BRITISH STANDARD

BS 1553-1: 1977

Specification for

Graphical symbols for general engineering —

Part 1: Piping systems and plant

UDC 003.62:62+621.64+628.8+66.02+697

Cooperating organizations

The Mechanical Engineering Standards Committee and the Chemical Engineering Standards Committee, under whose supervision this British Standard was prepared, consist of representatives from the following Government departments and professional and industrial organizations:

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Associated Offices Technical Committee
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Association of Hydraulic Equipment Manufacturers' Ltd*
Association of Mining Electrical and Mechanical Engineers
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British Gas Corporation
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British Internal Combustion Engine Manufacturers' Association
British Mechanical Engineering Confederation
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British Steel Industry
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Institution of Gas Engineers*
Institution of Heating and Ventilating Engineers
Institution of Mechanical Engineers
Institution of Plant Engineers
Institution of Production Engineers
London Transport Executive
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Ministry of Defence*
National Coal Board
National Engineering Laboratory — Department of Industry
Process Plant Association
Railway Industry Association of Great Britain
Royal Institute of British Architects
Society of Motor Manufacturers and Traders
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Chemical Engineering Standards Committee
Association of Consulting Engineers
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British Mechanical Engineering Confederation
Chemical Industries Association*
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Department of Industry
Department of Trade
Engineering Equipment Users' Association*
Institution of Chemical Engineers
Institution of Gas Engineers*
Institution of Structural Engineers
Process Plant Association*

The Government department and scientific and industrial organizations marked with an asterisk in the above lists, together with the following, were directly represented on the committees entrusted with the preparation of this British Standard.

Chartered Institute of Patent Agents
Electricity Supply Industry in England and Wales
Institution of Chemical Engineers
Institution of Civil Engineering
North East Coast Institution of Engineers and Shipbuilders
Patent Office
Society of Chemical Industry
United Kingdom Atomic Energy Authority

This British Standard, having been prepared under the direction of the Mechanical and the Chemical Standards Committees, was published under the authority of the Executive Board on 31 March 1977

First published September 1949
First revision March 1977

The following BSI references relate to the work on this standard:
Committee references MEE/88 and CHE/17
Drafts for comment 71/34910, 71/34911 and 71/35726

ISBN 0 580 09551 7

Amendments issued since publication

Amd. No.	Date of issue	Comments

Contents

Foreword

For many years BSI has published separate specifications for graphical symbols used on engineering diagrams relating to individual technical disciplines; this has inevitably led to a few inconsistencies between standards. In this revision of BS 1553-1:1949, which has been prepared under the authority of the Mechanical and the Chemical Standards Committees, an attempt has been made to eliminate such differences and produce a standard which specifies symbols which will be common to heating and ventilating installations and to process plants of all types. To accomplish this aim BS 1553-4:1956 “Graphical symbols for heating and ventilating installations” and BS 974:1953 “Symbols for use on flow diagrams of chemical and petroleum plant”, have also been revised and incorporated into this standard. BS 1553-4 and BS 974 have accordingly been withdrawn.

It is intended that the symbols specified in this standard should be applied in accordance with the practice recommended in BS 5070.

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

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 40, 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 Scope

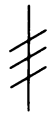
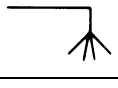
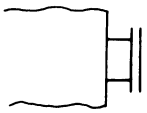
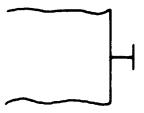
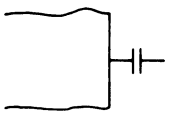
This Part of BS 1553 specifies graphical symbols for use in the creation of flow and piping diagrams for process plant and heating and ventilating installations. It is intended that diagrams employing these symbols should be drawn in accordance with the practice recommended in BS 5070.

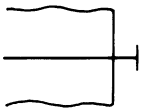
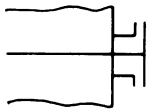
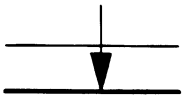
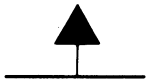
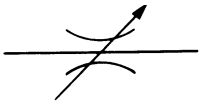
2 References

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

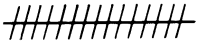
3 Symbols (or elements of symbols) used in conjunction with other symbols

3.1 General

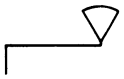
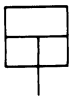
No.	Description	Symbol
3.1.1	Mechanical linkage	
3.1.2	Weight device	
3.1.3	Electrical device	
3.1.4	Vibratory or loading device (any type)	
3.1.5	Spray device	
3.1.6	Rotary movement	
3.1.7	Stirring device	
3.1.8	Fan	
3.1.9	Access point	
3.1.10	Equipment branch: general symbol NOTE The upper representation does not necessarily imply a flange, merely the termination point. Where a breakable connection is required the branch/pipe would be as shown in the lower symbol.	 

No.	Description	Symbol
3.1.11	Equipment penetration (fixed)	
3.1.12	Equipment penetration (removable)	
3.1.13	Boundary line	
3.1.14	Point of change (See **4.1.12** for specific examples)	
3.1.15	Discharge to atmosphere	
3.1.16	Intake from atmosphere	
3.1.17	Trap: release or retention	
3.1.18	Flow restrictor (fixed)	
3.1.19	Flow restrictor (variable)	

3.2 Pipelines

No.	Description	Symbol
3.2.1	Pipeline (major flow line)	
3.2.2	Pipeline (minor flow line)	
3.2.3	Pipeline (existing)	
3.2.4	Pipeline (undeground, or concealed)	
3.2.5	Existing pipeline (to be removed)	
3.2.6	Pipeline (future)	

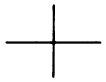
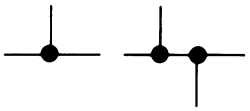
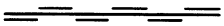
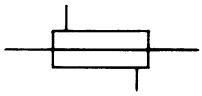
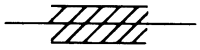
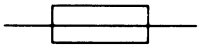
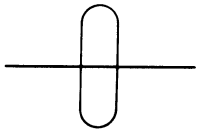
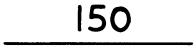
3.3 Valves: actuating methods

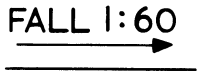
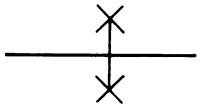
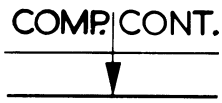
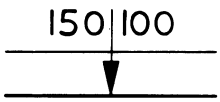
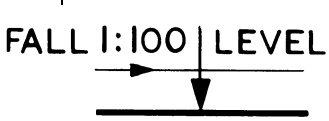
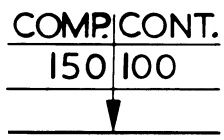
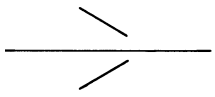
No.	Description	Symbol
3.3.1	Manual isolation	
3.3.2	Power signal	
3.3.3	Statically loaded	 i.e symbol **3.1.4**
3.3.4	Spring loaded	
3.3.5	Weight loaded	
3.3.6	Quick opening	
3.3.7	Quick closing	
3.3.8	Float control	
3.3.9	Dash pot checked	
3.3.10	Piston	
3.3.11	Diaphragm	
3.3.12	Solenoid	
3.3.13	Automatic actuating element	
3.3.14	Automatic actuating element, with integral manual actuating element	

No.	Description	Symbol
3.3.15	Manual actuating element	
3.3.16	Motor	

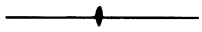
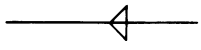
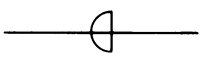
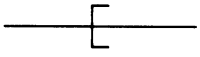
4 Basic functional symbols

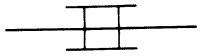
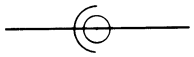
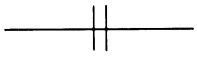
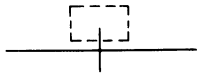
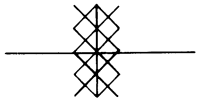
4.1 Pipelines

No.	Description	Symbol
4.1.1	Crossing (unconnected) (See Appendix A)	
4.1.2	Junction (connected) (see Appendix A)	
4.1.3	Heated or cooled NOTE Heating or cooling medium to be annotated adjacent to symbol	
4.1.4	Jacketed NOTE Healing or cooling medium to be annotated adjacent to symbol	
4.1.5	Lagged	
4.1.6	Sleeved NOTE Fluid or fill of the annulus to be annotated adjacent to symbol	
4.1.7	Provision for flexibility (See **4.7** for specific methods)	
4.1.8	Indication of flow direction NOTE Included angle of arrow = 30°	
4.1.9	Indication of pipe size ϕ150 mm example	

