

Fluid power transmission and control systems —

**Part 3: Code of practice for the technical
specification, design, construction,
commissioning and safe application of
hydraulic and pneumatic fluid power
systems**

UDC 621.81.033:62-522.7:62-851:621.6.02

NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW

BSI
Documents

AVA

Document Sharing Hub

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Machinery and Components Standards Committee (MCE/-) to Technical Committee MCE/18 upon which the following bodies were represented:

- Advanced Manufacturing Technology Research Institute
- Association of British Mining Equipment Companies
- British Compressed Air Society
- British Fluid Power Association
- British Hydromechanics Research Association
- British Steel Industry
- British Telecommunications plc.
- Department of Trade and Industry (National Engineering Laboratory)
- Electricity Supply Industry in England and Wales
- Federation of Manufacturers of Construction Equipment and Cranes
- Institution of Mechanical Engineers
- Ministry of Defence

The following body was also represented in the drafting of the standard, through subcommittees and panels:

Bath University

This British Standard, having been prepared under the direction of the Machinery and Components Standards Committee, was published under the authority of the Board of BSI and comes into effect on 30 September 1988

© BSI 01-2000

The following BSI references relate to the work on this standard:
Committee reference MCE/18
Draft for comment 87/74235 DC

ISBN 0 580 16841 7

Amendments issued since publication

Amd. No.	Date of issue	Comments

Contents

	Page
Committees responsible	Inside front cover
Foreword	iii
Section 1. General	
1.1 Scope	1
1.2 Definitions	1
1.3 General introduction	1
Section 2. Technical specification	
2.1 General	3
2.2 Accountabilities	3
2.3 Systems function	3
2.4 Fluids	3
2.5 Maintenance	4
2.6 Layout	4
2.7 Standards	4
2.8 Controls	4
2.9 Documentation	5
2.10 Quality	5
2.11 Variations	5
Section 3. System design	
3.1 General	6
3.2 Accountabilities	6
3.3 Circuit diagrams	6
3.4 Component layout	7
3.5 Parts lists	7
3.6 Controls	7
3.7 Documentation	7
3.8 Site facilities	7
3.9 Quality	8
3.10 Safety	8
3.11 Commissioning	8
3.12 Spares	8
Section 4. Construction and installation	
4.1 General	9
4.2 Preparation of plans and production drawings	9
4.3 Manufacture/installation	9
4.4 Filling, bleeding and pressure testing	10
4.5 Flushing	10
4.6 Commissioning	11
4.7 Updating	11
Section 5. Commissioning	
5.1 General	12
5.2 Safety	12
5.3 Allocation of accountabilities	12
5.4 Preparation	13
5.5 Commissioning procedure	13
5.6 Pressurizing the system	14
5.7 Actuators and motors	14
5.8 Controls	14

	Page
5.9 Full load	14
5.10 Final settings	15
5.11 Contamination level	15
5.12 Documentation	15
Section 6. Safe application	
6.1 General	16
6.2 Accountabilities	16
6.3 Safe application	16
Appendix A Standards and publications	17
Appendix B Statutory duties of designers, manufacturers and others	17
Appendix C Bibliography	17
Figure 1 — Chain of accountabilities, communications and checks	2
Table 1 — Quality classes of compressed air	4
Publications referred to	Inside back cover

Foreword

This Part of BS 4575 has been prepared under the direction of the Machinery and Components Standards Committee and is one of a series of standards dealing with the design of fluid power installations and systems. This document seeks to emphasize the importance of the system designer in the design of the system and in the choice of the components, particularly as modern machines are growing in complexity and higher safety standards being demanded.

This code of practice for fluid power system engineering has been prepared at the request of the British Fluid Power Association and the British Compressed Air Society to define the way in which the accountabilities of different groups of persons concerned are shared.

Other Parts in this series are:

- *Part 1: Guide for hydraulic equipment and systems;*
- *Part 2: Code of practice for pneumatic equipment and systems.*

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

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

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 18, 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.

Section 1. General

1.1 Scope

This code of practice defines the way in which the accountabilities of different groups of persons concerned with fluid power systems engineering are shared. It is applicable both to complete systems and to subsystems; in the case of the latter some of the accountabilities may not apply. It describes the best existing practice of information exchange required by the component manufacturers, machine manufacturers, system designers, system builders, commissioning engineers, users and maintenance engineers and to ensure that they are made fully aware of the intercommunication between these groups which is necessary if safe, reliable and economic systems are to result.

Aerospace systems are excluded from this standard.

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

1.2 Definitions

For the purposes of this British Standard the following definition applies.

commissioning

the act of inspecting, testing, adjusting and operating a system, or unit, for the first time to ensure that it functions according to the specified performance. Such functional tests would include the extremes of the required specification

1.3 General introduction

The use of the term “fluid power” or “system” without further qualification in this standard denotes the recommendations relate to both hydraulic and pneumatic systems.

The design of simple fluid power systems requires expertise and experience if they are to avoid the pitfalls that can result from poor design and result in unreliability, difficult maintenance and less than optimum performance. Complex fluid power systems having many sub-systems or using electrically-operated or modulated control systems can only be safely and satisfactorily designed and manufactured by engineers with a high level of expertise and experience.

With the advent of the Health and Safety at Work etc. Act 1974, the European product liability legislation, the growing use of custom built parts, such as manifold blocks, and the trend toward more sophisticated controls for use with electronic process controllers, there is a need for guidelines.

These can help to ensure that safe, reliable economic systems are produced, help eliminate possible misunderstandings, draw attention to data which may be overlooked, and maintain the high standards within industry.

Different systems have very different requirements in performance, installation, range of ambient conditions, safety, and maintenance according to the type of machine to which the system is fitted, and the people concerned with the various functions may or may not work for different companies. For these reasons the chain of accountabilities and communications shown in Figure 1 illustrates the functions that have to be undertaken. Frequently one person may undertake several functions, but the same accountabilities have to be accepted in the discharge of that function.

No differentiation has been made between hydraulic, pneumatic, electrohydraulic, electrical, or electronic components. The systems engineer deals with all of them on the same basis, on a clear interface basis.

It is hoped that this code of practice will draw attention to the growing importance of the “Systems Engineer” in industry and the wider range of technical expertise and experience which is now essential if advantage is to be taken of the developments which are available today.

