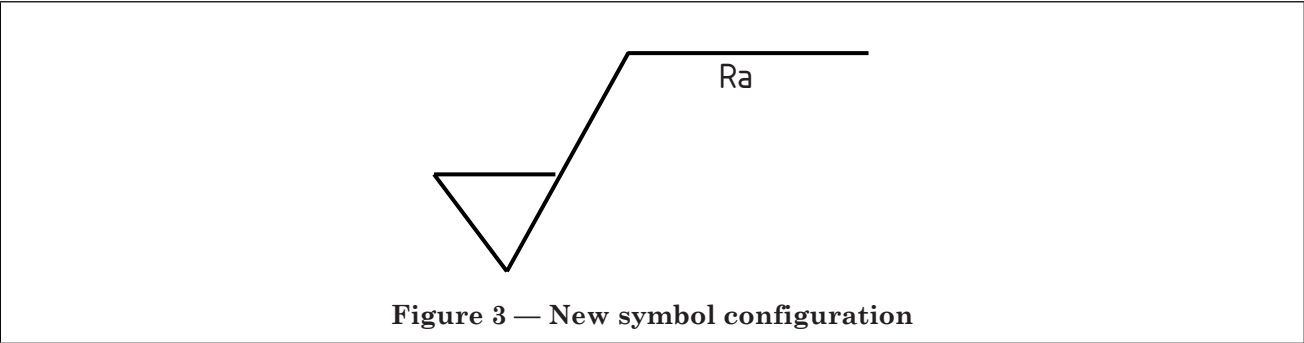
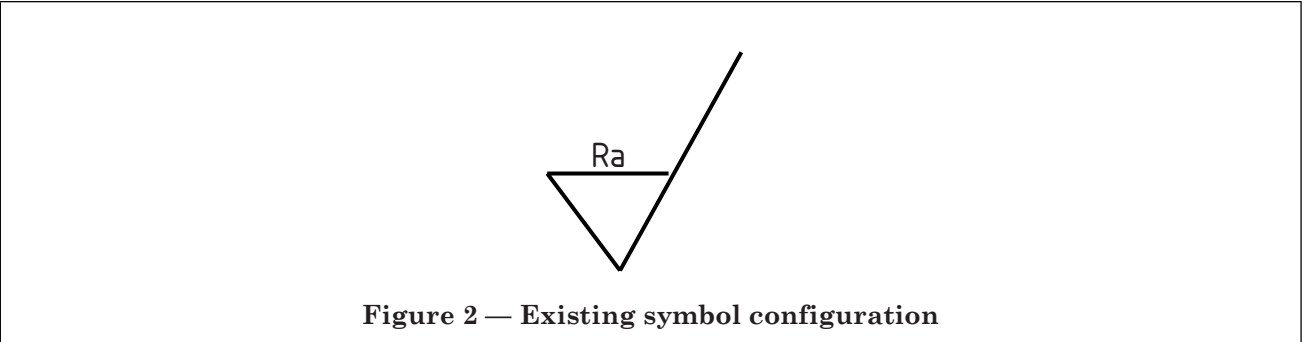
NOTE Details concerning the supplementary kit to this PD can be found in 4.5.

4.3 Options for enhanced expression

In the revision of BS ISO 1302 the options for expressing surface texture requirements are to be developed and enhanced. Additional information will be provided regarding the composition of symbols and the presentation of associated information such as manufacturing method, surface lay and machining allowance.

4.4 The Ra parameter

Proposed for inclusion in BS ISO 1302 is the repositioning of the Ra parameter indication within the surface texture symbol. This, in effect, changes the role of surface parameter Ra from its previous pre-eminent position to being just one of a series of options that may be selected to specify a particular surface. This changed representation is shown in Figure 2 and Figure 3. Figure 2 shows the existing symbol configuration and Figure 3 shows the new symbol configuration.



The position of the Ra parameter in Figure 2 is for a single surface requirement or for additional data necessary to create an unambiguous relationship between the surface texture requirement and the intended function of the surface. Example of such an expanded representation is included in the revision of BS ISO 1302, but for advance information, the key elements are reproduced in this Published Document in Figure 4.