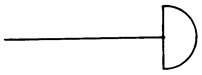
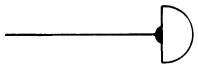
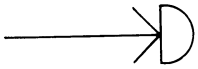
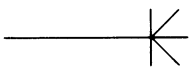
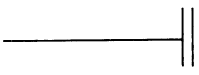
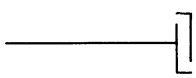
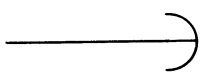
No.	Description	Symbol
4.1.10	Indication of fall (or rise)	
4.1.11	Indication of support points (See **4.4** for specific types of supports and hangers)	
4.1.12	Indication of point of change (i.e. size, specification, level, responsibility, etc. added to symbol **3.1.14**) NOTE Changes in conditions should embrace the arrow Examples: Responsibility change Pipe bore change Change in fall	  
4.1.13	Coincident point of change	
4.1.14	Pipe bore change (unspecified)	

4.2 Joints

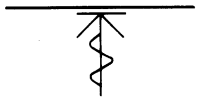
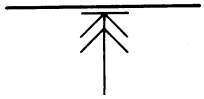
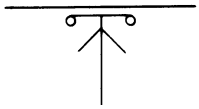
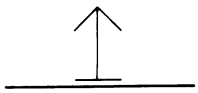
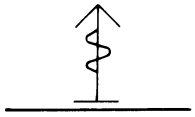
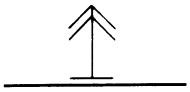
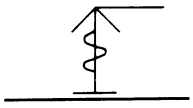
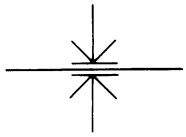
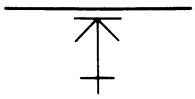
No.	Description	Symbol
4.2.1	Butt welded NOTE The proportions of the weld should be thus: 	
4.2.2	Soldered or solvent welded	
4.2.3	Screwed	
4.2.4	Compression	
4.2.5	Sleeve: BS 534	

No.	Description	Symbol
4.2.6	Socket welded: BS 3799	
4.2.7	Socket and spigot	
4.2.8	Swivel	
4.2.9	Flanged and bolted	
4.2.10	Electrically bonded	
4.2.11	Electrically insulated	

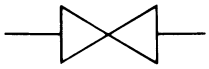
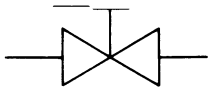
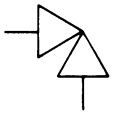
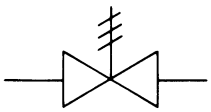
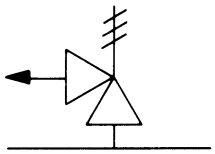
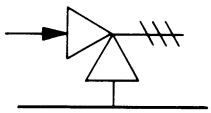
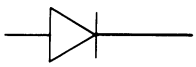
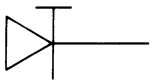
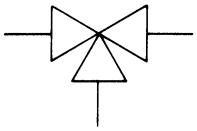
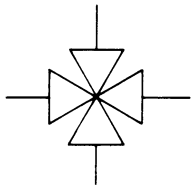
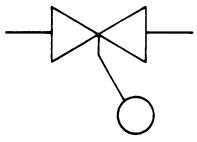
4.3 End closures

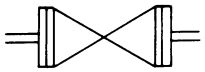
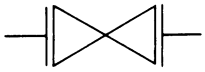
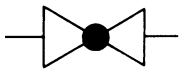
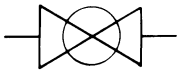
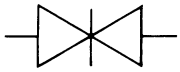
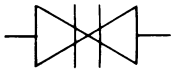
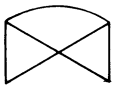
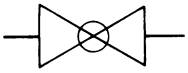
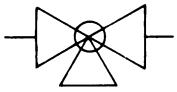
No.	Description	Symbol
4.3.1	End cap: general symbol (method unspecified) (Annotate as “detachable”, when appropriate)	
4.3.2	End cap: butt welded	
4.3.3	End cap: screwed	
4.3.4	End cap: fillet welded	
4.3.5	End screwed and plugged	
4.3.6	End flanged and bolted	
4.3.7	End closure: quick release	
4.3.8	End socket and spigot	

4.4 Supports and hangers

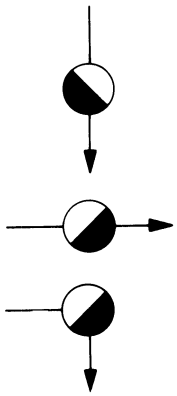
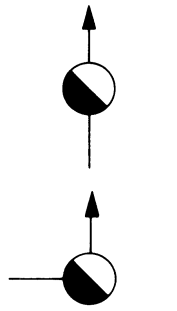
No.	Description	Symbol
4.4.1	Support: basic symbol (Use symbol **4.1.11** when a detailed support or hanger is not required)	See **4.1.11**
4.4.2	Simple support	
4.4.3	Resilient support	
4.4.4	Adjustable support	
4.4.5	Roller support	
4.4.6	Simple hanger	
4.4.7	Resilient hanger	
4.4.8	Adjustable hanger	
4.4.9	Constant load hanger	
4.4.10	Guide	
4.4.11	Anchor	

4.5 Valves

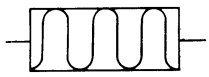
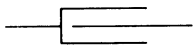
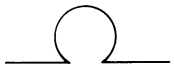
No.	Description	Symbol
4.5.1	In-line (any type or pattern)	
4.5.2	In-line (simple screw-down)	
4.5.3	Angle (simple screw-down)	
4.5.4	Relief (in-line)	
4.5.5	Relief (angle, pressure)	
4.5.6	Relief (angle, vacuum)	
4.5.7	Check (non-return or reflux)	
4.5.8	Check (non-return or reflux) screw down	
4.5.9	3-way	
4.5.10	4-way	
4.5.11	In-line (float operated)	

No.	Description	Symbol
4.5.12	Flanged or alternatively	 
4.5.13	Butterfly	
4.5.14	Globe	
4.5.15	Ball	
4.5.16	Wedge gate	
4.5.17	Parallel slide	
4.5.18	Needle	
4.5.19	Diaphragm	
4.5.20	Plug Annotate type of port adjacent to symbol i.e. T (Tee port) L (L port)	
4.5.21	Plug 3-way Annotate type of port adjacent to symbol i.e. T (Tee port) L (L port)	

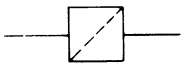
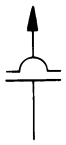
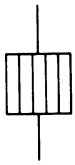
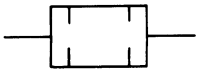
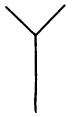
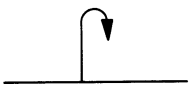
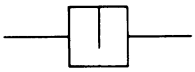
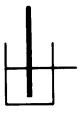
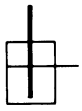
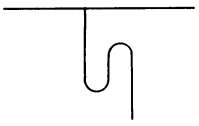
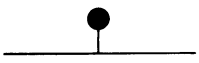
4.6 Trap functions

No.	Description	Symbol
4.6.1	Trap drain, e.g. condensate release	
4.6.2	Trapped vent, e.g. automatic air valve	

4.7 Pipeline flexibility

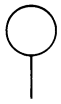
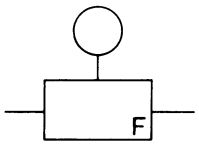
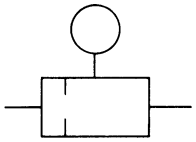
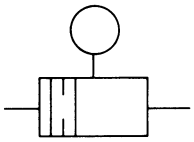
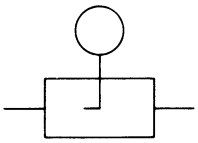
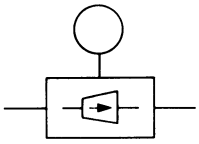
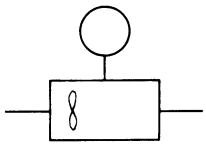
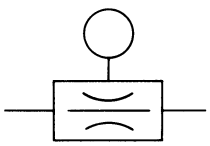
No.	Description	Symbol
4.7.1	Bellows	
4.7.2	Sleeve extension	
4.7.3	Expansion loop	
4.7.4	Flexible hose, flanged example	

