Building Metrication News

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This section, which will appear in the fourth issue of 'Building' each month, will give current news and information on metrication as well as providing a forum for industry in which the ramifications on the change to metric can be freely discussed. It is published in association with the Modular Society.

AN OPPORTUNITY TO COMMENT

This month we publish a draft British Standard. In some countries, such as Germany, publication of draft standards in the press is commonplace, part of the routine, but in this country it is, to say the least, unusual. Normally draft standards are circulated in quantity to the trade and professional organisations concerned with their preparation or who are known to be interested. These organisations in turn circulate the drafts to selected members. By publishing in 'Building' we hope to increase circulation by at least a factor of ten to give many people who are concerned with the implications of the draft, but who would not normally see it, the opportunity to comment. We think that it is important that everyone possible should have this opportunity. We were particularly glad, therefore, that when we approached BSI they immediately agreed to publication. In the future it is our intention to publish all the key dimensional standards that are being prepared at BSI when they are sent out for comment.

The draft BS for controlling dimensions is probably the most important standard to be prepared since BS 4011 recommended four preferences for selecting basic sizes for components and assemblies, in multiples of three decimetres, 1dm., 0.5 and 0.25dm. The decimetre which appeared to be a convenient unit of measure (equal to the basic module) is now apparently out of favour which seems to some a pity. But nevertheless this draft picks up where BS 4011 leaves off and gives recommendations for such key dimensions in the design of buildings as floor to floor heights, changes of level, floor zones, zones for columns and loadbearing walls, spacing of zones and intermediate dimensions such as cill heights, window head heights and door set heights. To many it may seem that far too many dimensions are given. Controlling dimensions are intended as a guide to designers, to identify the location of key reference planes in building and to standardise the size of spaces between planes. This in itself may be a concept which is unfamiliar to many but it is essential at this time in order to ensure the maximum correlation between spaces in building and component sizes. Component sizes will be derived from controlling dimensions but will not necessarily be either the same size or the same range of sizes. Indeed it will be the objective of BSI's Functional Groups to recommend limited ranges of component sizes. It is in fact the standardisation of component sizes that we need to achieve. The introduction of this concept of controlling dimensions is only a tool to be used in the process of standardisation. It will ensure that there is at least one method of designing and building with the new metric co-ordinated components. In due course it should be possible for designers using these components to evolve alternative rules for their placing and perhaps one day to drop this standard. But by that time it will have served its purpose and the necessary lessons learned.

The outstanding problem is whether controlling dimensions will have the desirable effect of reducing variety of size in component ranges. In some instances it appears that we may require larger ranges of components to satisfy user requirements than we have at present. How large should a range of sizes be? If the resulting standard range has the effect of reducing the infinite demand for special sizes then it will have done its job. But if the range is of such a number that few manufacturers can produce it then some guidance needs to be given on methods of selection. The appendices to the draft show which sizes are likely to be most used by the public sector and comment is sought from the private sector so that similar information may be given there too. We should, perhaps, point out here that all comments on the draft should be sent to the British Standards Institution, 2 Park-street, London, W1, by 20 December, supported, wherever practicable by proposed revisions. If, on the other hand, you have anything to say on the policy of publishing draft standards or if you find the draft controversial and want to argue about it in the open, our own pages are offered as a useful forum.

This has obviously been a difficult draft to prepare and incorporate within BSI's programme. We are only sorry to hear that John Redpath, who successfully guided B/94/4, the committee responsible, through their arduous task has since had to relinquish the Chair.

BUILDING METRICATION NEWS

The Metric Change

3. MINISTRY OF HOUSING AND LOCAL GOVERNMENT

The third of our series on government bodies and the way they are organising for the coming change to metric concerns the Ministry of Housing and Local Government. The development work on components carried out by their Research and Development Group is described below.

The change to the metric system provides a unique opportunity to rationalise and co-ordinate building product sizes and performances. It therefore provides a welcome catalyst for the work on component development carried out by the Research and Development Group of the MHLG.

The objective of this work is to make it possible (without the necessity for architects and manufacturers to be directly involved on component design solely for individual projects or groups of projects):

1) for manufacturers to design and produce ranges of components which will satisfy the dimensional and functional requirements of all forms of housing;

2) for architects to design buildings which will be sized and detailed to use these components.

Assuming that satisfactory methods of pre-determining component requirements can be developed, the advantages will be that components with suitable performance characteristics should become readily available on the open market, and that these components will be mass produced, i.e. made on the initiative of component and materials producers to suit their own production facilities and capacity, with consequent benefits in price and quality.

Some mass produced components are already commonly used in housing. Doors and windows, kitchen equipment and fittings, heating equipment and sanitary fittings, bricks, blocks and tiles and many other products are made in this way. The need now is to extend the principle to larger components and to ensure that all components will be dimensionally and functionally compatible and can be combined in many different ways, both in rationalised traditional and factory produced buildings.

During the past 25 years, considerable standardisation of building components and materials has taken place on a national scale through the work of the British Standards Institution. Its committees, composed of representatives of the producers and of the users, have agreed on standard product specifications which have gained wide acceptance and have shown great benefits in the more efficient use of time and materials by industry and the professions. BSI thus provides a ready made forum for the extension of component co-ordination. The task now is to make its standards dimensionally compatible and to express them in terms of performance and not of products.

It will be the Ministry's policy to encourage local housing authorities to use components produced in accordance with such standards and to conform with the BSI timetable for the change to metric.

A small team within the Research and Development Group has provided information on housing for the Component Co-ordination Group working party responsible for DC4, 5, 6 and 7, as described in the report from MPBW. The team is now working on a design bulletin on the application of the dimensional framework to be used in housing. In doing this, it has sought informally the views of architects in local authority offices, the RIBA, and manufacturers and builders. As the group proceeds now to the preparation of performance specifications, it is proposed to make the interchange of information more effective by setting up a housing components working party selected from local authority architects and with a wider group of corresponding members. The performance specifications will be tested out in pilot projects. Members will maintain their usual contacts with industry while this work is in progress.

Practical Work

Practical work on the use of standard components is also being carried out through the medium of the R and D group's own project for the Wokingham RDC and will be pursued in subsequent projects, the next being a high density urban scheme. Work on an actual project ensures that a reasonable balance is maintained between user needs and technical requirements, within an overall cost budget. A survey has been made of manufacturers' standard products, and these have been appraised against performance specifications. At this early stage suitable standard components do not always exist and, in these instances, manufacturers are encouraged to modify MHLG basic designs to suit their own production facilities.

Another set of tasks falling to MHLG in the change to metric is the revision of all its reference documents. 'Space in the Home' has been metricated and should be republished by the end of 1967. As other existing bulletins come up for reprinting, metric equivalents will be added, or new metric sizes included as appropriate. Future bulletins will be in metric terms unless they relate to projects already carried out in imperial measure.

A major task in this series is the metrication of the Building Regulations. A list of metric equivalents, in order of size and related to each Regulation, will be published by the end of the year. The next step will be the publication of proposals for rationalised metric dimensions. Comments on these proposals will be considered in the same way as comments on proposed amendments. Finally a metric revision of the Building Regulations will be issued to take effect at the end of the metric changeover period.

The Ministry intends to associate th National Building Agency with many of th tasks which will have to be undertaken to ensure that the change to metric in housing proceeds smoothly, and that it results in the development and much more widespread use of standard components. It will be particularly important to secure effective communication between all those concerned and in this field the NBA is likely to be able to make a special contribution.

METRIC PRODUCTS

Baths

The new Vogue series of baths, manufactured by Allied Ironfounders Ltd., have been designed to metric dimensions. For details see New Products section, p. 156, 3 November issue of 'Building.'

Kitchen Units

The International range of kitchen fur ture by F. Wrighton & Sons Ltd. is base on a 10 cm. module used in multiples of 4, 5, 6, 8, 10 and 15. For details see New Products section, p 222, 17 November issue of 'Building.'

Sink Tops

Stainless steel sink tops made to BS 4011 sizes are now being supplied by Dahl Brothers Ltd. Of Swedish origin, Motala sinks offer a choice of five types including single bowl, double bowl and combination ($1\frac{1}{2}$) bowl versions.

Information Sheets

As the changeover to metric progresses we shall be including, within this section, details of metric products, and manufacturers will be invited to support these with information sheets.

The first of these information sheets has been produced for the Bath division of Allied Ironfounders Ltd. and appears in this issue. Manufacturers wishing further information on this service are invited to contact the Advertisement Director of 'Building.'

Baths: Vogue 1700

Allied Ironfounders Ltd.

