

Mounting dimensions of single rod double acting hydraulic cylinders —

**Part 4: Specification for 63 bar series,
including associated components**

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- Association of British Mining Equipment Companies
- Association of Hydraulic Equipment Manufacturers
- British Compressed Air Society
- British Hydromechanics Research Association
- British Steel Corporation
- British Telecommunications
- Department of Trade and Industry (National Engineering Laboratory)
- Electricity Supply Industry in England and Wales
- Federation of Manufacturers of Construction Equipment and Cranes
- Health and Safety Executive
- Institution of Mechanical Engineers
- Machine Tool Industry Research Association
- Ministry of Defence
- National Coal Board

The following bodies were also represented in the drafting of the standard, through subcommittees and panels:

- British Industrial Truck Association
- British Steel Industry
- Hydraulic Press Manufacturers' Association
- Institution of Chemical Engineers
- Welding Manufacturers' Association (BEAMA Ltd.)
- Coopted member

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Foreword

This British Standard has been prepared under the direction of the Mechanical Engineering Standards Committee and is the fourth Part of a series specifying mounting dimensions of single rod double acting hydraulic cylinders and related features.

The standard has been prepared at the request of the Association of Hydraulic Equipment Manufacturers and is based upon proposals prepared by them in association with the Machine Tool Industry Research Association. The codes used in this standard to identify the mounting types and the mounting dimensions are in accordance with ISO 6099¹⁾, and the mounting accessories are dimensionally interchangeable with the 160 bar series of accessories specified in ISO 8133¹⁾ and ISO 8134¹⁾.

Guidance for the installation of the cylinder accessories is given in Appendix A.

Other Parts of this British Standard are:

- *Part 1: Specification for 160 bar medium series;*
- *Part 2: Specification for 160 bar compact series;*
- *Part 3: Specification for 250 bar series.*

It is anticipated that further Parts will be published in due course to specify requirements for mounting accessories such as piston rod eye ends and fork ends, clevis brackets, etc. for the cylinders specified in Parts 1, 2 and 3.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 28, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

¹⁾ Published by the International Organization for Standardization (ISO).

1 Scope

This Part of BS 6331 specifies interchangeability dimensions for thirteen mounting styles of, and eight mounting accessories for, a series of single rod double acting compact hydraulic square headed cylinders with 25 mm to 200 mm nominal bore working at pressures up to 63 bar²⁾. It also specifies alternative piston rod diameters and threads for each nominal bore.

The standard relates primarily to external dimensions and is not intended to restrict the internal design of cylinders.

NOTE The titles of the publications referred to in this standard are listed on the inside back cover.

2 Definitions

For the purposes of this Part of BS 6331 the definitions given in BS 5755 apply, together with the following.

mounting

that part of the cylinder assembly that enables the cylinder to be fixed to a structure and transfers to the structure the load reaction forces acting upon the cylinder

3 Symbols

The following symbols are used in this Part of BS 6331:

- A is the percentage elongation on gauge length after fracture
- R_e is the yield strength (in N/mm²)
- S_o is the original cross-sectional area of the gauge length (in mm²).

4 Cylinder dimensions

4.1 Basic cylinder

The dimensions of the features which are common to all the following cylinder mounting styles shall be as stated in Table 1 and illustrated in Figure 1.

4.2 Mounting

The dimensions for the various cylinder mounting styles shall be as follows:

Mounting style	Description of mounting	In accordance with table
MF1	rectangular flange on head	Table 2
MF2	rectangular flange on cap	Table 2
ME5	rectangular flange integral with head	Table 3
ME6	rectangular flange integral with cap	Table 4
MP1	fixed clevis on cap	Table 5
MP5	fixed spherical bearing eye on cap	Table 6
MS2	side lugs	Table 7
MS4	side tapped	Table 8
MT1	male trunnion integral with head	Table 9
MT4	male trunnion (fixed or movable) in intermediate position	Table 10
MX1	extended studs or tie rods at both ends	Table 11
MX2	extended studs or tie rods at cap end	Table 12
MX3	extended studs or tie rods at head end	Table 13

4.3 Cylinder ports

The sizes of the entry ports and the associated threads shall be in accordance with Table 1.