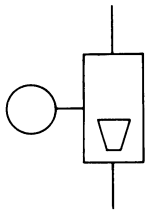
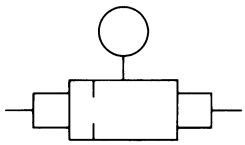
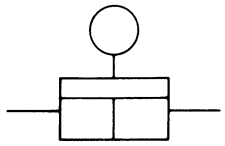
4.8 Pipeline features and general equipment

No.	Description	Symbol
4.8.1	Strainer or filter	
4.8.2	Bursting disc	
4.8.3	Flame arrester	
4.8.4	Silencer	
4.8.5	Tundish NOTE Arrow to be added when discharge is to atmosphere	
4.8.6	Open vent	
4.8.7	Separator	
4.8.8	Bell mouth	
4.8.9	Liquid seal, open	
4.8.10	Liquid seal, closed	
4.8.11	Syphon drain	
4.8.12	Hydrant	

No.	Description	Symbol
4.8.13	Exhaust head	

4.9 Sensing elements for measurement and control

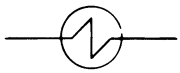
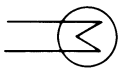
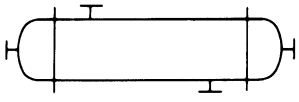
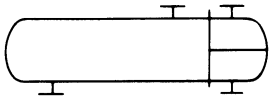
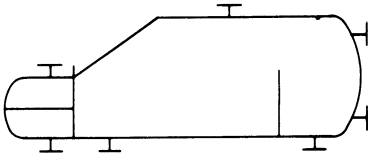
No.	Description	Symbol
4.9.1	Point of measurement	
4.9.2	Meter (any type) NOTE Letter F indicates flow measurement	
4.9.3	Orifice plate	
4.9.4	Orifice carrier	
4.9.5	Pitot tube	
4.9.6	Turbine or propellor	
4.9.7	Rotary displacement	
4.9.8	Venturi	

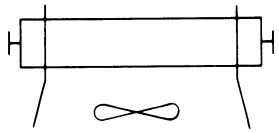
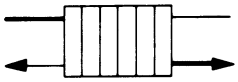
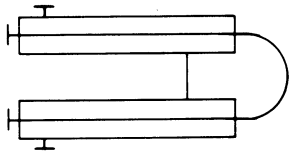
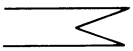
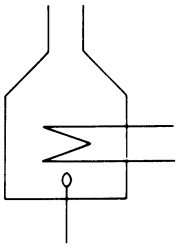
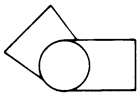
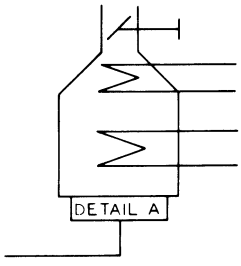
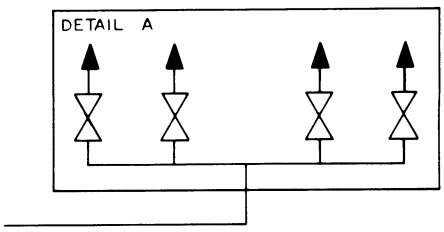
No.	Description	Symbol
4.9.9	Sight flow indicator	
4.9.10	Variable area meter	
4.9.11	Calibrated pipe run	
4.9.12	Diaphragm meter	

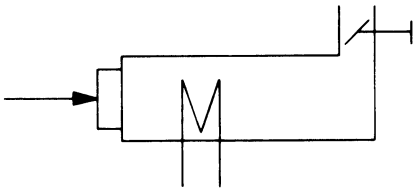
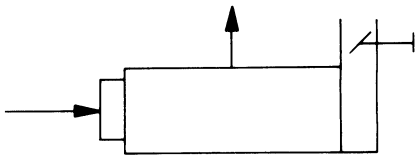
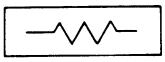
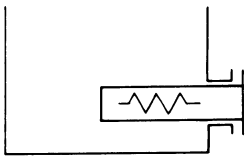
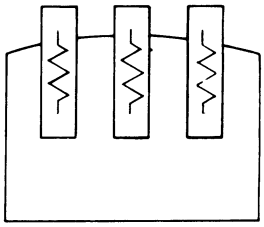
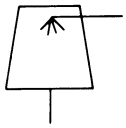
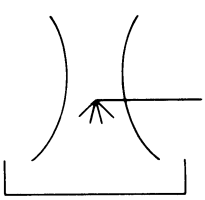
NOTE For letter codes within the instrument circle and for detailed measurement and control symbols see BS 1646.

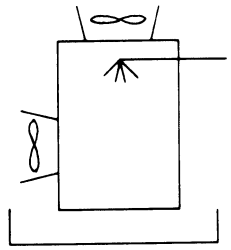
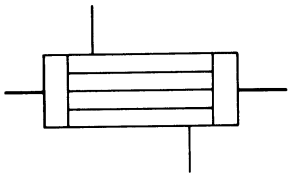
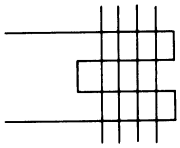
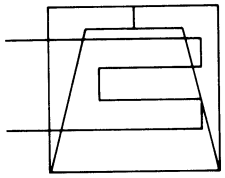
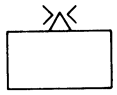
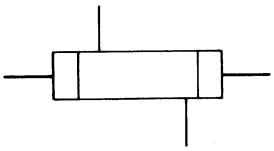
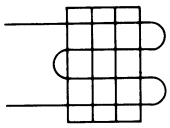
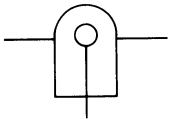
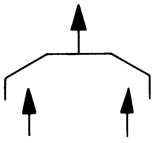
5 Basic and developed symbols for plant and equipment

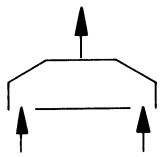
5.1 Heat transfer equipment

No.	Description	Symbol
5.1.1	Heat exchanger (basic symbols) Alternative:	 
5.1.2	Shell and tube: fixed tube sheet	
5.1.3	Shell and tube: U tube or floating head	
5.1.4	Shell and tube: kettle reboiler	

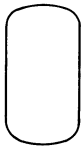
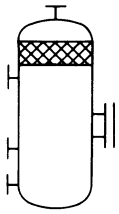
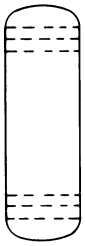
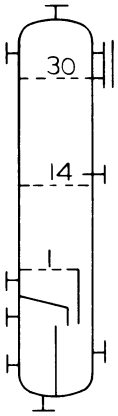
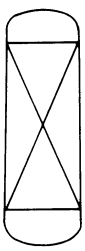
No.	Description	Symbol
5.1.5	Air-blown cooler	
5.1.6	Plate type	
5.1.7	Double pipe type	
5.1.8	Heating/cooling coil (basic symbol)	
5.1.9	Fired heater/boiler (basic symbol)	
5.1.10	Automatic stoker	
5.1.11	Upshot heater Where complex burners are employed the "burner block" may be detailed elsewhere on the drawing, thus:	 

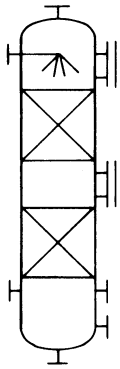
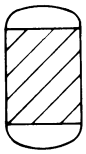
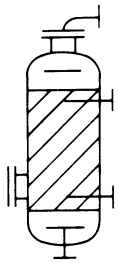
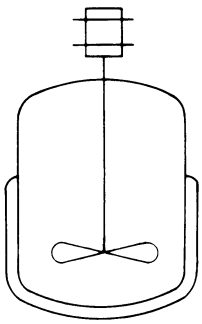
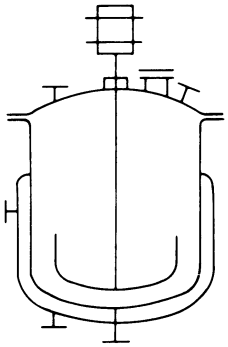
No.	Description	Symbol
5.1.12	Cabin heater	
5.1.13	Fire tube boiler	
5.1.14	Electrical heater (basic symbol)	
5.1.15	Oil burner	
5.1.16	Gas burner	
5.1.17	Tank heater	
5.1.18	Electric furnace	
5.1.19	Cooling tower (basic symbol)	
5.1.20	Cooling tower: natural draft	