M

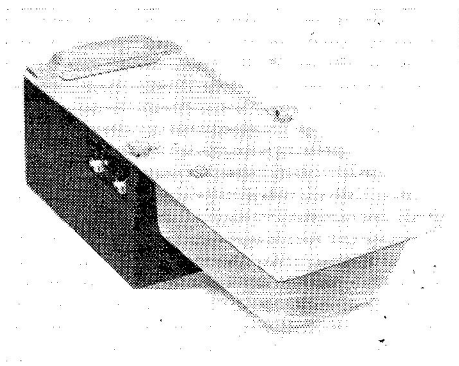
SfB (74)

UDC 643.52

Building Metrication News Modular Metric Component Data Sheet

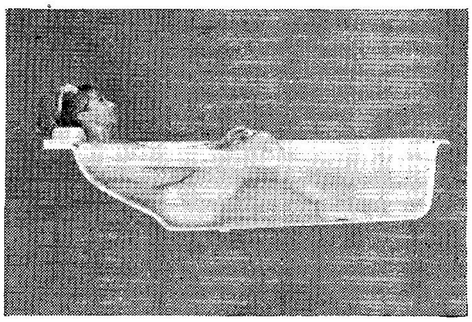
November 1967

The Vogue 1700 range of baths is the result of an extensive research and development programme. Each bath is supplied as a single package complete with the basic bath tub, taps, plumbing and accessories, ready for assembly and connection to services.



Function

Careful consideration has been given to the needs for safety, comfort and convenience for both the user and the installer. The bath tub is of an entirely new contour which gives full back support. The bottom is flat and the overall height gives ease of access. The water inlet/anti-slip handgrip is fitted to all models. An additional anti-slip handgrip/magnetic soap holder is fitted to the Plus models. The waste plug is located in an off-centre position convenient to hand. Water controls are on an external panel, accessible from outside or inside the bath. The headrest, supplied with Plus models, folds to form a seat.

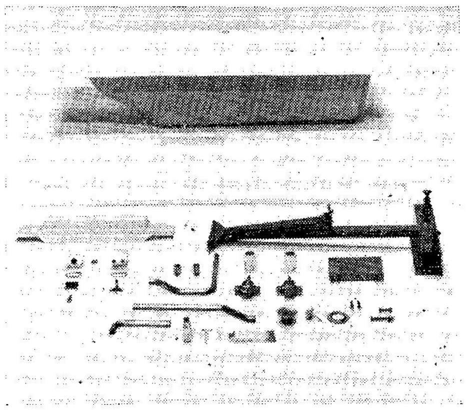


Variants

Vogue 1700
Comprising bath tub, supporting frame, pre-formed pipework, water controls and plastic control pocket, water inlet/handgrip, soap platform, plug and waste.

Vogue 1700+
Comprising bath tub, frame, pipework, water controls, water inlet/handgrip, soap holder/handgrip, full side and end panels, headrest/seat, plug and waste, Vogueseal kit.

Vogue 1700+Cantilever
As above with the exception of the panels. Additions include half side and U shaped blanking panels, cantilever cover moulding.

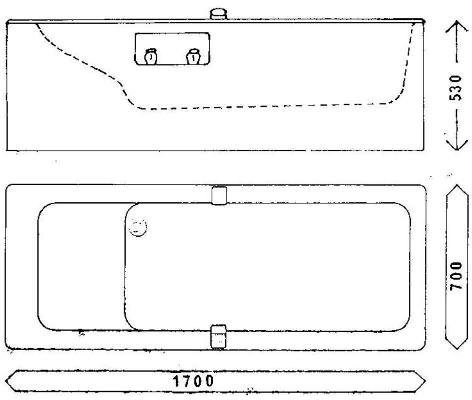


Size

Nominal length	1700mm
Nominal width	700mm
Mean height	530mm

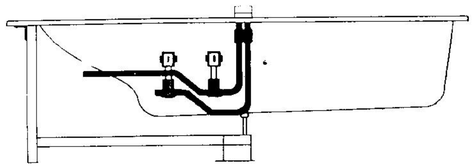
Colour

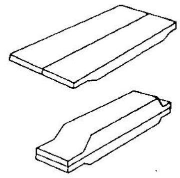
The bath tubs are available in white, 109 grey, 106 pink, 112 sky blue, 105 primrose and 108 turquoise. The panels are in white, grey (9-094) and strong blue (munsell ref.SB4/8). The headrest is in grey only.

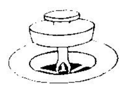


Materials and Parts

Bath tub: porcelain enamelled cast iron.
Frame: steel, in two parts supplied folded.
Panels: plastics, series of six.
Tap heads: plastics, colour coded red and green.
Water inlet/handgrip: plastic coated brass, colour coded red and green.
Soap holder: plastic coated brass, magnetic disc.
Plug: plastics.
Headrest: plastics.

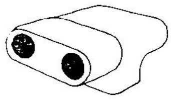


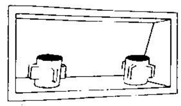




Packaging

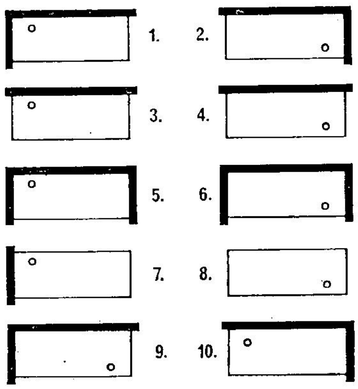
The complete bath is supplied as a number of packages.
Vogue 1700: separate bath tub and frame; plumbing package containing water and waste fittings, plastic pocket and all necessary screws etc.
Vogue 1700+: separate bath tub and frame, plumbing package containing water and waste fittings and Vogueseal kit; paper sacks with bath panels, channels and foam plastic seals; boxed headrest/seat.
Vogue 1700+cantilever: as 1700+ with additional separate cantilever cover.





Location

The bath may be installed in any one of ten positions relative to the adjacent walls. When ordering, the location number should be stated so that the correct panels are supplied.



Installation

1. Assemble and secure in position the supporting framework.
2. Prepare services and fit accessories to the bath tub.
3. Erect and level the bath tub on the supporting framework.
4. Assemble plumbing and make connection to services.
5. Position and fix panels, apply Vogueseal.

British Standards and Patents

The co-ordinating dimensions of the baths conform to BS 4011. The design of the baths is covered by the following registrations: 929233, 929234, 931710 and 931709.
Patents applied for.

Availability

Supplied through builders' merchants.

Prices

Current retail price list for complete appliances.

	white	colour
Vogue 1700	£44. 0. 0.	£51. 0. 0.
Vogue 1700+	£67. 0. 0.	£74. 0. 0.
Vogue 1700+ cantilever	£70. 10. 0.	£78. 0. 0.

Allied Ironfounders Ltd.
Bath Division, Cadbury Road,
Sunbury-on-Thames, Middx.
Tel: Sunbury-on-Thames 5577
Showroom
28 Brook Street, London W1

Controlling Dimensions

DRAFT BRITISH STANDARD FOR COMMENT

This draft BS is published by arrangement with the British Standards Institution. Comments would be welcomed and should be sent to BSI, 2 Park-street, London, W1, not later than Wednesday 20 December 1967.

Draft British Standard for Dimensional Co-ordination in Building. Recommendations for Controlling Dimensions (Metric Units).

Notes (Draft for Comment only)

In addition to inviting comment on the body of the text, an important reason for this draft is to seek advice on controlling dimensions for those types and sizes of buildings outside the public sector. Comment however that was submitted on the draft BS for vertical dimensions, 67/7841 (issued in May 1967), is being considered in relation to this draft. In particular proposals for vertical dimensions for private sector building types have been included in the tables of Appendix A. While confirmation of these vertical dimensions would be welcome, comment on the tentative suggestions for horizontal dimensions would be particularly appreciated. It is hoped that comment will be directed to the deletion of controlling dimensions not required as well as to the inclusion of others.

It will be an objective of the functional group panels (as described in PD 6249[1]) to recommend such limited ranges of sizes for components as will adequately meet the requirements arising from these controlling dimensions. It would be most helpful if comments were supported by draft revisions to text, tables or diagrams.

FOREWORD

PD 6030, 'Programme for the change to the metric system in the construction industry'[2] (items 2(b), 4(b), 5(b) and 6(b)) outlines a procedure for sizing building components and products in metric terms to achieve at the same time co-ordination of dimensions where this is desirable. The process began in 1966 with the publication of BS 4011[3] and continues with this BS, which makes recommendations, based on user considerations, for those dimensions in building, horizontal and vertical, which influence the sizing of components and assemblies. Examples of such dimensions are floor to floor heights, which control the vertical layout of building and determine the heights of those components or assemblies to be accommodated within a given storey height.

This BS incorporates BS 4176, 'Floor to floor heights' published in June 1967, and also the vertical dimensions issued in May 1967, as a draft[4] for general comment. It gives guidance on how to apply the dimensions, and indicates in an Appendix those which may be appropriate for particular building types. Being design guides rather than work sizes for parts of a building, the dimensions are not subject to tolerances.

In PD 6249 the next two stages of work after controlling dimensions are identified, i.e. dimensional requirements of components and products in and between functional groups; and BS's for components and products with metric dimensionally co-ordinated sizes. The concept of functional groups, i.e. of groups of dimensionally related products arranged according to their common functions in building, is also described, the concept being a convenient means of dividing the work. For BSI technical committees working on the sizing of products in each of these groups, this BS will be an important tool. It will also serve as guidance to designers of buildings where they are concerned with layout and general planning, by indicating those dimensions which may be expected to result in the full use of dimensionally co-ordinated metric products and components.

