

Specification for

Chucks for machine tools and portable power tools —

Part 1: Tool-holding chucks

Confirmed
December 2009

Co-operating organizations

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

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Association of Consulting Engineers	Institution of Civil Engineers
Association of Mining Electrical and Mechanical Engineers	Institution of Gas Engineers
Board of Trade	Institution of Heating and Ventilating Engineers
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British Gear Manufacturers' Association	Locomotive and Allied Manufacturers' Association of Great Britain
British Internal Combustion Engine Manufacturers' Association	London Transport Board
British Mechanical Engineering Federation	Machine Tool Trades Association*
British Pump Manufacturers' Association	Ministry of Defence
British Steel Industry	Ministry of Defence, Army Department*
Crown Agents for Oversea Governments and Administrations	Ministry of Power
Department of Employment and Productivity (H.M. Factory Inspectorate)	Ministry of Public Building and Works*
Electricity Council, the Central Electricity Generating Board and the Area Boards in England and Wales	Ministry of Technology
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Gas Council	Ministry of Transport
	National Coal Board
	National Physical Laboratory (Ministry of Technology)
	Royal Institute of British Architects

The Government departments and scientific and industrial organizations marked with an asterisk in the above list, together with the following, were directly represented on the committee entrusted with the preparation of this British Standard:

Association of Supervisory Staffs Executives and Technicians	Portable Electric Tool Manufacturers Association
Gauge & Tool Makers' Association	Production Engineering Research Association
Ministry of Defence, Air Force Department	Society of Motor Manufacturers and Traders Ltd.
Ministry of Defence, Navy Department	Trades Union Congress
National Federation of Engineers' Tool Manufacturers	Individual manufacturer

This British Standard, having been approved by the Mechanical Engineering Industry Standards Committee, was published under the authority of the Executive Board on 21 March 1969

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First published July 1953
First revision March 1969

The following BSI references relate to the work on this standard:
Committee reference MEE/6/13
Draft for comment 67/31056

ISBN 580 05277 X

Amendments issued since publication

Amd. No.	Date of issue	Comments
706	March 1971	Indicated by a sideline in the margin

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Foreword

This standard makes reference to the following British Standards:

BS 308, *Engineering drawing practice*.

BS 891, *Method for Rockwell hardness test*.

BS 1134, *Centre-line-average height method for the assessment of surface texture*.

BS 1580, *Unified screw threads*.

BS 1660, *Machine tapers — Part 1: Self-holding tapers and gauges for self-holding tapers*.

BS 1916, *Limits and fits for engineering*.

This revision of this British Standard relates to the accuracy and mounting and certain other details of chucks, as did the 1953 edition, but the word “accuracy” has been omitted from the title in view of the other details included.

The present revision has been divided into two parts, dealing separately with tool-holding chucks and work-holding chucks. This action will facilitate the work of revision and will help manufacturers and users who may be concerned with chucks for only one purpose. This Part 1 covers tool-holding chucks, which were termed under Section 1 of the original standard, “Chucks for drilling machines”. The change of title to “Chucks for machine tools and portable power tools” reflects the wider use of these tool-holding chucks.

The unguided-jaw drilling machine chuck referred to in the 1953 edition of the standard has been omitted since in the field covered by this standard it has been largely superseded by the guided three-jaw chuck. (Its use in hand-operated drills is covered by BS 2556¹⁾.)

As in the 1953 edition, no reference is made to the static balancing of tool-holding chucks, since they are machined all over and few are unbalanced to an extent that could be detected in a static test. The dynamic balance of these chucks is however important, and a rotational accuracy test is specified for the chuck body as some safeguard against the production of chucks so unbalanced as to be unsuitable or unsafe at normal speeds. Additional safeguards will be necessary with chucks for use at the higher speeds coming into use. In cases of doubt the chuck manufacturer should be consulted.

The quick change collet type chucks which were omitted in 1953 have now been included.