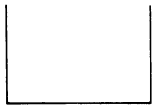
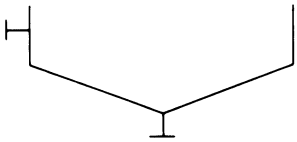
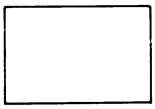
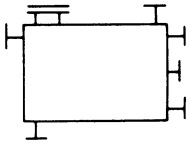
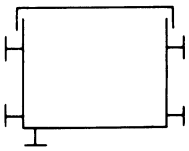
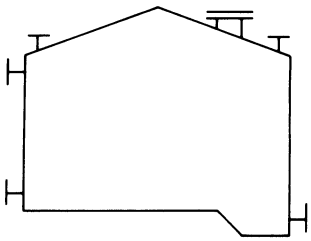
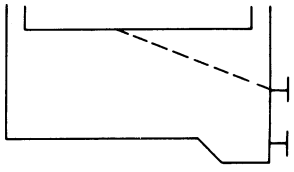
No.	Description	Symbol
5.1.21	Cooling tower: forced/induced draft (Fans to be included as appropriate)	
5.1.22	Water-cooled condenser	
5.1.23	Air-cooled condenser, natural/forced draft Add fan **3.1.8** if required	
5.1.24	Evaporative condenser	
5.1.25	Unit humidifier	
5.1.26	Water chilling evaporator	
5.1.27	Air cooling evaporator	
5.1.28	Oil separator	
5.1.29	Extractor hood, open type	

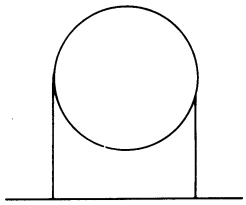
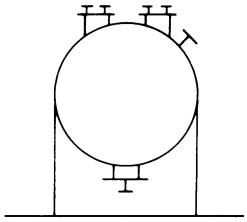
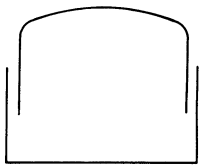
No.	Description	Symbol
5.1.30	Extractor hood, slot type	

5.2 Vessels and tanks

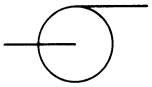
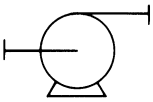
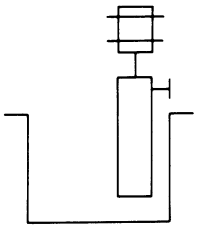
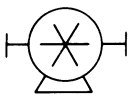
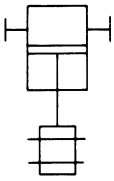
No.	Description	Symbol
5.2.1	Drum or simple pressure vessel (basic symbol)	
5.2.2	Knock-out drum (with demister pad)	
5.2.3	Tray column (basic symbol)	
5.2.4	Tray column Trays should be numbered from the bottom; at least the first and the last should be shown. Intermediate trays should be included and numbered where they are significant.	
5.2.5	Fluid contacting vessel (basic symbol)	

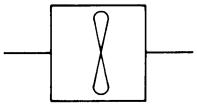
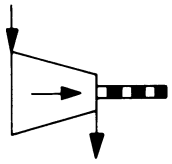
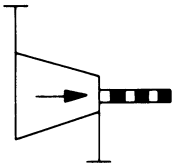
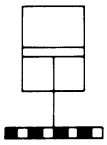
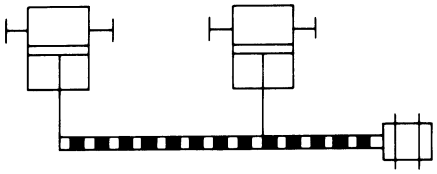
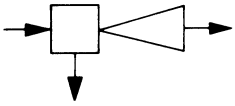
No.	Description	Symbol
5.2.6	Fluid contacting vessel Support grids and distribution details may be shown	
5.2.7	Reaction or absorption vessel (basic symbol)	
5.2.8	Reaction or absorption vessel Where it is necessary to show more than one layer of material alternate hatching should be used	
5.2.9	Autoclave (basic symbol)	
5.2.10	Autoclave	

No.	Description	Symbol
5.2.11	Open tank (basic symbol)	
5.2.12	Open tank	
5.2.13	Clarifier or setting tank	
5.2.14	Closed tank (basic symbol)	
5.2.15	Sealed tank	
5.2.16	Covered tank	
5.2.17	Tank with fixed roof (with draw-off sump)	
5.2.18	Tank with floating roof (with roof drain)	

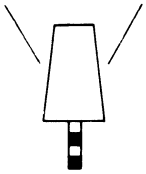
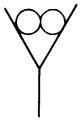
No.	Description	Symbol
5.2.19	Storage sphere (basic symbol)	
5.2.20	Storage sphere	
5.2.21	Gas holder (basic symbol for all types)	

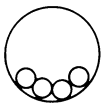
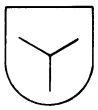
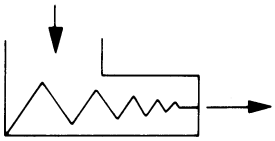
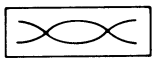
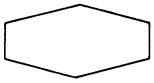
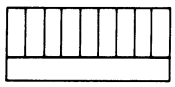
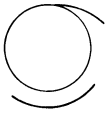
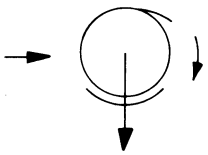
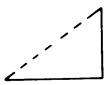
5.3 Pumps and compressors

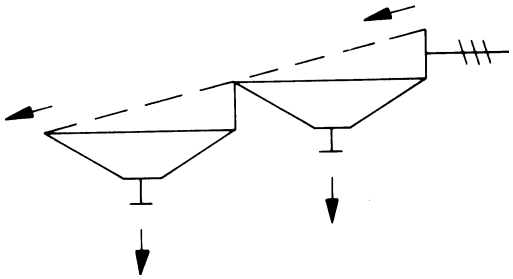
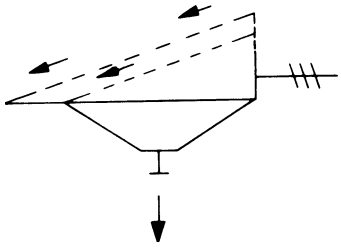
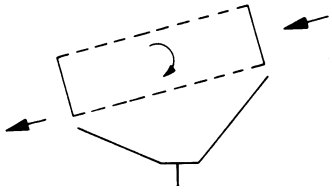
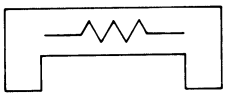
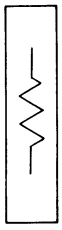
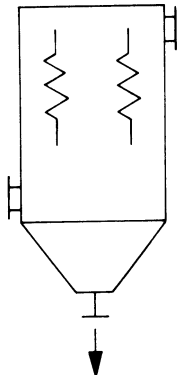
No.	Description	Symbol
5.3.1	Rotary pump, fan or simple compressor (basic symbol)	
5.3.2	Centrifugal pump or centrifugal fan	
5.3.3	Centrifugal pump (submerged suction)	
5.3.4	Positive displacement rotary pump or rotary compressor	
5.3.5	Positive displacement pump (reciprocating)	

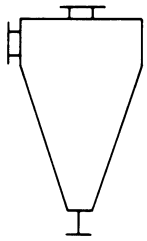
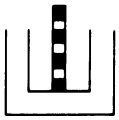
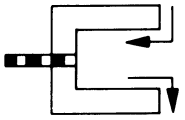
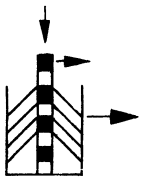
No.	Description	Symbol
5.3.6	Axial flow fan	
5.3.7	Compressor: centrifugal/axial flow (basic symbol)	
5.3.8	Compressor: centrifugal/axial flow	
5.3.9	Compressor: reciprocating (basic symbol)	
5.3.10	Two-stage, electric motor driven reciprocating compressor	
5.3.11	Ejector/injector (basic symbol)	

5.4 Solids handling

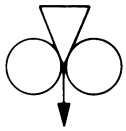
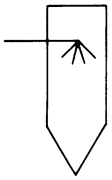
No.	Description	Symbol
5.4.1	Size reduction (basic symbol)	
5.4.2	Breaker: gyratory	
5.4.3	Roll crusher	