The bulk of the information upon which these recommendations are based comes from the public sector where extensive studies have recently been completed. This information is given in Appendix A; it reflects past experience of dimensional co-ordination in foot/inch terms. The specific requirements of the public sector are given in DC statements,[5] and acknowledgement is made of the valuable contribution of the Interdepartmental Sub-committee for Component Co-ordination to this BS.

1. SCOPE

These Recommendations provide a dimensional framework for use in the design of buildings and for assistance in the derivation of the sizes of dimensionally co-ordinated components. It gives recommendations for floor to floor heights, floor to ceiling heights, horizontal spans between load-bearing walls and columns, zones for floors, roofs, walls and columns, door and window head heights and sill heights. Since horizontal dimensions such as spans are between key reference planes which may be either axes or boundary planes of walls or columns, and as both concepts are appropriate to different constructional arrangements, dimensions for both are included.

An indication is given in Appendix A of those sizes likely to be appropriate for different building types.

An explanation of the relation of grids to controlling lines is given in Appendix B.

2. DEFINITIONS AND EXPLANATION OF TERM USED[6]

Controlling dimension. A dimension between key planes of a reference system.

The dimensions provide a framework, based on user considerations, within which buildings may be designed and to which dimensions of components and assemblies may be referred.

Controlling line. Controlling lines are reference lines spaced at controlling dimensions apart. They represent the boundaries of zones or the axial lines of loadbearing walls and columns. They may also represent the boundaries of neutral zones. An axial line may not necessarily coincide with a centre line.

A controlling line is indicated in the diagrams thus: o— — — — — — — — —[7]

300 mm Grid. A grid based on the first preference of BS 4011 so that the grid lines are spaced at 300 mm intervals.

Zone.[8] A space between reference planes which is provided for a component or set of components which do not necessarily fill the space.

Zones for floors and roofs may include finishes, services and ceiling as well as the structure and those for walls and columns may similarly include finishes and casing to steelwork. A roof may extend beyond the upper limit of the zone providing it does not affect the controlling dimensions of any storey above.

Neutral zone.[8] A zone whose size is not in accordance with Table 2 or Table 5 of this BS. In certain circumstances, particularly in the transition to dimensionally co-ordinated components, it may be convenient to use a neutral zone in an otherwise dimensionally co-ordinated project.

3. SELECTION OF VERTICAL DIMENSIONS

Vertical controlling dimensions determine the dimensions of zones for floors and roofs, the heights for floor to floor, floor to roof and floor to ceiling and the heights for changes in level.

Selection of sizes should be made from the following appropriate table:

Table 1 Floor to ceiling heights
Table 2 Zone heights for floors and roofs
Table 3 Floor to floor and floor to roof heights[9]
Table 4 Changes in level

Dimensions in all tables refer to the distance between controlling lines bounding the zones. They conform to the preferences given in BS 4011.

NOTES

1. The following considerations should be taken into account when selecting dimensions from Tables 1 to 3 (see Fig. 1):

The user requirement for the floor to ceiling height (A).

The space required within the zone for floors and roofs (B) for finishes, structure, services and ceilings.

The sum of the dimensions selected (C) should add up to a dimension recommended in Table 3. If it does not, the next appropriate dimension for either floor to ceiling height or floor zone, or both, must be selected in order to satisfy this requirement.

(It will be noted that not all combinations of floor to ceiling heights and zones shown add up to recommended floor to floor heights, in order to encourage the limitation of variety of component sizes. Similarly, if some floor zone dimensions are subtracted from floor to floor heights, it may lead to sizes not included in Table 1.)

2. In housing, the dimension shown in Table 3 need not always be used for the floor to roof dimensions. This dimension should be that which will achieve the maximum use of standard components.

3. A roof may extend beyond the upper limit of the zone provided this does not affect the controlling dimensions of any storey above this level.

4. The dimensions in Table 4 refer to the vertical distances between controlling lines bounding the top of the zones for floors and roofs within buildings (see Fig. 2).

(It will be noted that not all combinations of the sizes of changes in level (X and Y dimensions) add up to the recommended floor to floor heights, in order to encourage the limitation of variety of component sizes. Similarly if some dimensions for changes in level are subtracted from floor to floor heights, it may lead to sizes not included in Table 4.)

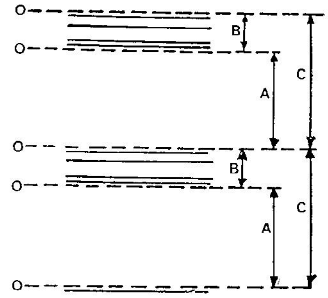


Fig. 1

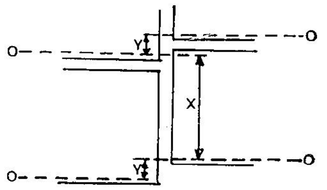


Fig. 2

TABLE 1: FLOOR TO CEILING HEIGHTS

Heights in mm in increments of 300	100	50	Foot/inch equivalent ft in
2,100			6 10¾
	2,300		7 6⅝
		2,350	7 8⅝
2,400			7 10½
		2,450	8 0⅜
	2,500		8 2⅜
	2,600		8 6½
2,700			8 10¼
	2,900		9 6⅛
3,000			9 10⅛

Further heights in increments of 300 from 3,000 to 7,800 and thereafter in increments of 600 to 11,400

[1] PD 6249, 'Dimensional co-ordination in building'. Estimate of timing for BSI work, published by BSI, October 1967.

[2] Published by BSI, February 1967.

[3] BS 4011, 'Recommendations for the co-ordination of dimensions in building. Basic sizes for building components and assemblies'.

[4] 67/7841, 'Draft BS, Control dimensions in building, Part 1. Vertical dimensions. Metric units'.

[5] 'Dimensional Co-ordination for building'.
DC 4, 'Recommended vertical dimensions for educational, health, housing, office and single-storey general purpose industrial buildings'.
DC 5, 'Recommended horizontal dimensions for educational, health, housing, office and single-storey general purpose industrial buildings'.
DC 6, 'Guidance on the application of recommended vertical and horizontal dimensions for educational, health, housing, office and single-storey general purpose industrial buildings'.
all published by HMSO.
DC 7, 'Recommended intermediate vertical controlling dimensions for educational, health, housing and office buildings, and guidance on their application'. (Not yet published.)

[6] For other definitions, see BS 2900 'Modular co-ordination in building'

[7] This method of designation will probably need to be changed to accord with the recommendations in the revision (being drafted) of BS 1192, 'Drawing office practice for architects and builders'.

[8] Differences from those definitions proposed in revisions of BS 2900 are under discussion with the committee concerned.

[9] The floor to floor heights in Table 3 accord with BS 4176, 'Specification for floor to floor heights'.

[10] These sentences are tentative suggestions. Comments would be appreciated.

BUILDING METRICATION NEWS

TABLE 2: ZONE HEIGHTS FOR FLOORS AND ROOFS

Heights in mm in increments of 300	100	50	Foot/inch equivalent ft in
	200		$7\frac{3}{4}$
		250	$9\frac{3}{4}$
300			$11\frac{3}{4}$
	400		1 $3\frac{3}{4}$
600			1 $11\frac{5}{8}$
900			2 $11\frac{3}{8}$
1,200			3 $11\frac{1}{4}$
1,500			4 11
1,800			5 $10\frac{7}{8}$
2,100			6 $10\frac{3}{4}$

TABLE 3: FLOOR TO FLOOR AND FLOOR TO ROOF HEIGHTS

Heights in mm in increments of 300	100	Foot/inch equivalent ft in
	2,600	8 6
2,700		8 $10\frac{1}{4}$

Further heights in increments of 300 from 2,700 to 8,400 and thereafter in increments of 600 to 1,200

TABLE 4: CHANGES IN LEVEL

Heights in mm in increments of 300	100	Foot/inch equivalent ft in
	100	3
	200	$7\frac{3}{4}$
300		$11\frac{1}{4}$
600		1 11
900		2 11
1,200		3 11
1,500		4 11

Further heights in increments of 300 from 1,500

4. SELECTION OF HORIZONTAL DIMENSIONS

Horizontal controlling dimensions determine the dimensions of zones for loadbearing walls and columns, and the spacing of these zones.

4.1. Controlling dimensions for zones. Sizes of controlling dimensions for zones (except neutral zones) should be selected from Table 5. The sizes in this table refer to the distance between the boundaries of zones.

TABLE 5: WIDTHS OF ZONES FOR COLUMNS AND LOAD BEARING WALLS

The table applies to widths of zones for walls and to both horizontal dimensions of column zones.

Widths in mm in increments of 300	100	50	Foot/inch equivalent ft in
	100		$3\frac{7}{8}$
		150	$5\frac{7}{8}$
	200		$7\frac{7}{8}$
		250	$9\frac{3}{4}$
300			$11\frac{3}{4}$
	400		1 $3\frac{3}{4}$
600			1 $11\frac{5}{8}$

If other widths are required sizes should be selected from the first and second preferences of BS 4011.

NOTE. The breakdown of the dimensions by building types is indicated in Appendix A.