The dimensions specified for chuck taper bores, whether short Morse taper as in 3.1 or Jacobs taper as in 3.2, are functionally interchangeable with the dimensions of Morse and Jacobs drill chuck tapers of ISO/R.239²⁾.

It will be noted that threads specified for mounting chucks in Table 5 and Table 7 (see 3.3.1 and 3.4.1) are non-standard in respect of certain diameter relationships. This was considered necessary in order to ensure that the threads specified were entirely adequate for their purpose. It should be noted, however, that this only applies to the chucks themselves; the threads in the corresponding machine spindles are standard but are fully capable of mating with the respective chuck threads.

¹⁾ BS 2556, “*Hand and breast drills*”.

²⁾ ISO/R 239, “*Drill chuck tapers*” (issued by the International Organization for Standardization).

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Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 20, 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 British Standard specifies requirements for the mounting and accuracy of tool-holding chucks for use in machine tools and portable power tools and in particular to the five types of these chucks described in Clause 2. Examples of typical chuck capacities by types, and related mounting details are shown in Appendix A.

NOTE 1 The millimetre and inch dimensions given in Table 1, Table 2, Table 3 and Table 4 are sufficiently close conversions that chucks dimensioned in millimetres may be used with spindles dimensioned in inches and vice versa.

NOTE 2 In Clause 4, all the millimetre dimensions relate to chucks whose rated capacities are stated in millimetres and the inch dimensions to those whose rated capacity is stated in inches. Corresponding values are in general equivalent to each other but are not accurate conversions.

NOTE 3 More accurate conversions should be based on the data in BS 350, "Conversion factors and tables".

2 Description of types of tool-holding chucks

The five types of tool-holding chucks covered in this standard are as follows:

2.1 Guided three-jaw light duty chuck. In this type of chuck, the three jaws which grip the shank of a drill operate in guides in the chuck body. The chuck is tightened and untightened by means of a geared key and, though suitable for any light duty application, is mainly used with light duty portable power tools (see Figure 1).