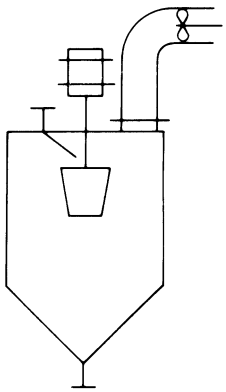
No.	Description	Symbol
5.4.4	Hammer crusher	
5.4.5	Pulverizer: ball mill	
5.4.6	Mixing (basic symbol)	
5.4.7	Kneader	
5.4.8	Ribbon blender	
5.4.9	Double cone blender	
5.4.10	Filter (basic symbol, simple batch)	
5.4.11	Filter press (basic symbol)	
5.4.12	Rotary filter (basic symbol)	
5.4.13	Rotary filter, film drier or flaker	
5.4.14	Screen (basic symbol)	

No.	Description	Symbol
5.4.15	Vibrated single-deck screen	
5.4.16	Vibrated multi-deck screen	
5.4.17	Rotary screen	
5.4.18	Electro-magnet (basic symbol)	
5.4.19	Electrostatic precipitator (basic symbol)	
5.4.20	Electrostatic precipitator	

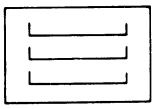
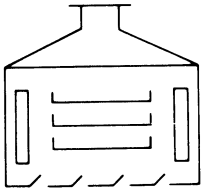
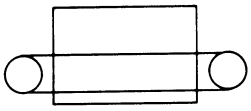
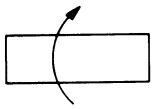
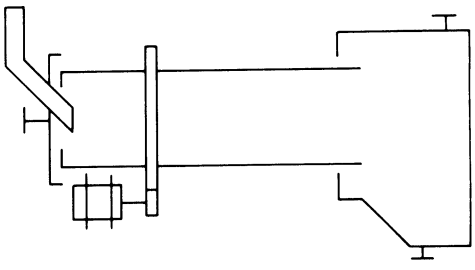
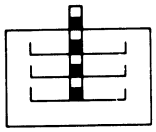
No.	Description	Symbol
5.4.21	Cyclone and hydroclone (basic symbol)	
5.4.22	Cyclone and hydroclone	
5.4.23	Centrifuge (basic symbol)	
5.4.24	Centrifuge: horizontal peeler type	
5.4.25	Centrifuge: disc bowl type	

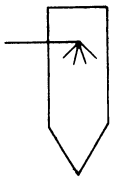
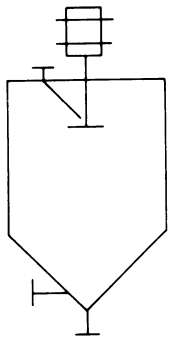
5.5 Shaping and forming

No.	Description	Symbol
5.5.1	Briquetting machine (basic symbol)	
5.5.2	Prill tower (basic symbol)	

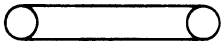
No.	Description	Symbol
5.5.3	Prill tower	

5.6 Drying

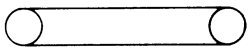
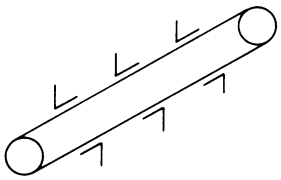
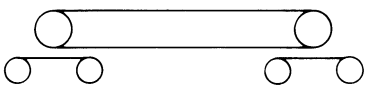
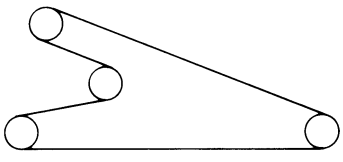
No.	Description	Symbol
5.6.1	Batch tray dryer (basic symbol)	
5.6.2	Drying oven	
5.6.3	Belt drier (basic symbol)	
5.6.4	Rotary drier (basic symbol)	
5.6.5	Rotary kiln	
5.6.6	Hot gas drier with trays (basic symbol)	

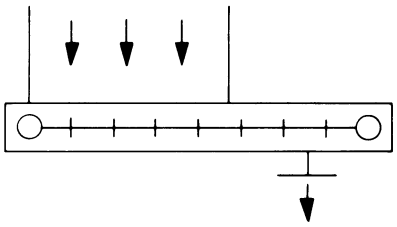
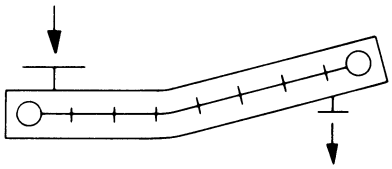
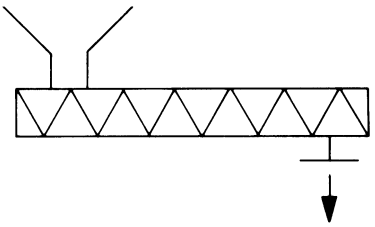
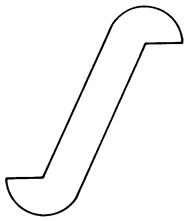
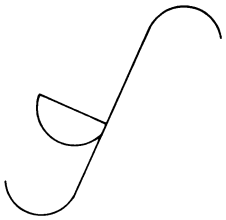
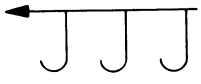
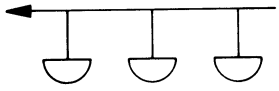
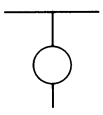
No.	Description	Symbol
5.6.7	Spray drier (basic symbol)	
5.6.8	Spray drier	

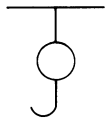
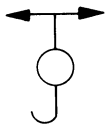
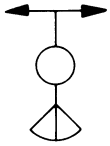
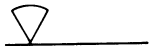
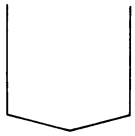
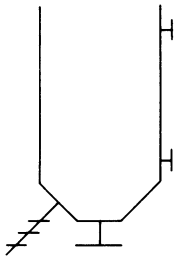
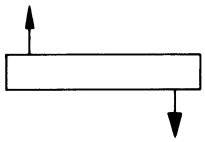
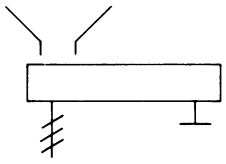
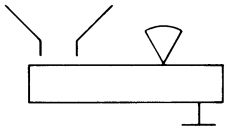
5.7 Materials handling

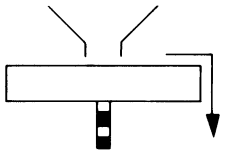
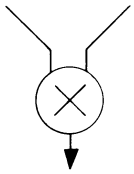
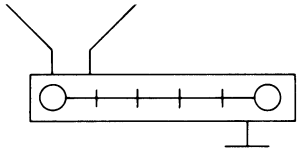
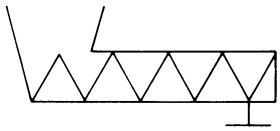
No.	Description	Symbol
5.7.1	Conveyor (basic symbol)	

NOTE It is thought that for the elementary flow diagram, the basic symbol would be the only symbol necessary to illustrate a conveyor, mainly because the specification of the equipment would rarely be known at that stage. It is therefore recommended that wherever possible, the basic symbol should be used for a conveyor of any type. However, if it is felt that some elaboration must be given, the following symbols are shown to demonstrate the development of the basic symbol.