4.2 Controlling dimensions for the spacing of zones. Sizes of controlling dimensions for the spacing of zones should be selected from the sizes that are increments of 300 mm commencing at 900 up to 13,200 mm. They refer to the distance between controlling lines. Where further sizes are required these should be increments of 600 from 13,200.[10] Specific requirements for certain building types are indicated in Tables 11 and 12, Appendix A.

4.3. Location of controlling lines. There are two principal methods of locating controlling lines in relation to loadbearing walls and columns:

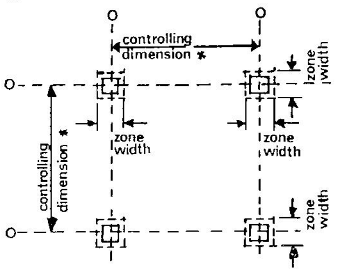
A. on axial line of loadbearing walls or columns.

B. on the boundary of zones. These are illustrated in Fig. 3.

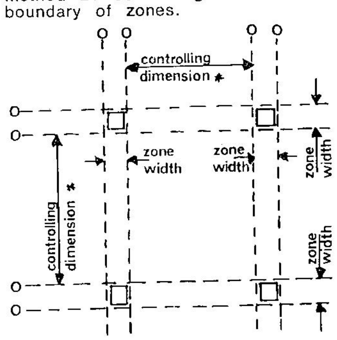
The two methods are not exclusive if zones are multiples of 300 mm and in this instance the controlling dimensions both between axes and between boundaries will be multiples of 300 mm. If the two methods are combined and zones are not multiples of 300 mm either the dimension between axes or that between boundaries of zones will be a multiple of 300 mm, and the other by definition will not be a controlling dimension. Care should be taken that the dimension that is not a controlling dimension should accord with BS 4011, to ensure the maximum use of co-ordinated components.

Fig. 3. Location of controlling lines.

Method A. Controlling lines on the axial lines of loadbearing walls and columns.



Method B. Controlling lines on the boundary of zones.



*in accordance with clause 4. 2.

Organisations represented on Sub-committee B/94/4 Metric Building Sizes (Advisory) were:
Association of Industrialised Building Component Manufacturers.
Building Research Station.
Inter-departmental sub-committee for component co-ordination.
Modular Society.
National Council of Building Material Producers.
National Federation of Building Trades Employers.

4.4. Sizes derived from methods A and B. Controlling dimensions apply to either Method A (the distance between centre lines) or Method B (the distance between zones). The space between loadbearing walls and columns will vary according to which of these methods is used for locating controlling lines.

5. SELECTION OF INTERMEDIATE CONTROLLING DIMENSIONS

Intermediate controlling dimensions are sub-divisions of the controlling dimension framework found useful for the design of buildings. Intermediate horizontal controlling dimensions should be based on the first and second preferences of BS 4011. In the case of vertical dimensions the sizes given are the vertical distances from the controlling line bounding the top of the floor zone. Intermediate controlling lines indicate where joints are most likely to occur between and within building components and assemblies.

5.1. Sill heights. Sill heights should be selected from the first and second preferences of BS 4011. Probable requirements by building types are given in Table 13, Appendix A.

5.2. Window head heights. Window head heights should be selected from the first and second preferences of BS 4011. Probable requirements by building types are given on page 186 of Appendix A.

5.3. Door set head height. The first preference for door set head height should be 2,100 mm. Other heights if required should also be based on BS 4011. (The door set comprises doo and frame.)

APPENDIX A

Controlling dimensions by building types

This appendix gives an indication of those sizes likely to be appropriate for different building types.

The dimensions for public sector building types are shown thus: X

The dimensions for the private sector are shown thus: O

Note for draft for comment only

Dimensions of the public sector have been taken from DC 4, 5, 6 and 7 (see Foreword). Those of the private sector have been taken from comments submitted on the draft for vertical dimensions (67/7841—see Foreword), or are tentative suggestions of the committee. Comment on all dimensions, especially the tentative suggestions, would be appreciated, and it is hoped the comments will be directed to deletion of dimensions not required as well as to the inclusion of others.

It will be assumed that private sector requirements will be the same as the public sector, unless comment shows otherwise.

TABLE 6: FLOOR TO CEILING HEIGHTS

Heights in mm in increments of 300	100	50	Education	Health	Housing	Offices	Industrial†	Hotels	Shops	Farm buildings	Foot/inch equivalent ft in
2,100							O*				6 $10\frac{3}{4}$
	2,300				X		O*				7 $6\frac{5}{8}$
		2,350			X						7 $8\frac{5}{8}$
2,400			X	X	X	X		O			7 $10\frac{1}{2}$
		2,450			O					O	8 $0\frac{3}{8}$
	2,500				O				O		8 $2\frac{3}{8}$
	2,600					O			O		8 $6\frac{3}{8}$
2,700			X	X		X		O	O		8 $10\frac{1}{4}$
	2,900					O			O		9 $6\frac{1}{8}$
3,000			X	X		X	O	O	O	O	9 $10\frac{1}{8}$
3,300			X	O				O	O		10 10
3,600			X	O				O	O		11 $9\frac{3}{4}$
3,900			X					O	O		12 $9\frac{1}{2}$
4,200			X	X			X	O	O		13 $9\frac{3}{8}$
4,500			X					O	O		14 $9\frac{1}{4}$
4,800			X	X			X	O	O		15 9
5,100			X					O	O		16 $8\frac{3}{4}$
5,400			X	X			X	O	O		17 $8\frac{5}{8}$
5,700			X					O	O		18 $8\frac{3}{8}$
6,000			X	X			X	O	O		19 $8\frac{1}{4}$
6,300			X								20 8
6,600			X	X			X	O	O		21 $7\frac{3}{4}$
6,900											22 $7\frac{5}{8}$
7,200			X				X	O	O		23 $7\frac{3}{8}$
7,500											24 $7\frac{1}{4}$
7,800							X				25 8
8,400							O				27 $6\frac{3}{4}$
9,000							O				29 $6\frac{1}{4}$
9,600							O				31 6
10,200							O				33 $5\frac{5}{8}$
10,800							O				35 $5\frac{1}{4}$
11,400							O				37 $4\frac{3}{4}$

† Uninterrupted height from floor to underside of floor zone or ceiling.
* Lock-up garages and multi-storey car parks.

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TABLE 7: ZONES FOR FLOORS AND ROOFS

Heights in mm in increments of: 300	100	50	Education	Health	Housing	Offices	Industrial	Hotels	Shops	Farm buildings	Foot inch equivalent: ft	in
	200				X*							7$\frac{3}{4}$
		250			X*							10
300			X	X	X*	X	O	O	O			11$\frac{3}{4}$
	400					O		O				
600			X	X		X	X	O	O		1	11$\frac{3}{8}$
900			X	X		X	X	O	O		2	11$\frac{3}{8}$
1,200			X	X		X	X	O	O		3	11$\frac{1}{4}$
1,500			X	X			X				4	11
1,800			X	X			X				5	10$\frac{7}{8}$
2,100				X			O†				6	10$\frac{3}{4}$

Zones for floors only.

† Greater sizes based on B.S. 4011.

TABLE 8: FLOOR TO FLOOR AND FLOOR TO ROOF HEIGHTS

Heights in mm in increments of: 300	100	Education	Health	Housing	Offices	Industrial	Hotels	Shops	Farm buildings	Foot inch equivalent: ft	in
	2,600			X*			O			8	6$\frac{3}{4}$
2,700		X	X	O	X		O	O		8	10$\frac{1}{4}$
3,000		X	X		X		O	O		9	10$\frac{1}{8}$
3,300		X	X		X		O	O		10	10
3,600		X	X		X		O	O		11	9$\frac{3}{4}$
3,900		X	X		X		O	O		12	9$\frac{1}{2}$
4,200		X	X		X	O	O	O		13	9$\frac{3}{8}$
4,500		X	X		O		O	O		14	9$\frac{1}{4}$
4,800		X	X		O	O	O	O		15	9
5,100		X			O		O	O		16	8$\frac{3}{4}$
5,400		X	X			O	O	O			
5,700		X					O	O		18	8$\frac{3}{8}$
6,000		X	X			O	O	O		19	8$\frac{1}{4}$
6,300		X								20	8
6,600		X	X			O	O	O		21	7$\frac{3}{4}$
6,900		X								22	7$\frac{3}{8}$
7,200		X	X			O	O	O		23	7$\frac{3}{8}$
7,500		X								24	7$\frac{1}{4}$
7,800		X	X			O	O	O		25	8
8,100		X								26	7$\frac{3}{4}$
8,400		X				O				27	7$\frac{5}{8}$
9,000						O				29	6$\frac{1}{4}$
9,600						O				31	6
10,200						O				33	5$\frac{3}{8}$
10,800						O				35	5$\frac{1}{4}$
11,400						O				37	4$\frac{3}{4}$
12,000						O				39	4$\frac{1}{2}$

* This is the height specified by the Ministry of Housing and Local Government for local authority housing in Ministry circular No. 31/67.

