BS 4395 : Part 3 : October 1973
UDC 624.014.26 : 693.814.26 : 621.882

Specification for

High strength friction grip bolts & associated nuts & washers for structural engineering

Part 3. Higher grade bolts (waisted shank), nuts and general grade washers

Amendments issued since publication

Amd. No.	Date of issue	Text affected
1843 No. 1	31/10/75	as shown by ⚠1 in the margin

British Standards Institution · 2 Park Street · London W1A 2BS
Telephone 01-629 9000
Telex 266933

BS 4395 : Part 3 : 1973

Contents

Foreword

This British Standard has been prepared under the authority of the Mechanical Engineering Industry Standards Committee and is the completion of a series of standards for high strength friction grip bolts, the first two parts having been published as follows:

Part 1 of this standard provides for a general grade of parallel shank high strength friction grip bolts and their associated nuts and washers. The mechanical properties of the bolts conform to metric equivalents of USA standard SAE grade 5 material used in BS 3139 'High strength friction grip bolts for structural engineering', Part 1 'General grade bolts' and ASTM A325 'High-strength carbon steel bolts for structural joints, including the suitable nuts and plain hardened washers'.

Part 2 of this standard gives requirements for a higher grade of parallel shank bolt with mechanical properties conforming to ISO/R 898/I strength grade 10.9. The requirements for the nuts in Part 2 of the standard are in accordance with ISO/R 898/II strength grade 12.

This part deals with the waisted shank version of the higher grade bolt. It is intended that the techniques described in BS 4604 'The use of high strength friction grip bolts in structural steelwork. Metric series' Part 3 'Higher grade (waisted shank)' shall be used. The nuts and washers specified in this part of the standard are the same as those in Part 2.

Although the basic hexagon sizes for the bolts and nuts are in accordance with those given in ISO/R 272, the next larger width across flats for any given diameter, as shown in the normal metric series, has been selected in order to provide greater bearing areas for both bolts and nuts.

The diametral dimensions for the flat washers have been based on those of the 'large diameter series' detailed in ISO/R 887. The thicknesses for the flat washers have been based on those currently given in BS 3139 and the American Standard ASTM A325 since it was felt that these thicknesses were more compatible with the function for which these washers are used, the washer thicknesses quoted in ISO/R 887 being more applicable to use with ordinary hexagon bolts and nuts.

The dimensions of square taper washers have been based on the inch sizes currently given in BS 3139.

Although at present there are no ISO Recommendations, draft recommendations or draft proposals relating specifically to high strength friction grip bolts, account has been taken of current documentation prepared by ISO Committee ISO/TC 2, 'Bolts, nuts and accessories', and where appropriate the provisions of the following ISO Recommendations have been incorporated in the text of this standard:

ISO Recommendation R 225	'Bolts, screws and nuts, dimensions'.
ISO Recommendation R 272	'Hexagon bolts and nuts, metric series, width across flats, heights of heads, thicknesses of nuts'.
ISO Recommendation R 733	'Hexagon bolts and nuts, metric series, tolerances on widths across flats, widths across corners'.
ISO Recommendation R 885	'Bolts and screws. Radii under the head for general purpose bolts and screws. Metric series'.
ISO Recommendation R 887	'Washers for hexagon bolts, metric series'.
ISO Recommendation R 888	'Nominal lengths for bolts, screws and studs, thread lengths for general purpose bolts'.
ISO Recommendation R 898/I	'Mechanical properties of fasteners'. Part I, 'Bolts, screws and studs'.
ISO Recommendation R 898/II	'Mechanical properties of fasteners'. Part II, 'Nuts with specified proof load values'.

A Sub-Committee of ISO/TC 2 is studying the requirement for bolts and nuts for steel structures and in its deliberations high strength friction grip bolts will be included.

Although the minimum radii under the head, specified for bolts in this standard, are in accordance with those given in ISO/R 885, the transition diameter (d_a max.) quoted in Table 5 falls between the values stated for finished and semi-finished products in the recommendation. This minor deviation is considered justified on the grounds that these products are not general-purpose bolts and it is therefore considered desirable to specify a maximum transition diameter consistent with their specialised function.