4.4 Piston rod thread

The piston rod thread shall be the short type of shouldered male thread specified in Table 1.

NOTE Other types of piston rod thread are specified in BS 5755.

4.5 Nominal stroke tolerances

The tolerance on the stroke of the piston rod shall be in accordance with Table 14.

²⁾ 1 bar = 10⁵ N/m² = 100 kPa.

5 Accessories

5.1 Dimensions

The dimensions of the various mounting accessories shall be as follows:

Accessory description	In accordance with table
Rod clevis	Table 15
Rod eye, plain	Table 16
Rod eye, with spherical plain bearing	Table 17
Pivot pins (plain)	Table 18
Pivot pins (spherical plain bearing)	Table 19
Eye bracket	Table 20
Clevis bracket (plain)	Table 21
Clevis bracket (spherical plain bearing)	Table 22

5.2 Material

5.2.1 Each accessory shall be manufactured from material having a minimum yield stress $R_{e\ min}$, of 250 N/mm² and an elongation, A_{min} , of 12 % on a gauge length of $5.65 \sqrt{S_o}$.

5.2.2 The spherical plain bearings fitted to the eye of cylinder MP5 (see Figure 5) and the rod eye (see Figure 15) shall be of steel and their bearing surfaces shall have a minimum hardness of 50 HRC.

5.3 Load capacity

Each accessory shall be designed to withstand the maximum axial forces (tension and compression) which can be produced by the associated cylinders, based upon a safety factor of 2.5 on the minimum yield strength of the material used.

6 Identification³⁾

6.1 The following particulars shall be marked in a permanently and readily visible form on all cylinders and accessories:

- a) manufacturer's name;
- b) manufacturer's type or model number.

6.2 In addition to that specified in 6.1 the following (as appropriate) shall also be marked on the cylinder:

- a) manufacturer's brief address;
- b) symbol according to BS 2917 and all ports correctly identified;
- c) safe maximum continuously rated pressure;
- d) cylinder bore diameter;
- e) piston rod diameter;
- f) length of stroke;
- g) number of this British Standard i.e. BS 6331-4⁴⁾.

NOTE If there is insufficient space available for legible lettering some or all of the above may be omitted.

³⁾ Identification requirements are in accordance with ISO 4413.
⁴⁾ Marking BS 6331-4 on or in relation to a product is a claim by the manufacturer that the product has been manufactured to the requirements of the standard. The accuracy of such a claim is therefore solely the manufacturer's responsibility. Enquiries as to the availability of third party certification to support such claims should be addressed to the Director, Quality Assurance Division, BSI, Maylands Avenue, Hemel Hempstead, Herts HP2 4SQ for certification marks administered by BSI or to the appropriate authority for other certification marks.