TABLE 9: CHANGES IN LEVEL

Heights in mm in increments of: 300	100	050	Education	Health	Housing	Offices	Industrial	Hotels	Shops	Farm buildings	Foot inch equivalent: ft	in
	100									O		3$\frac{7}{8}$
	200									O		7$\frac{3}{4}$
300			X	X	O	X	O	O	O			11$\frac{3}{4}$
600			X	X	X*	X	X	O	O		1	11$\frac{5}{8}$
900			X	X	O	X	O	O	O		2	11$\frac{3}{8}$
1,200			X	X	O	X	X	O	O		3	11$\frac{1}{4}$
1,500			X	X	O	X	O	O	O		4	11

Further heights in increments of 300 from 1,500 mm

* Only between dwellings.

* The figures in Table 11 are tentative suggestions only, as a basis for comment. It is hoped that comment will be directed to deletion of those little required as well as to the inclusion of further sizes. The figures will not be included in the B.S. unless there is indication of appreciable demand.

§ For further information on public sector housing reference should be made to the

TABLE 10: WIDTHS OF ZONES FOR COLUMNS AND LOADBEARING WALLS

This Table applies to widths of zones for walls and to both horizontal dimensions o column zones.

Widths in mm in increments of: 300	100	50	Education	Health	Housing	Offices	Industrial*	Hotels*	Shops*	Farm buildings	Foot/inch equivalent: ft	in
	100		X	X	X	X	O	O	O			3$\frac{7}{8}$
		150	X									5$\frac{7}{8}$
	200		X	X	X	X	O	O	O			7$\frac{7}{8}$
		250	X									9$\frac{3}{4}$
300			X	X	X	X	O	O	O			11$\frac{3}{4}$
	400				X		O	O	O		1	3$\frac{3}{4}$
600				X			O	O	O		1	11$\frac{5}{8}$

* The figures in these columns are tentative suggestions only, as a basis for comment. It is hoped comment will be directed to the deletion of those little required as well as to the inclusion of further sizes. The figures will not be included in the B.S. unless there is indication of appreciable demand.

TABLE 11: SPACING OF ZONES FOR COLUMNS AND LOADBEARING WALLS LOCATED BY AXIAL LINES

Sizes mm	Education	Housing§	Offices	Industrial	Hotels*	Shops*	Farm buildings*	Foor/inch equivalent: ft	in
900		X	X					2	11$\frac{3}{8}$
1,200		X	X					3	11$\frac{1}{4}$
1,500	X	X						4	11$\frac{1}{8}$
1,800	X	X	X*f*		O			5	10$\frac{7}{8}$
2,100		X	X		O			6	10$\frac{3}{4}$
2,400	X	X	X*f*		O		O	7	10$\frac{1}{2}$
2,700	X	X	X*f*		O	O	O	8	10$\frac{1}{4}$
3,000	X	X	X	X	O	O	O	9	10$\frac{1}{8}$
3,300		X	X		O	O	O	10	9$\frac{7}{8}$
3,600	X	X	X*f*		O	O		11	9$\frac{3}{4}$
3,900		X	X		O	O		12	9$\frac{1}{2}$
4,200	X	X	X		O			13	9$\frac{3}{8}$
4,500	X	X	X	X	O		O	14	9$\frac{1}{4}$
4,800	X	X	X		O			15	9
5,100		X	X		O			16	8$\frac{3}{4}$
5,400	X	X	X*f*		O	O		17	8$\frac{5}{8}$
5,700		X	X		O	O		18	8$\frac{3}{8}$
6,000	X	X	X*f*	X	O	O	O	19	8$\frac{1}{4}$
6,300	X	X	X*f*		O			20	8
6,600	X	X	X		O	O		21	7$\frac{3}{4}$
6,900		X	X		O			22	7$\frac{3}{4}$
7,200	X	X	X*f*		O			23	7$\frac{1}{2}$
7,500		X†	X	X	O	O	O	24	7$\frac{1}{4}$
7,800		X†	X					25	7$\frac{1}{8}$
8,100	XX	X†	X					26	6$\frac{1}{8}$
8,400	X	X†	X					27	6$\frac{3}{4}$
8,700		X†	X					28	6$\frac{1}{2}$
9,000	X	X†	X	X	O	O	O	29	6$\frac{1}{2}$
9,300		X†	X					30	6$\frac{1}{8}$
9,600	X	X†	X					31	6
9,900	X	X†	X					32	5$\frac{3}{4}$
10,200		X†	X					33	5$\frac{5}{8}$
10,500		X†	X		O	O	O	34	5$\frac{3}{8}$
10,800	X	X†	X*f*					35	5$\frac{1}{4}$
11,100		X†						36	5
11,700	X							38	4$\frac{5}{8}$
12,000	X			X	O	O	O	39	4$\frac{3}{8}$
12,600	X							41	4$\frac{1}{8}$
14,400	X							47	2$\frac{7}{8}$
15,000				X				49	2$\frac{5}{8}$
16,200	X								
18,000	X			X		O		59	0$\frac{3}{4}$

All sizes are in increments of 300 mm.

MHLG Bulletins. In public sector housing these dimensions may be applied to framed buildings and, for a limited period, to certain types of precast concrete, loadbearing wall construction.

f Indicates first selection dimensions.

† These sizes apply to pitched roof construction.

(continued on page 186)

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TABLE 12. SPACING OF ZONES FOR COLUMNS AND LOADBEARING WALLS LOCATED BY BOUNDARIES OF ZONES

Sizes mm	Health	Housing	Offices	Industrial	Hotels	Shops	Farm buildings	Foot/inch equivalent ft	in	Sizes mm	Health	Housing	Offices	Industrial	Hotels	Shops	Farm buildings	Foot inch equivalent ft	in
900		X	X					2	11⅜	7 500		X†	X					24	7¼
1,200		X	X					3	11¼	7,800		X†	X					25	7⅛
1,500		X	X					4	11⅛	8,100		X†	X					26	9⅞
1,800		X	X*f*					5	10⅞	8,400		X†	X					27	6¾
2,100		X	X					6	10¾	8,700	X	X†	X					28	6½
2,400		X	X*f*					7	10½	9,000	X	X†	X					29	6¼
2,700	X	X	X*f*					8	10¼	9,300	X	X†	X					30	6⅛
3,000	X	X	X					9	10⅛	9,600	X	X†	X					31	6
3,300		X	X					10	9⅞	9,900		X†	X					32	5¾
3,600		X	X*f*					11	9¾	10,200		X†	X					33	5⅝
3,900		X	X					12	9½	10,500		X†	X					34	5⅝
4,200	X	X	X					13	9⅜	10,800		X†	X*f*					35	5¼
4,500	X	X	X					14	9¼	11,100		X†						36	5
4,800		X	X					15	9	11,700	X							38	4⅝
5,100	X	XX	X					16	8¾	12,000	X							39	4⅜
5,400	X	X	X*f*					17	8	12,300	X							40	4¼
5,700	X	X	X					18	8⅜	12,600	X							41	4⅛
6,000	X	X	X*f*					19	8¼	12,900	X							42	3⅞
6,300	X	X	X*f*					20	8	13,200	X							43	3¾
6,600		X	X					21	7¾	17,400	X							57	1
6,900		X	X					22	7¾	18,600	X							61	0¼
7,200		X	X*f*					23	7½	19,800	X							64	11½

f Indicates first selection dimensions. All sizes are in increments of 300 mm.
† These sizes apply to pitched roof construction.

TABLE 13: WINDOW SILL HEIGHTS

Heights in mm in increments of 300	100	Education	Health	Housing	Offices	Industrial	Hotels*	Shops*	Farm buildings*	Foot/inch equivalent ft	in
0	100	X	X	X	X		O	O			0
	200		X								7⅞
300							O	O			11¾
600		X	X	X			O	O		1	11⅝
	700	X	X		X					2	3⅝
	800	X	X	X	X					2	7⅝
900		X	X		X		O		O	2	11⅜
	1,000	X	X	X	X					3	3⅜
	1,100		X							3	7¼
1,200		X	X						O	3	11¼
	1,300									4	3¼
	1,400			X						4	7¼
1,500		X	X							4	11
1,800			X	X	X				O	5	10⅞
2,100		X	X		X				O	6	10⅝

* The figures in these columns are tentative suggestions only, as a basis for comment. It is hoped that comment will be directed to deletion of those little required as well as to the inclusion of further sizes. The figures will not be included in the BS unless there is indication of appreciable demand.

The Technical Working Party of the Country Landowners' Association has carried out studies, in consultation with farm building users, on controlling dimensions for use in farm building construction. It was not possible to include their recommendations in the comment draft on controlling dimensions 67/27945 issued by BSI due to the time factors involved but nevertheless BSI would welcome comment on the following proposals:

TABLE I: VERTICAL DIMENSIONS
(Floor to underside of ceiling or eaves, defined as top of panelling or wallplate line)
(metres)

1·50	3·30	4·80
2·40	3·90	5·40
2·70	4·20	6·00

TABLE II: HORIZONTAL DIMENSIONS
(Between centre lines of load-bearing walls and columns)
(metres)
4·50
6·00
and multiples of these, which may be used additively

Window Head Heights

For education, health and office buildings in the public sector the first preference for window head heights is the ceiling heights of Table 6. For public sector housing a highest window head height of 2,300 mm from top of floor zone is the first preference.