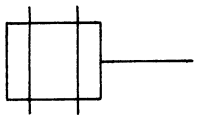
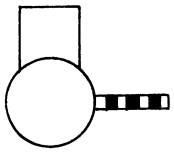
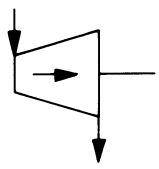
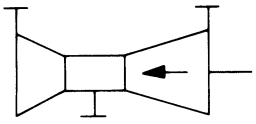
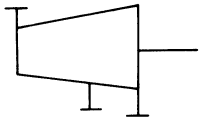
5.7.2	Belt conveyor	
5.7.3	Inclined conveyor (with chevrons)	
5.7.4	Boom loader	
5.7.5	Shuttle conveyor	
5.7.6	Tripper conveyor	

No.	Description	Symbol
5.7.7	Scraper conveyor (en masse)	
5.7.8	Inclined scraper conveyor	
5.7.9	Screw conveyor	
5.7.10	Elevator (basic symbol)	
5.7.11	Skip hoist (basic symbol)	
5.7.12	Overhead conveyor (basic symbol)	
5.7.13	Overhead conveyor with hooks	
5.7.14	Overhead conveyor or ropeway with buckets or carriers	
5.7.15	Hoist (basic symbol)	

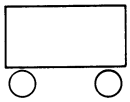
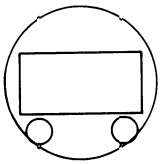
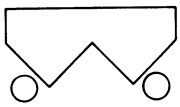
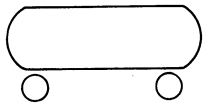
No.	Description	Symbol
5.7.16	Fixed hoist with hook	
5.7.17	Travelling hoist with hook	
5.7.18	Travelling hoist with grab	
5.7.19	Weighing machine (Refer to symbol **3.1.2**)	
5.7.20	Weighbridge (Refer to symbol **3.1.2**)	
5.7.21	Hopper bunker or silo (basic symbol)	
5.7.22	Bunker with vibrator	
5.7.23	Feeder (basic symbol)	
5.7.24	Vibrator feeder	
5.7.25	Weigh feeder	

No.	Description	Symbol
5.7.26	Rotary table feeder	
5.7.27	Rotary valve feeder	
5.7.28	Scraper feeder	
5.7.29	Screw feeder	

5.8 Prime movers

No.	Description	Symbol
5.8.1	Electric motor (basic symbol)	
5.8.2	Reciprocating engine (basic symbol)	
5.8.3	Turbine (basic symbol)	
5.8.4	Gas turbine engine	
5.8.5	Steam turbine with intermediate pass-out	

5.9 Trucking

No.	Description	Symbol
5.9.1	Wagon, tub or bogey	
5.9.2	Wagon, rotary tipper	
5.9.3	Wagon, bottom hopper	
5.9.4	Road or rail tanker	

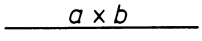
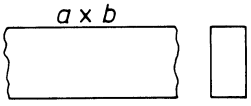
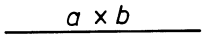
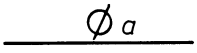
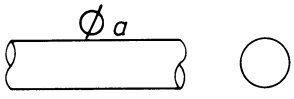
6 Heating and ventilating installations

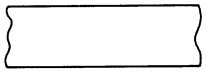
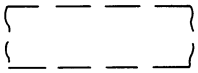
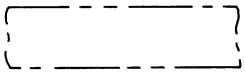
NOTE Refer to Appendix B and Appendix C for examples of the use of symbols for such installations.

6.1 Pipelines

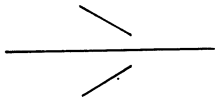
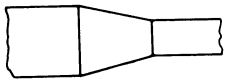
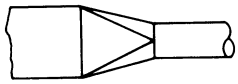
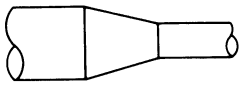
No.	Description	Symbol
6.1.1	Pipe in front of (or above) section	
6.1.2	Pipe in roof or above ceiling (a specific case for plans only)	
6.1.3	View of pipe perpendicular to the plane of the drawing	

6.2 Ducts (trunks)

No.	Description	Symbol	
		Single line convention	Double line convention
6.2.1	Duct, rectangular NOTE The size of the rectangular duct should be indicated by its dimensions $a \times b$ where a is the dimension seen in the view drawn		
6.2.2	Duct, rectangular-oval NOTE The size of the rectangular oval duct should be indicated by its dimensions $a \times b$, where a is the dimension in the view drawn.		
6.2.3	Duct, circular NOTE The diameter of the circular duct should be indicated by ϕa		

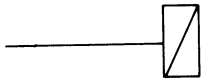
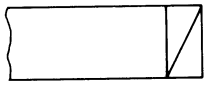
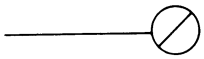
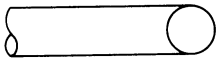
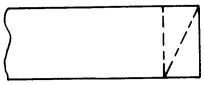
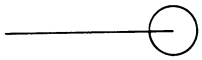
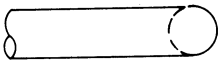
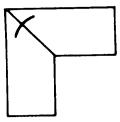
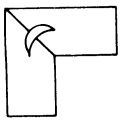
No.	Description	Symbol	
		Single line convention	Double line convention
6.2.4	Indication of direction of flow, inlet or supply.	i.e. as symbol **4.1.8**	
6.2.5	Indication of direction of flow, outlet or exhaust.		
6.2.6	Duct at low level or visible at section	i.e as symbol **3.2.1**	
6.2.7	Duct concealed at plan or section	i.e. as symbol **3.2.4**	
6.2.8	Duct at high level on plan, or in front of (or above) section	i.e. as symbol **6.1.1**	
6.2.9	Duct in roof or above ceiling (a specific case for plans only)	i.e. as symbol **6.1.2**	

6.3 Changes of section and/or size of duct (trunk)

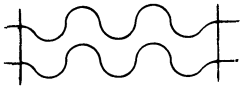
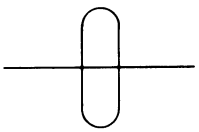
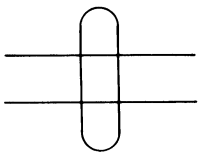
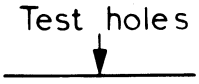
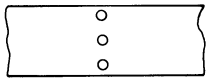
No.	Description	Symbol	
		Single line representation	Double line representation
6.3.1	Rectangular to rectangular	 i.e. as symbol **4.1.14**	 (See note)
6.3.2	Rectangular to circular		 (See note)
6.3.3	Circular to circular		 (See note)

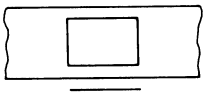
NOTE Applicable dimensions should be annotated.

6.4 Duct (trunk) bends: representation and design

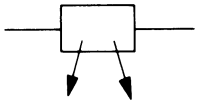
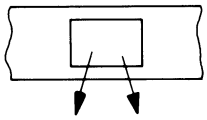
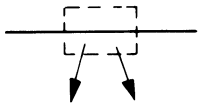
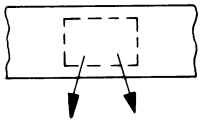
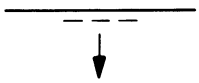
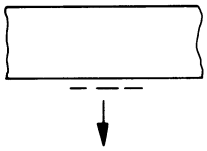
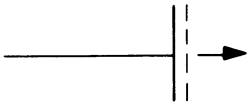
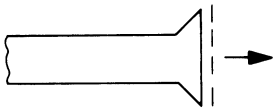
No.	Description	Symbol	
		Single line representation	Double line representation
6.4.1	Rectangular duct bend (visible section)		
6.4.2	Circular duct bend visible (visible section)		
6.4.3	Rectangular duct bend (hidden section)		
6.4.4	Circular duct bend (hidden section)		
6.4.5	Bend with internal splitters or vanes	not applicable	Number splitters to be annotated on drawing 
6.4.6	Mitre bend with internal vanes		
6.4.7	Mitre bend with internal aerofoil vanes		

6.5 Duct (trunk) fittings

No.	Description	Symbol	
		Single line representation	Double line representation
6.5.1	Flexible duct	 i.e. as symbol **4.7.4**	
6.5.2	Flexible connection	 i.e. as symbol **4.1.7**	
6.5.3	Test holes		

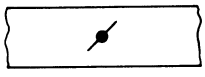
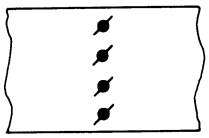
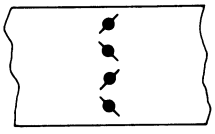
No.	Description	Symbol	
		Single line representation	Double line representation
6.5.4	Access door or cover		

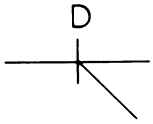
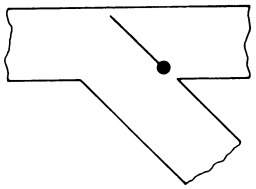
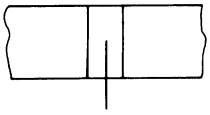
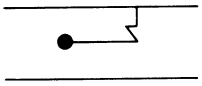
6.6 Grilles and diffusers

No.	Description	Symbol	
		Single line convention	Double line convention
6.6.1	Grille, diffuser: facing (or near side)		
6.6.2	Grille, diffuser: remote (or far side)		
6.6.3	Grille, diffuser: edge view		
6.6.4	Grille, diffuser: on end of duct		

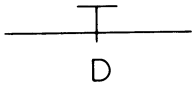
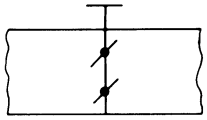
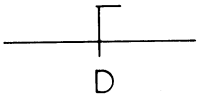
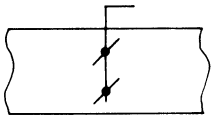
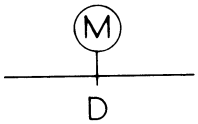
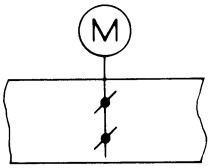
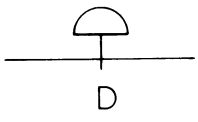
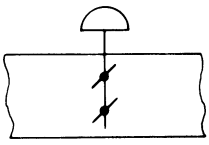
NOTE The arrows in these symbols denote supply from the duct. The direction and configuration of the arrows define the function of the equipment. Arrows **6.2.4** and **6.2.5** should be used, as appropriate.