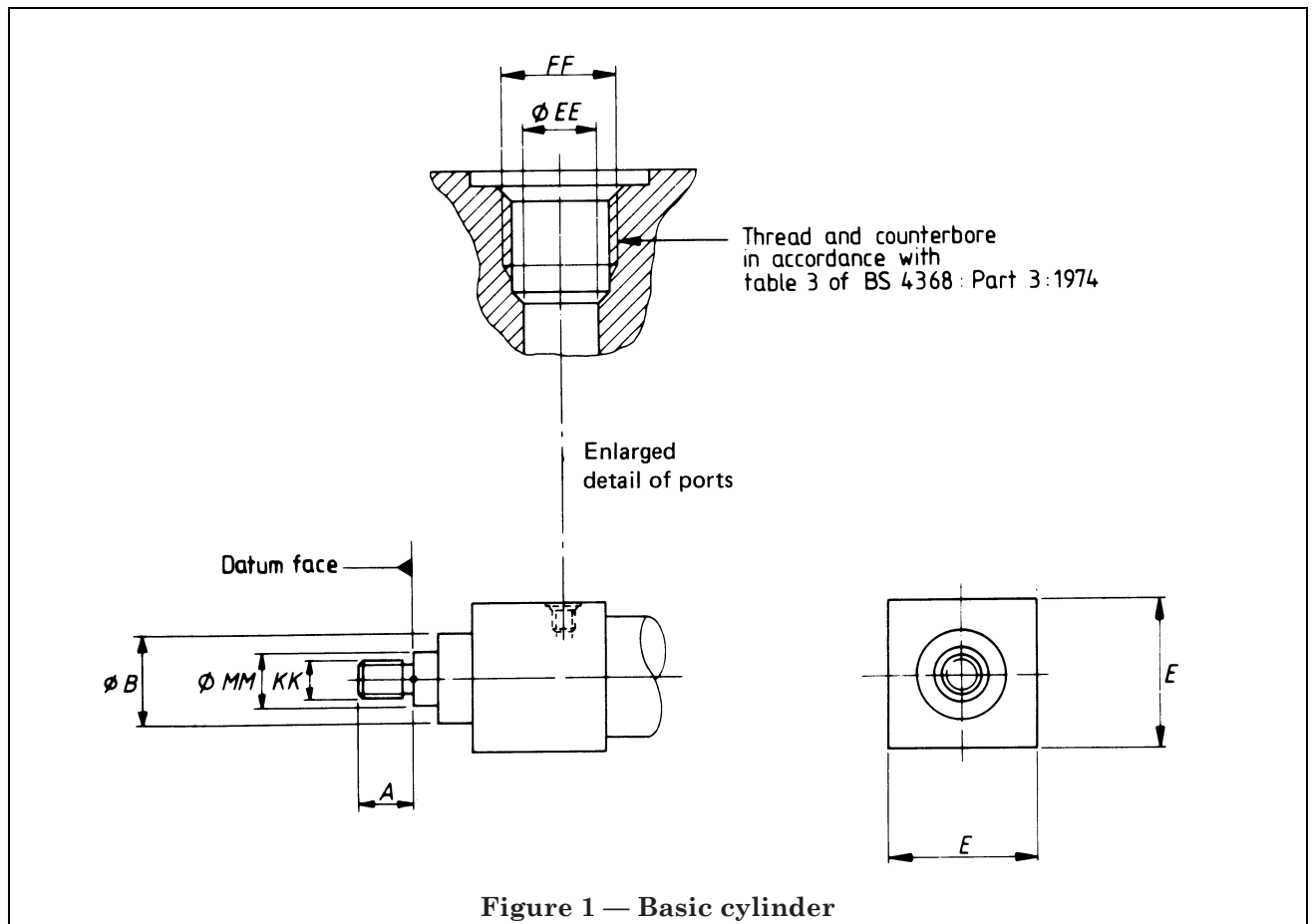
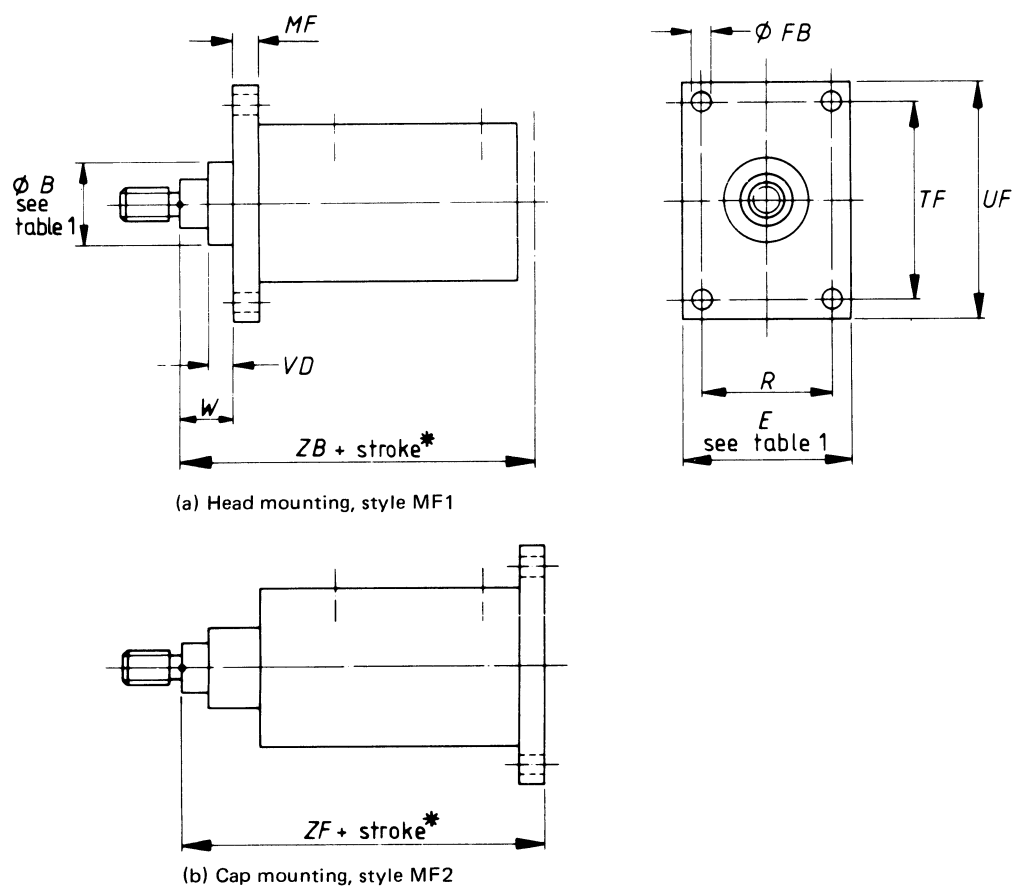