Where a lower window head height is required for any of the above types, 2,100 mm is the second preference.

It should not be assumed however that window heads need necessarily coincide with the selected ceiling height in any particular application.

Door Set Head Height

For all building types (for pedestrian access)—2,100 mm.

APPENDIX B

Relation of Grids to Controlling Lines

B.1. The sizes of horizontal controlling dimensions for the spacing of controlling lines are multiples of 300 mm. Since it is often of value to use a grid for locating components, a grid of 300 mm or a multiple of 300 mm is appropriate (see Fig.4).

B.2. Relation of axial line spacing to a 300 mm grid. The controlling dimensions for spacing loadbearing walls and columns on axial lines (method A of Clause 4.3) are multiples of 300 mm. It is possible therefore to locate controlling lines on the grid without interruption and these lines will coincide with the grid lines. If a larger grid is used, which is a multiple of 300 mm, then in some instances the controlling lines will be offset from the grid by a multiple of 300 mm (see Fig. 5).

B.3. Relation of zones to a 300 mm grid. So long as the width of the zone is a multiple of 300 mm the grid is continuous. If, however, a width of zone is selected which is not a multiple of 300 mm, the grid is interrupted by that dimension. This space may be a neutral zone as defined in Section 2 (see Figs. 6 and 7).

B.4. Relation of components to grids. Since at least one dimension of a component is often less than 300 mm or may be offset from the 300 mm grid by a dimension less than 300 mm it is of value to sub-divide the grid. In this instance a smaller grid of 100 mm is appropriate (see Fig. 8).

B.5. Displacement of grids. In some instances it is convenient to displace grids to ensure the maximum use of dimensionally co-ordinated components. It is not always essential to use a grid; the indication of controlling lines may be sufficient.

B.6. Other relationships. Many different arrangements of grids may be used to facilitate the location of components and to distinguish between the location of different types of components. The illustrations above are of those more commonly used.

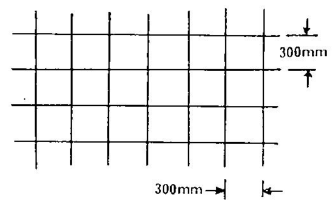


Fig. 4. 300 mm grid

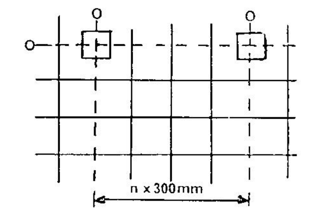


Fig. 5, grid uninterrupted. Loadbearing walls or columns on axial lines

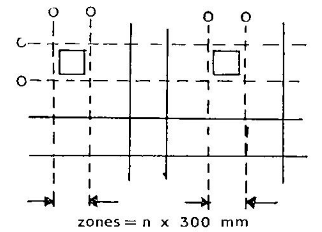


Fig. 6, grid uninterrupted

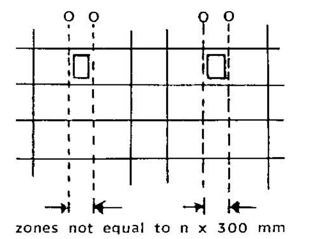


Fig. 7, grid interrupted

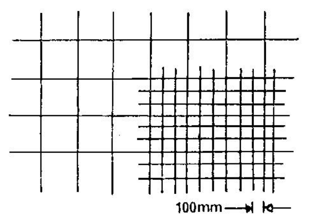


Fig. 8, 100 mm grid superimposed on 300 mm grid

CONVERSION TO METRIC BRICKS

The Brick Development Association repre- ment Association said that having achieved in the latest BS a single standard brick size, the brick industry feels that this great advantage should not be lost in the changeover to metric. Their solution is to keep brick dimensions close to the present at 21.5 x 10.25 x 6.5 cm which, with a 1 cm joint, means a working size of 22.5 x 11.25 x 75 cm. Below, Philip D. Edmon- on, BA, AMICE, AMIEAust, enlarges on 1e considerations behind this suggested size.

The Brick Development Association represents the whole of the building brick industry in Great Britain which is of such diversity and size that its statement on the conversion to metric bricks is concerned primari'y with facts and is short on argument. It is on this account possibly vulnerable to questioning, especially from those expecting a 10 cm. modular brick. The timing of the statement in relation to the setting up under BS1-B/94 of Functional Group Panels (see PD 6249) may also be questioned. The purpose of the following comments is to anticipate and to attempt to answer such questions.

The first point which must surely be apparent to those concerned with the theory and practice of dimensional co-ordination in building is that a system of preferred sizes for components offers most :cope for standardised mass production; .ı short, modules are not everything. However, we shall return to this.

At the same time as going metric, industry and government are attempting to introduce a revolutionary degree of standardised mass production into building; and the central feature of this is the subject of dimensional precision. Only in this way can the str'ct sequence of craft waiting upon and making good after craft be changed and the way opened for all the benefits of industrialisation. Particular attention should be given to the word precision; this is co-ordination with cognisance of tolerances. To accomplish the revolution in building a great deal more than is presently understood will be needed on tolerances.

Bricks were the building industry's first modules but due to their method of manufacture—often adjacent to the building site—they were, prior to standardisation, rarely interchangeable between sites. It has become ingrained in traditional building to use methods that cater for imprecision and which are permissive for inaccuracy. Brickwork has been relegated to the rôle of a 'plastic' or flexible material; and possibly for this reason it has not been seriously regarded, other than by brickmakers, as the likely central feature of high productivity building. How else is it possible to account for a systematic building module of 4 in./10 cm. that is manifestly incongruent with standard brickwork.

Brickmakers have persevered towards establishing a standard brick and BS 3921:1965 achieved this in face of considerable reaction that tends to persist in certain quarters. The present economy of bricks for external walling and for loadbearing internal walls owes much to this single standard. More particularly it becomes possible to co-ordinate brickwork dimensionally with prefabricated components in methodical building other than by building-in such components. This is achievable with a minimum of waste either of labour or of materials. Nevertheless much remains to be done before all of the benefits inherent in a single standard can be realised. As in every other example of rationalisation there has to be a joint effort by designers and manufacturers and builders. There is also little use in a BS that is not used or complied with. How many designers check against the standard? How many manufacturers reflect on the benefits to them of producing to a single standard? How many builders and bricklayers attempt to achieve improved accuracy by more precise setting out and by the use of jigs and other aids? The point of these last remarks is not to criticise but rather to indicate what should be done before the full benefits of the standard may be realised.

Designers with an idée fixe concerning the virtues of 10 cm. will doubtless be asking at this point why not a 10 cm. modular brick standard; this would—they might argue—accelerate the whole business amazingly.

But which size(s) would they choose and should there be a single standard?

In any attempt to answer these questions it soon becomes apparent that there is a great deal more in this than the convenience of a designer. A number of performance factors enter into any equation that seeks to define an optimum metric size for bricks. All of these precede the establishment of a standard and it would be facile in the extreme to expect that these may readily be determined. To suppose that a single module such as 10 cm. could be used to determine such performance factors for bricks or for that matter other materials would seem to be equally facile.

But suppose for example that 10 cm. were able to do this and that congruence between this module and the brick format transcended all other considerations. Should the metric brick be 20 cm. x 10 cm. x 10 cm. or should it, in accordance with BS 4011, be 30 cm. x 15 cm. x 10 cm.; or one of the many variations possible in this context or as used on the Continent?

Brickmakers in choosing to maintain in effect the existing standard format have obviously considered these various factors and basically their concern has been to preserve—and if possible to improve—existing standards of manufacturing tolerances. To have selected, for example, 30 cm. would have led to a reduction in the standard of manufacturing precision; and a moment's reflection will serve to realise that for purposes of dimensional co-ordination with other components a higher standard would be required (because of the smaller proportion of joints to take up manufacturing inaccuracies). To have selected 20 cm x 10 cm. x 10 cm., whilst this might be expected to work the other way, would have precluded the use of existing highly economical methods of drying and firing certain types of bricks.

By choosing the one practical course that preserves their single standard and which permits the benefit inherent in the same to be realised, brickmakers show their understanding of the basic importance of precision and of tolerances without a knowledge of which progress in dimensional co-ordination cannot be made. At the same time they have indicated their readiness and willingness to develop alternative formats against specific demands. In a free enterprise system this should result in the emergence of potential new standards should these be economically competitive.

By stating their considered opinion at this stage brickmakers are mindful of the need to allay speculation and ill-informed opinion. It should, moreover, be appreciated that by going metric at an early date, brickmakers would provide a substantial base for metrication in building. By preserving their single standard any by adhering to the closest manufacturing tolerances consistent with use and economy, brickmakers will be contributing to the practice of dimensional co-ordination throughout the building industry. To have done less or to have postponed their statement would surely have been a disservice.