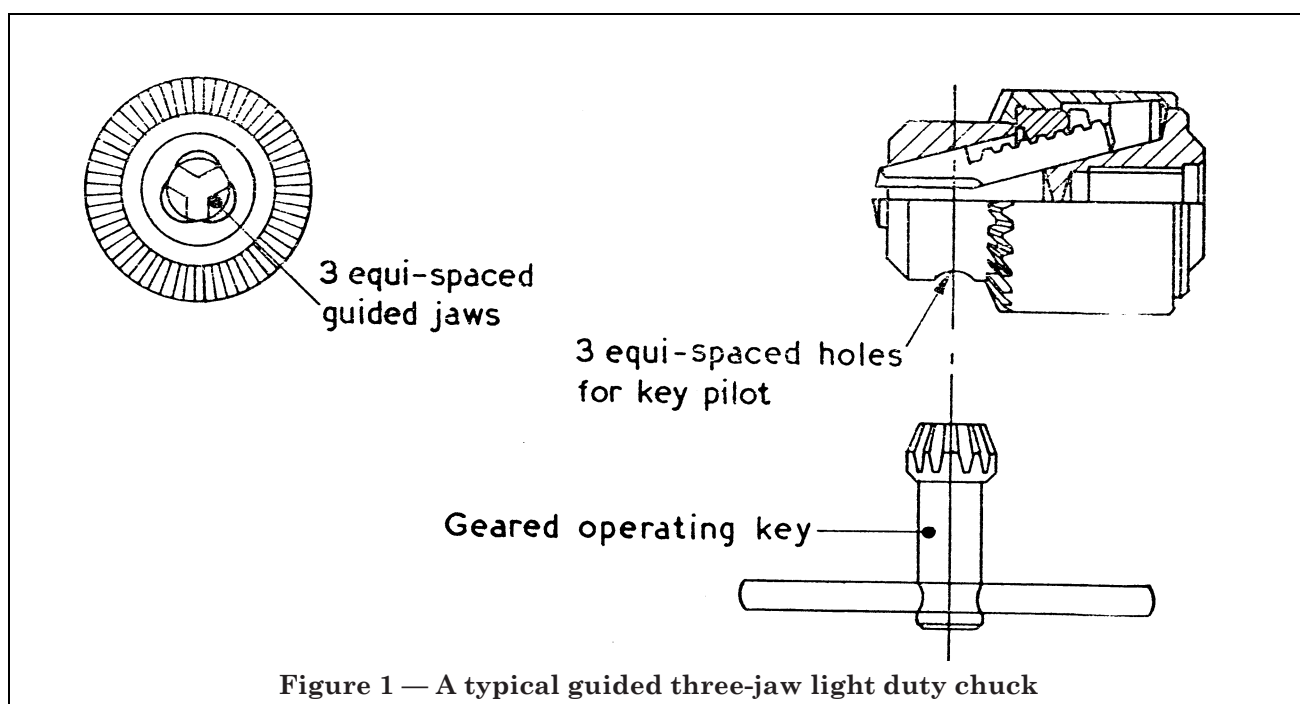


Figure 1 — A typical guided three-jaw light duty chuck

2.2 Guided three-jaw industrial chuck. In this type of chuck also, the three jaws which grip the shank of a drill operate in guides in the chuck body and the chuck is tightened and untightened by means of a geared key. It is capable of transmitting higher torque loads than the light duty chuck and is suitable for use with machine tools and medium duty and heavy duty portable power tools (see Figure 2).

