

This Standard is confirmed.
See the BSI Catalogue for details.
April 1998

Specification for

Metal washers for general engineering purposes metric series

UDC 621.882.4:669

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:

- Associated Offices' Technical Committee

Association of Consulting Engineers

Association of Mining, Electrical and Mechanical Engineers

Board of Trade

British Chemical Plant Manufacturers' Association

British Compressed Air Society

British Electrical and Allied Manufacturers' Association*

British Gear Manufacturers' Association

British Internal Combustion Engine Manufacturers' Association

British Mechanical Engineering Federation

British Pump Manufacturers' Association

British Steel Industry*

Crown Agents for Oversea Governments and Administrations

Electricity Council, the Central Electricity Generating Board and the Area Boards in England and Wales*

Engineering Equipment Users' Association*

Gas Council

Institute of Marine Engineers

Institution of Civil Engineers
- Institution of Gas Engineers

Institution of Heating and Ventilating Engineers

Institution of Mechanical Engineers

Institution of Mechanical Engineers (Automobile Division)

Institution of Production Engineers*

Locomotive and Allied Manufacturers' Association of Great Britain*

London Transport Board

Machine Tool Trades Association

Ministry of Defence

Ministry of Defence, Army Department

Ministry of Labour (H.M. Factory Inspectorate)

Ministry of Power

Ministry of Public Building and Works

Ministry of Technology*

Ministry of Technology — National Engineering Laboratory*

Ministry of Transport

National Coal Board*

National Physical Laboratory (Ministry of Technology)

Radio Industry Council

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:

- Agricultural Engineers Association

Association of Hydraulic Equipment Manufacturers

Black Bolt and Nut Association of Great Britain

British Bolt, Nut, Screw and Rivet Federation

British Constructional Steelwork Association

British Cycle and Motor Cycle Industries Association Ltd.

British Railways Board

Council of British Manufacturers of Petroleum Equipment

Electronic Engineering Association
- Fasteners and Turned Parts Institute

Institute of Iron and Steel Wire Manufacturers

Ministry of Defence, Navy Department

Post Office

Precision Bolt and Nut Institute

Rolled Thread Screw Association

Scientific Instrument Manufacturers' Association

Society of Motor Manufacturers and Traders Limited

Washer Manufacturers' Association of Great Britain

Individual manufacturers

This British Standard, having been approved by the Mechanical Engineering Industry Standards Committee, and endorsed by the Chairman of the Engineering Divisional Council, was published under the authority of the General Council on 23 May, 1968

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Amendments issued since publication

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Foreword

In order to keep abreast of progress in the industries concerned, British Standards are subject to periodical review. Suggestions for improvements will be recorded and in due course brought to the notice of the committees charged with the revision of the standards to which they refer.

A complete list of British Standards, numbering over 9,000, fully indexed and with a note of the contents of each, will be found in the BSI Catalogue which may be purchased from BSI Sales Department. The Catalogue may be consulted in many public libraries and similar institutions.

This standard makes reference to the following British Standards.

BS 21, *Pipe threads.*

BS 265, *Cold rolled brass sheet, strip and foil. Common brass.*

BS 1449, *Steel plate, sheet and strip;*

BS 1449-3B, *Cold rolled mild and carbon steel strip.*

BS 1580, *Unified screw threads.*

BS 1706, *Electroplated coatings of cadmium and zinc on iron and steel.*

BS 3643, *ISO metric screw threads.*

BS 3692, *Dimensions of ISO metric precision hexagon bolts, screws and nuts.*

BS 4183, *Machine screws and machine screw nuts. Metric series.*

BS 4190, *ISO metric black hexagon bolts, screws and nuts.*

This British Standard has been prepared under the authority of the Mechanical Engineering Industry Standards Committee, arising out of the decision taken in November 1965 to adopt the ISO metric thread system in the United Kingdom (see Appendix A).

The complete standard specifies both bright and black washers suitable for use with ISO metric bolts, screws and nuts—specified in the various metric fastener standards referred to below. The nominal dimensions specified for these washers have been selected from ISO Draft Recommendation No. 940¹⁾ and various other draft proposals being considered internationally by Technical Committee ISO/TC 2, “Bolts, nuts and accessories”.

Pending the consideration of tolerances for washers within ISO/TC 2, the BSI Committee responsible decided to adopt, in the interim, the tolerances specified in German standard DIN 522. Attention is drawn to the fact that these tolerances are in certain cases considerably greater, on a size for size basis, than those specified in the parallel inch standard BS 3410. They do however allow the manufacture of these washers from SWG materials, which should prove advantageous, especially from an economic point of view, during the transition period prior to the general availability of metric sheet materials.

The washers are basically divided into three categories of size, i.e. “normal”, “large”, and “extra large” diameter metric series.

The “normal diameter series” is suitable for use with hexagon headed bolts, screws and nuts to BS 3692, “Dimensions of ISO metric precision hexagon bolts, screws and nuts” and to BS 4190, “ISO metric black hexagon bolts, screws and nuts” or with metric machine screws and machine screw nuts to BS 4183, “Machine screws and machine screw nuts. Metric series”.

The “large diameter series” is suitable for use in cases where the next larger size of hexagon is used for a particular diameter rather than the normal nut or bolt hexagon size given in ISO/R 272²⁾. It may also be useful in cases where a greater bearing area is required.

¹⁾ ISO/DR 940, “Washers for hexagon bolts and nuts. Metric series”.

²⁾ ISO Recommendation 272, “Hexagon bolts and nuts, widths across flats, heights of head, thicknesses of nuts”.

In line with current British practice a “light range” of bright washers has been provided in Section 1 of this standard, which has thicknesses approximately 60 % of the “normal range” thicknesses.

An “extra large diameter series” of washers with outside diameters three times the nominal bolt diameter, has been provided in Section 2 of this standard, which deals with black metal washers.

The question of metric series taper washers, round washers with square holes and square washers with round holes has yet to be considered either nationally or internationally, but the U.K. is initiating investigations in this field, which will, of course, be dependent to some extent upon the position in relation to metric stock materials and sections.

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

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