MODULAR SOCIETY REPLY TO BDA

The Brick Development Association, in a 'statement on behalf of the building brick industry,' proposes that the metric brick shall measure 2.25 by 1.125 by 0.75 dm. to centres of joints. (They give it in centimetres: we have put it into decimetres because BS 4011 is in decimetres.) The BDA sizes are got by translating the present standard 9 in. by 4½ in. by 3 in. at the rate of 0.25 dm.=1 inch, instead of 0.254 dm. They claim that these sizes will enable brickwork to comply with the 3 dm. first preference of BS 4011, basing their claim upon the fact that four courses will equal 3 dm. in height and four bricks 9 dm. in length.

This is not good enough. One brick (with its joint) is a component within the terms of BS 4011: two or more bricks used together are an assembly of components as defined in the same Standard. Let us see how the BDA proposal really measures up to BS 4011.

BUILDING METRICATION NEWS

Vertically they conform:—

Inches	Decimetres	BS 4011 preference
12	3·00	1
9	2·25	4
6	1·50	3
3	0·75	4

Horizontally, on the other hand, the BDA sizes contravene BS 4011 at every stage below 9 dm. excpt one, viz. 2.25 dm.

Feet and inches	Decimetres	BS 4011 preference
3′ 0″	9·00	1
2′ 7½″	7·875	X
2′ 3″	6·75	4
1′ 10½″	5·625	X
1′ 6″	4·50	3
1′ 1½″	3·375	X
1′ 0″	3·00	limit for 3rd and 4th preference
9″	2·25	4
4½″	1·125	X

The sizes in the table above marked X are not allowed at all in BS 4011, which also limits the use of the 3rd and 4th preferences to sizes up to 3 dm., except for 'strong economic or functional reasons.' In default of such reasons, all but one of the sizes below 9 dm., all the intermediate sizes above 3 dm. are nonconforming.

Above 9 dm. this does not matter very much: but below 9 dm. it does. We all know that 3 ft. is the watershed of brick dimensioning: beyond 3 ft. it is not so essential to plan to brick dimensions: below 3ft., brick dimensions must be used, or cutting puts the cost up. This is not a debating point: it is practical building. There are many cases (such as adding up the sizes of standard bricks and standard windows to make the front and back elevations of small houses match each other) where the present confusion of sizes presents real difficulty. For such cases we must co-ordinate sizes all the way up from the width of the brick.

The new metric brick must offer brickwork according to the first and second preferences of BS 4011: i.e. in 1 dm. steps all the way up from the width of one brick and its height=1 dm. or M).

Point and Counterpoint

The BDA supports its case for metricating the present brick sizes only by rounding off, with several arguments:—

Maintaining a single standard size. De-standardising the odd north-country course height was very reasonable in the interests of rationalisation, but there is no need to limit bricks to one size, provided that their sizes are co-ordinated. A component manufactured by the million has achieved the economies of scale many times over.

Twice width plus joint equals length. 9 in. by 4½ in. (or 2.25 dm. by 1.125 dm.) is not the only size that gives this: 2 dm. by 1 dm. does it more simply. Other sizes may be added, provided that they are co-ordinated, but not necessarily in the ratio of 2:1.

Conversions and repairs to existing buildings. The BDA has a point here, but marrying with existing brickwork is a question of course height: the length of the brick does not matter. Vertically the BDA proposal, as we showed above, does conform to BS 4011. So we will concede to them their 0.75 dm. course height.

Difficulty of manufacturing a different size. Much has been made of this argument in recent years, but we have heard that recently their boffins have found out how to fire a brick 90 mm. high by the simple device of readjusting the draught in the kiln. However, we would concede the 0.75 dm. height, temporarily to ease difficulties in maintenance as well as to bond with existing brickwork, whilst they finalise the solution of this 'insoluble' problem.

Modular Society Proposals

What are the Modular Society's proposals for brick sizes? We shall be putting up proposals for discussion at BSI, but at the risk of jumping the gun, like the BDA, we suggest the following (in decimetres, or modules):—

1. 3 × 1 × 1
2. 2 × 1 × 1
3. 2 × 1 × 0·75
4. 2 × 2 × 1

The first will produce the most economical brickwork. Already, in some parts of the country, brickwork in extruded modular bricks of 12 in. by 4 in. by 4 in. costing less per yard super than in pressed bricks of 9 in. by 4½ in. by 3 in., owing to the savings in motar and labour of the larger unit.

The second is the ordinary modular brick, available in Canada and U.S.A. as 8 in. by 4 in. by 4 in. The third is the concession in course height for matching existing buildings and to meet the proclaimed difficulties in manufacture. The fourth is a metric equivalent of the Calculon, for building very strong walls in the Roman manner. It would be cheaper than cross-bonded bricks for party walls.

Brickwork is at present the most convenient and flexible method for building walls: and the best value for money. We want it to stay that way and go on to improve its service to the community. One wonders why the BDA is so intent upon demoting their product from its present ascendency into becoming the awkward component that everyone will strive to avoid. Do they really mean us to dimension a 4½ in. wall on plans as 112.5 mm. (half a millimetre)?

We call upon the BDA to honour its obligation to conform to BS 4011 and, in dong so, to justify its own name and develop' the brick for the new age of co-ordinated dimensions for building.

LETTERS

Conversion Unknowns

Sir,—I feel that in all the mounting discussions on the metric changeover, that one or two points should be clarified. It seems to me that an undue amount of attention is being given to dimensions solely and that much more should be given to some of the related problems. Standardising dimensions is not enough (although how an industry which has not yet fully accepted the advantages o dimensional co-ordination can profit from simply going metric is puzzling).

The Education Consortia, through the Department of Education & Science, are, at the moment, almost entirely based on the dimensions shown in the DC series where preference is given to the 4 in./1 ft. dimension and in the process the Consortia have given up their previous ranges of sizes, which were based on grids 2 ft. 8 in., 3 ft. 4 in. etc., and have adopted 1 ft. as the increment for grid planning and sizing of large components. The reasons they did this are interesting because, although 4 in. was the common module on all the previous systems, it was felt that to achieve interchangeability of components and to produce some national dimensional standards, common decisions on increments were needed. Here, what is important is not the actual dimension arrived at, so much as the decision to accept common dimensions for a larger aim. The result, therefore, at the moment is that the Education Consoi tia have a common base, which can be changed quite simply from 4 in. to 100 mm and 1 ft. to 300 mm. In dimensional terms, therefore, the change to metric can be rapid and the period for changing would be the natural end of the existing programme quotations. However, the interchangeabiilty aspect of this is much more complicated and raises a lot of questions on ranges of size, tolerance, fit and jointing details, which have proved, in the past, to be the most complicated and difficult aspect. In the final details, the weathering, joint fixings, etc., can produce nominal identical ranges which have minor but critical differences preventing multi-consortia use. Most of the programme, therefore, for the conversion of the system will be in studies on these later points and the metric problem as such is considered relatively minor.

What is, however, very interesting, is the actual cost of the metric conversion. If can be used in both systems and one-off the aim, by inter-changeability, is to produce national standards where manufacturers can produce components which projects and where they can market their components through traditional channels, this will be prevented if the components are simply not available on time.

From the manufacturing industry's point of view one cannot see how the BSI programme can be interpreted in precise cost terms. How does the manufacturer know when the demand for metric components will start and, at what rate it will grow, what stocks need to be laid down and what quantities will be made initially.

How can an architect design for metric components, where the price and availability is not very well established, where the manufacturers are reluctant to quote precise details and where some elements in the building are metric and others remain foot/inch. The BSI programme, whilst providing guide lines, lacks precision and it will mean that, although it is not the long-term aim, the existing consortia will almost certainly have to continue to place orders on their present methods, with nominated suppliers and sub-contractors, based on large annual programmes.

J. PLATT, Chairman,
Technical Working Party, SEAC.

SI Units in Bills of Quantities

Sir,—My attention has been drawn to the problem of representation of S.1 units in bills of quantities and specifications and in particular to a suggested solution which I believe has some merit.

I would emphasise that this method is not suggested for general use since standards have already been laid down in BS PD 6031. Bills of quantities however are documents which need to be rapidly and accurately understood and therefore require a different presentation than, say, manufacturers' literature, BS specifications or drawings.

Use of letter M as a decimal marker is the suggestion that I would like your readers to consider. Thus:

35 mm = MO35
35 m = 35M
3½ m = 3M500

Use of the BS standards is most likely to cause confusion when dimensions about the 1M mark are used, e.g., a 2 in. × 4 in. sprocket piece 3 ft. 5 in. long could be:
50 mm × 100 mm × 1 020 mm sprocket; or
M050 × M100 × 1M020 sprocket.

Similarity between first and second examples is too close for rapid comprehension and it is a 'natural' for typing, reading over and punched card errors. Whether to use noughts before the decimal marker when quantities are less than 1M is a matter for individual preference, although I think M100 is preferable to 0M100 if only because of economy of type.

Cube and square measurement could be written 6M cu., 6M sq. instead of $6m^3$, $6m^2$. The disadvantages of the latter, apart with single space typing touch the line ^{3} and ^{2} are not easily typed (and in fact with single space tying touch the line above) and are not normally available from computer print out.