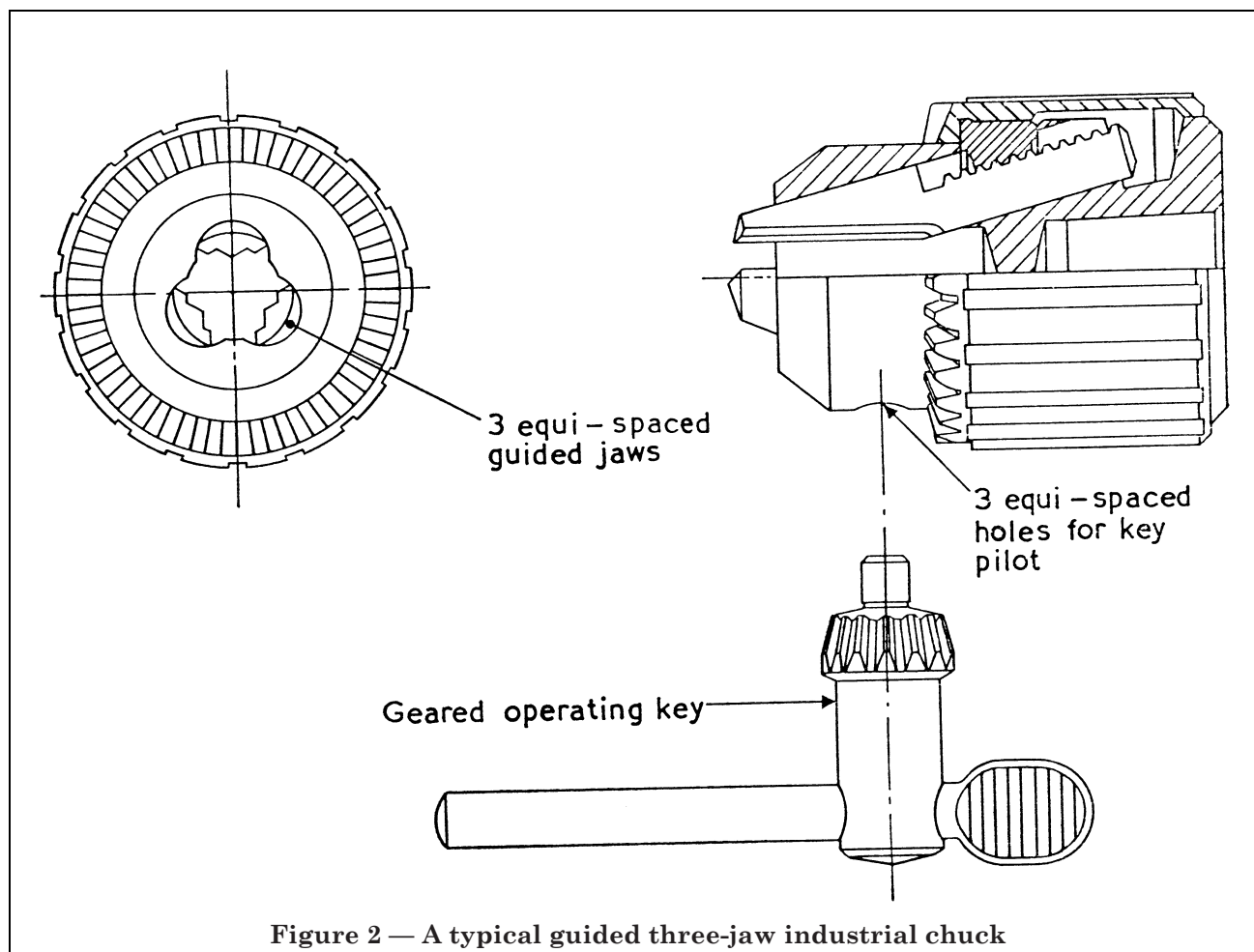
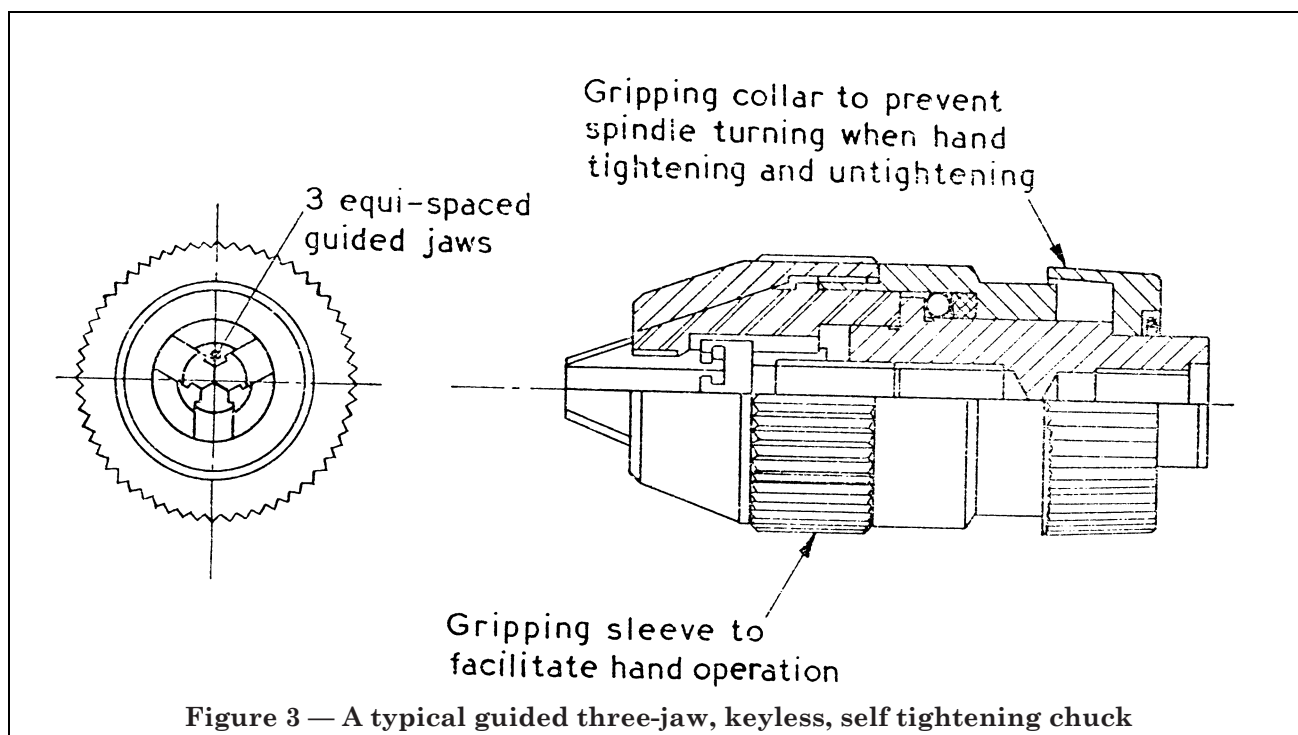
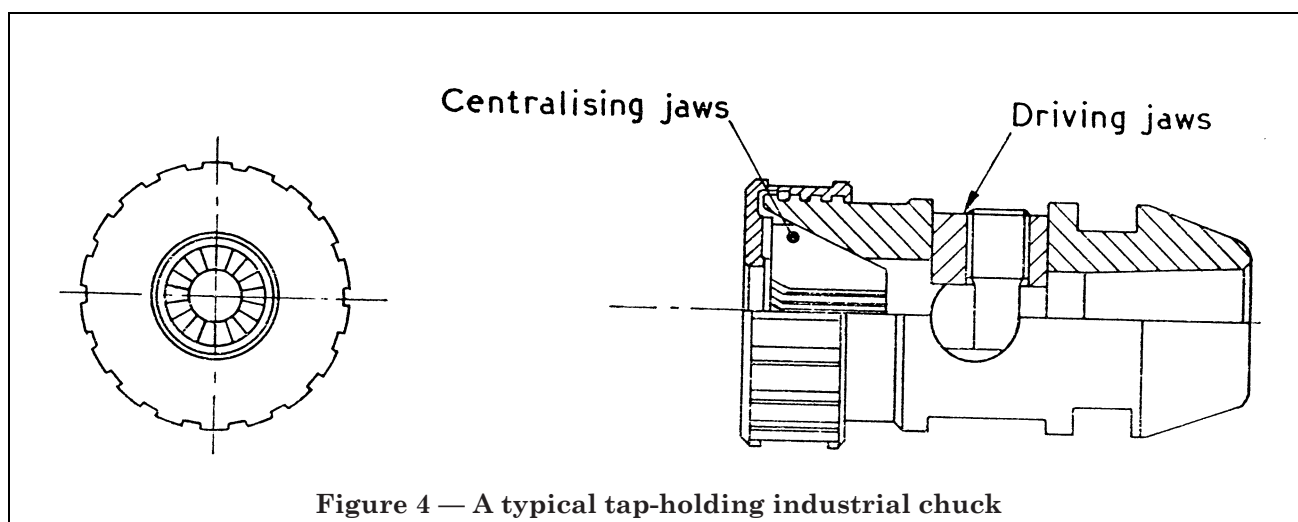