6.7 Dampers

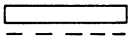
No.	Description	Symbol	
		Single line convention	Double line convention
6.7.1	Single leaf damper		
6.7.2	Multileaf, parallel blade damper		
6.7.3	Multileaf, opposed blade damper		

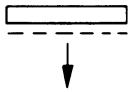
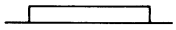
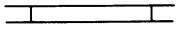
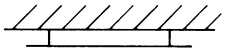
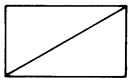
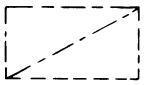
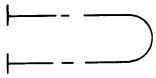
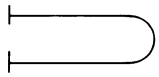
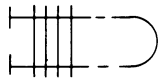
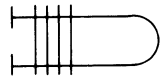
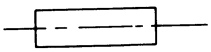
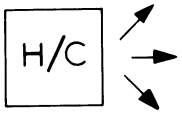
No.	Description	Symbol	
		Single line convention	Double line convention
6.7.4	Deflecting damper		
6.7.5	Sliding damper		
6.7.6	Fire damper		Annotate direction of flow 

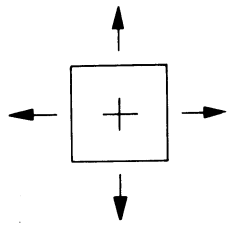
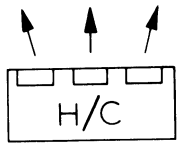
6.8 Damper actuation

No.	Description	Symbol	
		Single line convention	Double line convention
6.8.1	Manual Reflecting symbol **3.3.1**		
6.8.2	Power: unspecified Reflecting symbol **3.3.2**		
6.8.3	Power: motor Reflecting symbol **3.3.16**		
6.8.4	Power: pneumatic (diaphragm) Reflecting symbol **3.3.11**		

6.9 Heat exchange equipment

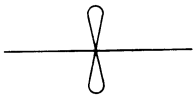
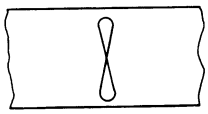
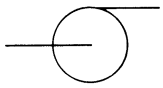
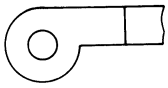
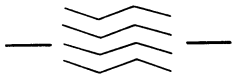
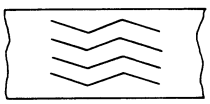
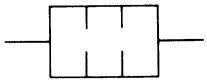
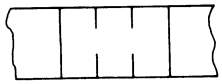
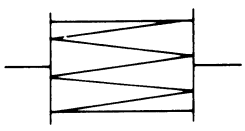
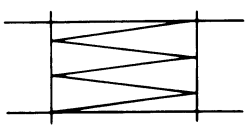
No.	Description	Symbol
6.9.1	Radiator	
6.9.2	Convector, natural	

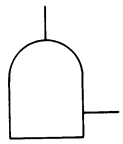
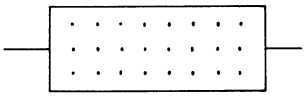
No.	Description	Symbol
6.9.3	Convector, fan	
6.9.4	Radiant panel, industrial, single (plan view)	
6.9.5	Radiant panel, industrial, double (plan view)	
6.9.6	Radiant panel, wall mounted (plan view)	
6.9.7	Radiant panel, ceiling mounted (face view)	
6.9.8	Radiant panel, embedded in floor or wall (face view)	
6.9.9	Radiant panel, embedded in ceiling or wall, behind section (face view)	
6.9.10	Pipe coils, plain: in front of, or above, section	
6.9.11	Pipe coils, plain: visible at section	
6.9.12	Pipe coils, finned: in front of, or above, section	
6.9.13	Pipe coils, finned: visible at section	
6.9.14	Towel rail	
6.9.15	Radiant strip: in front of, or above, section	
6.9.16	Heater/cooler unit, horizontal type Example: heater/cooler unit	 (See note)

No.	Description	Symbol
6.9.17	Heater/cooler unit, downward type Example: heater unit	 (See note)
6.9.18	Heater/cooler unit, floor mounted type	 (See note)

NOTE Annotate to indicate function, as follows.
Heater: H or +
Cooler: C or –

6.10 Air conditioning and ventilation equipment

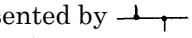
No.	Description	Symbol	
		Single line convention	**Double line convention**
6.10.1	Propeller fan	 i.e. as symbol **3.1.8**	
6.10.2	Centrifugal fan	 i.e. as symbol **5.3.1**	
6.10.3	Moisture eliminator		
6.10.4	Attenuator (silencer)	 i.e. as symbol **4.8.4**	
6.10.5	Air filter		

No.	Description	Symbol	
		Single line convention	Double line convention
6.10.6	Refrigerant receiver		Not applicable
6.10.7	Drier		Not applicable

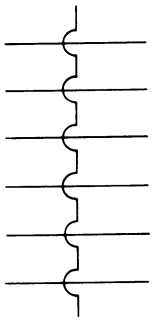
Appendix A Representation of flow lines crossing (connected and unconnected)

There are several variants in the symbolic representation of flow lines (pipelines) crossing, connected and unconnected, as depicted on engineering diagrams and engineering drawings. In order to appreciate the reasoning behind some of the alternatives it is necessary first to state the differences between the requirements of an engineering diagram and the requirements of an engineering drawing.

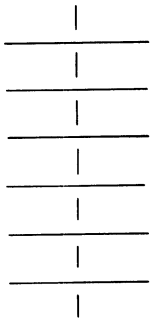
A.1 Diagram. An engineering diagram is usually prepared in single-plane form for the purpose of showing in the simplest possible manner the principal inter-relationships of elements in a system and how the system operates. It may show in full the functioning of a circuit, a process sequence or an installation, symbolically depicting all the essential units, parts and connections to show the layout in the clearest possible manner but without regard for the physical disposition of such features. Apart from giving such information as pipe size, linear dimensions are rarely used on engineering diagrams because they are not normally the proper vehicle for conveying information on precise physical or geographical relationships.

On an engineering diagram, flow lines crossing but unconnected are represented thus,  while flow lines crossing and connected are represented by  or  . Flow lines connected but without crossing are represented thus,  .