Table 1 — Dimensions of basic cylinder

All dimensions are in millimetres.

Cylinder			Threaded piston rod end ^b			Entry ports (see Figure 1)	
Nominal bore	B f_9^a	E max.	Piston rod diameter MM	Thread ^c designation KK	Thread length A	Thread designation FF^d	Diameter EE min.
25	24	42	12	M10 × 1.25	14	G ¼	6
	30		18	M14 × 1.5	18		
32	26	50	14	M12 × 1.25	16	G ¼	10
	34		22	M16 × 1.5	22		
40	30	51	18	M14 × 1.5	18	G ¼	10
	34		22	M16 × 1.5	22		
50	34	64	22	M16 × 1.5	22	G ⅜	10
	50		36	M27 × 2	36		
63	42	77	28	M20 × 1.5	28	G ⅜	10
	60		45	M33 × 2	45		
80	50	96	36	M27 × 2	36	G ½	12
	72		56	M42 × 2	56		
100	60	115	45	M33 × 2	45	G ½	12
	88		70	M48 × 2	63		
125	72	140	56	M42 × 2	56	G ½	12
	108		90	M64 × 3	85		
160	72	179	56	M42 × 2	56	G ⅜	16
	108		90	M64 × 3	85		
200	72	217	56	M42 × 3	56	G ⅜	16
	108		90	M64 × 3	85		

^a Tolerances in accordance with BS 4500.^b Selected from BS 5755.^c Constant pitch series in accordance with BS 3643-1.^d In accordance with BS 2779.



* See Table 14.

Figure 2 — Rectangular flange mounting styles

Table 2 — Dimensions of rectangular flange, mounting styles MF1 and MF2

All dimensions are in millimetres.

Nominal bore	FB H13 ^a	R J _s 14 ^a	MF	TF J _s 14 ^a	UF max.	W	ZB max.	ZF	VD	
									min.	max.
25	6	27	10	51	64	15 ±1.6	121	124	5	10
32	6.6	33	10	58	72	25 ±1.6	137	138	5	15
40	6.6	36	10	70	86	25 ±1.6	139	137	5	15
50	9	47	16	86	105	26 ±1.6	147	150	5	25
63	9	56	16	98	118	32 ±2.0	156	159	5	25
80	12	70	20	119	143	31 ±2.0	174	179	5	25
100	12	84	22	138	162	35 ±2.0	181	187	7	25

^a Tolerances in accordance with BS 4500.