Figure 2 — A typical guided three-jaw industrial chuck

2.3 Guided three-jaw, keyless, self-tightening chuck. In this type of chuck also, the three jaws operate in guides in the chuck body. The chuck after hand tightening operates without any auxiliary tightening mechanism. As the chuck is designed to self tighten under increased drilling torque, a gripping collar is usually fitted to assist untightening (see Figure 3). As for key type chucks (2.1 and 2.2), keyless chucks are available for light duty and industrial applications.



2.4 Tap-holding industrial chuck. This type of chuck enables conventional ground thread hand taps to be utilized on machine tools and portable power tools. Two sets of jaws are incorporated in each chuck, the lower set for centralizing a tap by means of its round shank and the upper set to effect a positive drive on the tap square (see Figure 4).



2.5 Quick change collet type industrial chuck. This type of chuck accommodates quick engaging and quick releasing collets and allows collets to be changed whilst the machine spindle is rotating under power. The collets are primarily designed to hold taper shank drills but many collet variations are available which permit the use of straight shank drills, taps and special tools. The main chuck housing terminates in a Morse taper shank and, when mounted in a machine spindle, becomes virtually an integral part of the machine, the collet providing the quick change facilities (see Figure 5).

NOTE Figure 1–Figure 5 illustrate typical chucks but do not imply any particular design or method of construction.