In past years alternative methods employing loops (a) and broken lines (b) have been used but on complex diagrams involving closely spaced, parallel flow lines these methods are not practicable

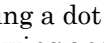


(a) deprecated

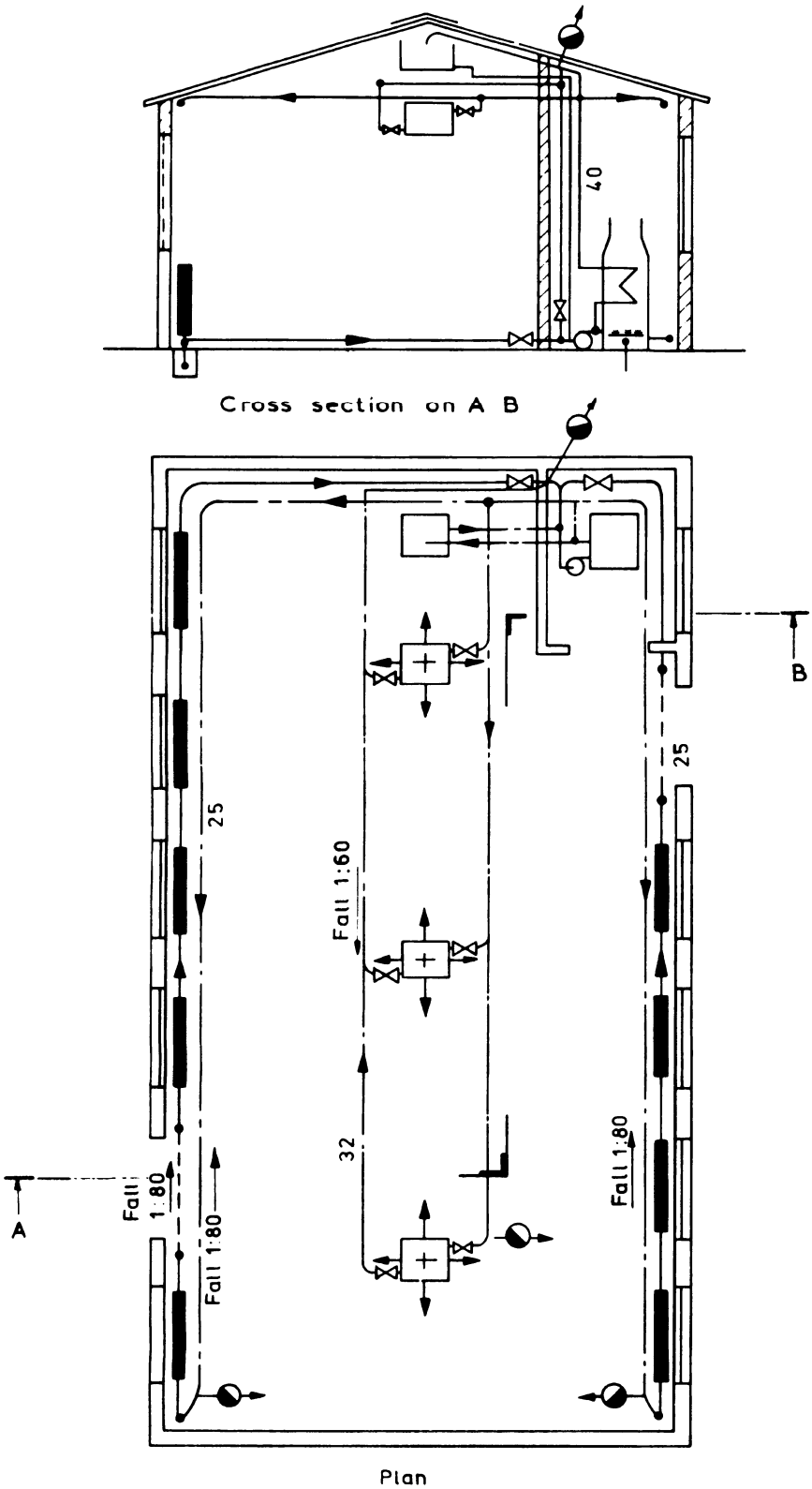


(b) deprecated

A.2 Drawing. An engineering drawing is used to show how a part is to be made, or how parts are assembled and installed relative to other equipment. The physical relationships of components and equipments and their disposition are important and therefore precise dimensions and locations are fully stated.

The installation of a heating, ventilating or refrigeration plant within a building or other structure, e.g. a ship, will be shown on a drawing rather than on a diagram. Contrary to the single-plane presentation of a diagram, a drawing is of multi-plane form and pipelines may be indicated normal to the plane of the drawing itself. In an engineering drawing a dot on a line thus,  would indicate that a pipeline rises or falls vertically from the plane of the drawing and is connected to another pipe running horizontally. Hence, it is necessary always to realize the distinct purpose of the engineering drawing and the engineering diagram and, by so doing, to avoid confusion between methods of representation which at first sight are similar but which, in their separate contexts, have very different interpretations. Because this is an accepted drawing discipline, misunderstandings are in reality very rare and their possibility can be further reduced by the use of additional elevations on the drawing.

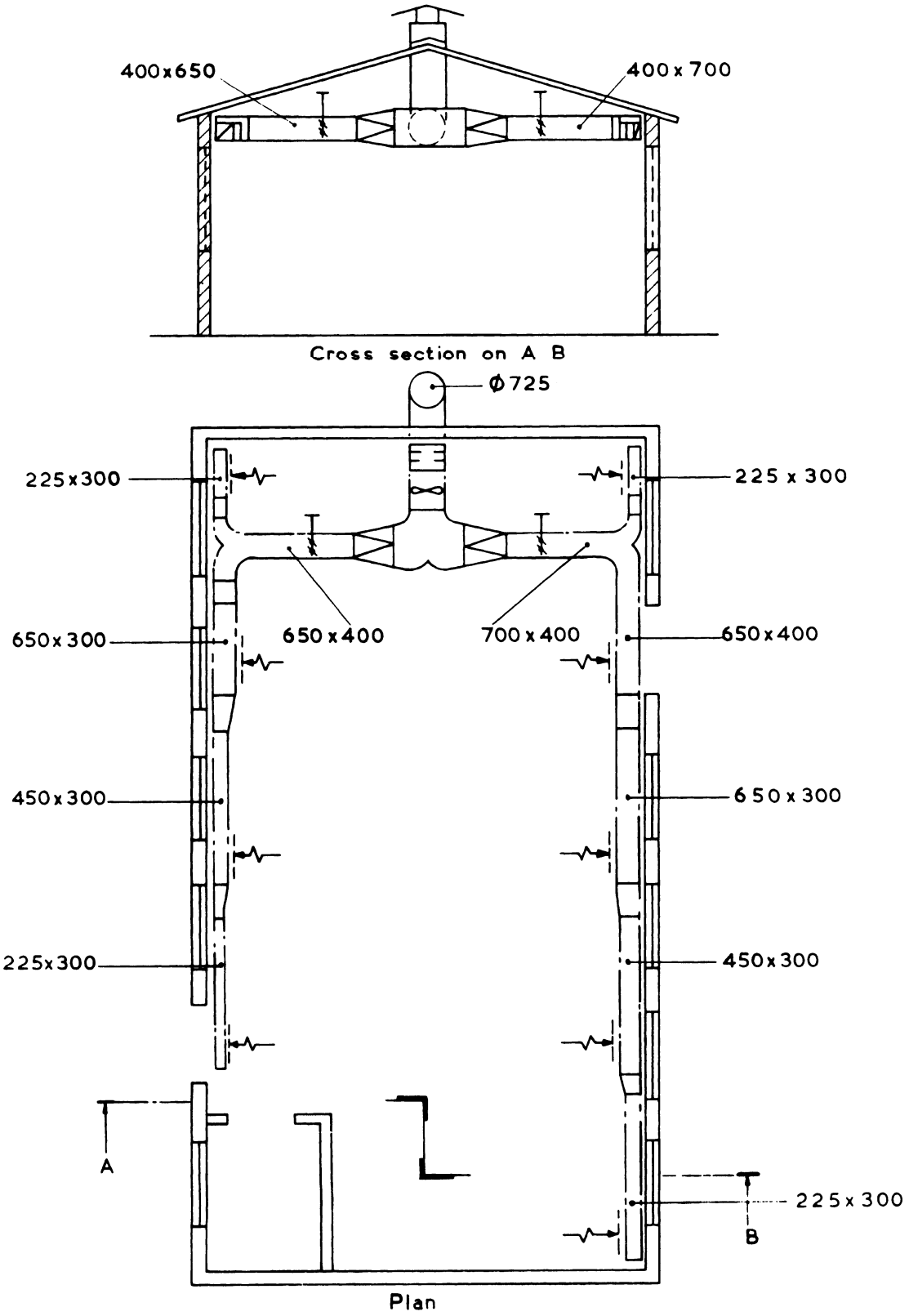
Appendix B Example of the use of symbols on a drawing of a low temperature hot water heating installation



Symbols are in accordance with BS 1553 : Part 1

All dimensions are in millimetres

Appendix C Example of the use of symbols on a drawing of an extraction ventilation installation



Symbols are in accordance with BS 1553 : Part 1

All dimensions are in millimetres

Publications referred to

BS 534, *Steel pipes, fittings and specials for water, gas and sewage.*
BS1646, *Graphical symbols for process measurement and control functions.*
BS 3799, *Steel pipe fittings, screwed and socket-welding for the petroleum industry.*
BS 5070, *Drawing practice for engineering diagrams.*

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