Computer programs which allow for 'ft.' and 'ins.' to be inserted by the computer in dimension variables will have to be amended for metric working. This may be achieved by conversion of these variables to number type variables and the M decimal marker will avoid the necessity to cater for m. and mm. insertion by the program. At the same time the computer will still accept imperial dimensions provided that the necessary 'ft.' 'ins.' signs are punched from the taking off sheets.

C. H. STEVENS [ARICS],
Cranleigh, Surrey.

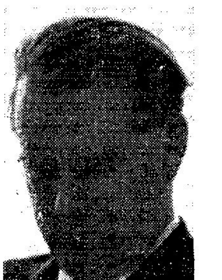
Brick Sizes

Sir,—If, as suggested by the Brick Development Association, the standard brick size becomes 21.5 by 10.25 by 6.5 cm. with a 1 cm. joint not only will the size be expressed in a non-standard unit (cm) but it will be given to a degree of accuracy of 0.5 mm—about the thickness of a trowel, scarcely an improvement on 4½ in. for dimensions in multiples of a brick.

W. R. SINNOTT,

FORECASTING IN A VACUUM

One of the biggest uncertainties manufacturers face when looking at the metric programme is what the level of demand will be from 1970—the year in which metric components will first be used. Philip Dunstone, in a recent address to the Guild of Surveyors (London and Home Counties Branch), saw it as the chicken and egg problem—how can designers specify metric before the components are available? how can manufacturers make to metric dimensions before there is an apparent demand? Taking the manufacturers' viewpoint, P. A. Denison (inset above) of Cape Building Products posed the latter question at the recent conference on metric components, organised by the MPBW, and despite two staggered attempts at answering (the second in the afternoon session after Mr. Denison had left) apprehension was not alllayed.



In an interview with BMN, Mr. Denison, who although only 44 has been sales director of his company for 11 years, outlined some of the complexities that face the manufacturer in the change to metric. What is not always realised, he says is the length of time some manufacturers may need before they can make a decision to invest in new plant or alter their existing production line. Certainly where large sums of money are involved, he doubts if companies will make them available until they have some degree of certainty that new plant would be economically utilised. And economic viability can hardly be deduced until some reliable forecast can be made of future demand.

What also concerns him is that no overall analysis has been undertaken of the time needed by different manufacturers producing different types of products to make the change. His own company offers a fairly good illustration of this point. In 1956, when the flint brick side of the business merged with the board manufacturing division of Cape Asbestos, turnover was around £¾m. Today it is nearer 4m., and besides insulating boards and bricks the group produces ceiling panels, ceiling suspension systems, asbestos cement cladding and, with their recent merger with UAM, asbestos cement roof cladding. Their bigest interest lies in Asbestolux, sold as sheet material, and for this product a change to metric does not seem to present any great difficulty. They are, in fact, already providing metric sizes for export markets. Brick production, however, if there is to be any major alteration in dimensions, is going to produce headaches. New presses will certainly be required, probably new handling equipment and the operation could be complicated and expensive. This is one area, says Mr. Denison, where an indication of future requirements needs to be known some time in advance. Asbestos cement roof sheets may also pose some problems since any alteration in purlin spacing will necessitate new moulds for the sheeting.

As to costs, he does not think that anyone will save money in the initial stages but there should be some savings with the rationalisation of dimensions. Sheeting would obviously go up in cost, assuming a 3 per cent reduction in size, since the same labour force and making process would be utilised, but where metric and imperial products were produced side by side, it would be injudicious to penalise metric by charging more than for their foot/inch equivalents. Prices were likely to be averaged out, so that in the first production runs the imperial would to some extent subsidise the metric products. Subsequently, as imperial becomes the slower moving line, he visualises they may be subject to a surcharge. At the same time, to encourage rationalisation, it would be essential to charge less for the faster moving metric line.

But in the first place the manufacturer has to know what his proportions will be, which is why Mr. Denison would like from the government, since it is obviously the public sector which will set the pace for the changeover, some estimates of the level of demand for both imperial and metric products after 1970. He believes that if sufficient economic weight of demand could be forecast for a definite future date, the building industry would be forced to produce metric. A strong lead at the centre could encourage this. At the moment, however, he feels that Government direction in this sphere is not sufficient.

BUILDING METRICATION NEWS

NEWS FROM THE INDUSTRY

RICS Decisions

To deal with the change to metric, the RICS formed a small working party which first met at the beginning of May 1966. This was later expanded into a Co-ordinating Committee. The more important issues with which the committee has already dealt are: the provision of speakers for the BSI pool; a decision to publish a guide for surveyors which will also be of interest to other members of the construction team; and a decision that the 1969 examinations, in so far as they relate to the construction industry, are to be the last in which imperial measure will be used in questions and be acceptable as answers. From 1970 the whole of the measures used will be metric.

The committee has written to BSI urging the early standardisation of the decimal marker, the 1000 marker and the precise notation of metric measurements. Liason on these topics with the RIBA and other professional bodies concerned in surveying is regarded as important and it is hoped to have a meeting so that close collaboration can be achieved.

Cost Thinking

Of all the members of the building team, the quantity surveyor probably has the fewest problems in going metric. Philip Dunstone told a meeting of The Guild of Surveyors (London and Home Counties Branch) in London on 7 November. At their quarterly meeting he was giving a lecture on Going Metric. It would, however, he said, be necessary for them to convert their cost thinking into metric terms. The surveyor would also have the added responsibility during the metric changes to hold costs to their proper level.

Looking at the broader aspect, Mr. Dunstone suggested that the success of the programme hinged a good deal on proper timing. There had to be sufficient metric contracts going to persuade manufacturers of the long term economic advantages. If, in the initial stages, metric building was more expensive than imperial, the private sector would be most unlikely to commit itself to metric. The onus was on the public sector to maintain the flow of building and to do this it might have to accept, at least temporarily, higher costs.

Metric Exercises

The weekend meeting on the transfer to metric, organised by the University of Bristol on 27-29 October, is reported to have been highly successful. Speakers included Michael Clarke, Peter Forbes, P. Aldworth, A. W. Rickard, C. C. Malby, W. J. Pinfold and J. A. Sliwa, who covered a wide spectrum of the building industry. One of the innovations of the meeting were some exercises in metric followed by discussion.

Machines for Metric

Costain Concrete have installed new machinery which can make the change-over to metric at both their Siporex factories—Newarthill, Scotland and Thurrock, Essex. The new machines enable Siporex aerated concrete slabs to be produced in 60 cm., as well as 24 in. widths. The 24 in. units will be produced as long as they are required and 60 cm. widths as soon as they are needed.

In the new machines the Siporex passes between high speed milling heads which give dimensional accuracy, sharp arrises and regular chamfers.

Birmingham Metric Exhibits

The information departments of the Engineering and Building Centre, Birmingham, are now in the process of gathering together details of the change over to metric. The British Standards Institution and the Ministry of Technology are involved and copies are available for reference, by interested enquirers, of most of the publications and standards produced so far.

Centre exhibitors are invited to display metric products when available and the first step has been taken by the G.K.N. Group of Companies who, in addition to their wide range of products already exhibited, now show their new range of ISO Metric Hexagon socket and machine screws. The Shardlow Anglo-Metric micrometer which reads inches and millimetres at the same time can also be seen. In the Building Centre, kitchen units to metric sizes are being displayed by Multyflex (IMC) Ltd., Llanelli.

The Centre, Broad-street, Birmingham, 1, say they would like to hear from any firm who are already producing products to the metric scale.

Metric Wall Charts

As part of its programme in connection with the change to the metric system, The Building Centre has produced metric wall charts for use in architects' and other offices. These charts, which show the metric equivalents of feet and inches up to 6 ft., are approximately 7 ft. tall overall. For ease of handling and to meet Post Office requirements for size of postal packages, they are in three sections, mounted on stiff card. The charts are available from The Building Centre, 26 Store-street, London, WC1, price 1 gn. each, including postage and packing.

COMING MEETINGS

WEDNESDAY, 29 NOVEMBER

The West Midland Branch of the Concrete Society has organised a meeting on 'The introduction of the metric system to the construction industry' to be held in Room 151, the University of Aston, Birmingham. Start is at 6 p.m. The speaker will be R. D. Anchor, BSc(Eng), MICE, MIStructE, technical director of GKN Reinforcements Ltd.

Metric Instruments List

As metric items for the drawing office become available we shall be publishing details in BMN. For the provision of this information we are indebted to the Drawing Office Material Manufacturers and Dealers' Association (DOMMDA).

—Levelling Staves—

Manufacturer	Telescopic —wooden	Folding —wooden	Telescopic —rod	Mining staffs	Telescopic —metal	One piece —metal	Remarks
Collimator Cases Ltd	4·25 M long	3 M and 4·25 M	—	—	3 M	3 M	Readings to 1 cm and ½ cm
Holmes Bros (Leyton) Ltd	2 M, 3 M and 4 M	3 M and 4 M	13 ft.	2 M and 2·25 M	3 M and 4 M	—	Readings to ½ cm

—Ranging Poles—

	Wood	Steel	Aluminium	Remarks
Holmes Bros (Leyton) Ltd	2 M and 2½ M	2 M and 2½ M	2 M and 2½ M	All in one piece or jointed. Painted red or white only in 50 cm divisions. 20 cm on request