

CONFIRMED
OCTOBER 1982

Specification for

Lubricating nipples —

**Part 1: Lubricating Nipples and
Adaptors for use on Machinery and
Vehicles**

UDC 621 – 725:621.89

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Amendments issued since publication

Amd. No.	Date of issue	Comments
4407	December 1961	Indicated by a sideline in the margin

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 21 October 1959

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First published November 1948
First revision October 1959

The following BSI references relate to the work on this standard:
Committee reference MEE/93
Draft for comment CX(MEE) 5919

ISBN 0 580 35792 9

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Foreword

This standard makes reference to the following British Standards:

BS 249, *Free machining brass rods and sections*.

BS 427, *Diamond pyramid hardness numbers*.

BS 970, *Wrought steels for automobile and general engineering purposes*.

BS 1580, *Unified screw threads (with metric equivalents)*.

BS 1768, *Unified precision hexagonal bolts, screws, nuts (UNC and WNF threads) and plain washers — normal series*.

BS 1936, *Undercuts and runouts for screw-threads*.

BS 2779, *Fastening threads of BSP sizes*.

BS 2856, *Precise conversion of inch and metric sizes on engineering drawings*.

BS SP 115-117, *Hydraulic surface check type lubricating nipples for aircraft*.

This publication forms Part 1 of a British Standard on lubricating nipples (sometimes referred to as lubricating fittings or grease nipples) and adaptors; it specifies the overall dimensions and thread sizes of lubricating nipples and limited supply plugs, together with straight and angled adaptors for the $\frac{3}{8}$ in. UNF and $\frac{1}{8}$ in. BSP.F. threaded items.

Two types of nipples suitable for normal oils or greases are provided for:

- 1) “Button head” nipples (formerly known as hexagon-headed nipples) for use with connectors which slide on the nipple head. Two types of connectors (sometimes called “couplers” or “nozzles”) are used; these are commonly referred to as the “hook on” and “thrust on” types.

A design change which resulted in removal of the hexagon from the head of these nipples has led to the change in name. Also the expression “button head” is widely used in North America for this type of nipple.

- 2) Hydraulic nipples, straight and angle types, for use with connectors (sometimes called “couplers” or “nozzles”) of the “hydraulic chuck” type.

The “push on” type of connector will also-service hydraulic nipples, but less efficiently than the “hydraulic chuck” type. Its use should, therefore, be limited to such applications as for a hydraulic nipple sunk in a counterbore where (i) the use of an adaptor cannot be accepted (ii) the use of the “hydraulic chuck” type connector is precluded by lack of necessary room for its application or “break away” and (iii) there is preferably a direct axial approach to the nipple.

In this first revision of the original standard, Unified screw threads to BS 1580 have been specified in addition to British Standard pipe fastening threads to BS 2779. Steel as a material for “button head” nipples and adaptors, and changes in the angles for hydraulic nipples have been introduced, whilst all reference to the “push on” type of nipple has been excluded.

Hexagonal bodies for straight adaptors and limited supply plugs have superseded cylindrical bodies.

Materials for nipples and plug bodies and also for adaptors, and case hardening and electro-plating treatment as relevant for the ferrous items, are included, but other than specifying the location of check valves, this standard is not concerned with the component parts of the final assemblies.

The type numbers allocated in this revision bear a relationship to those given in the last edition but the prefix “U” has been added where relevant, to indicate that the screw threads are Unified.

Notes on the use of nipples, including information on the clearances required for the application of connectors and minimum spacings for grouping, are given in Appendix A.

Part 2 of this standard, published separately, deals with heavy duty lubricating nipples and Part 3 which dealt with light weight miniature hexagon-headed nipples has been withdrawn.

NOTE Where metric equivalents have been given the figures in British units are to be regarded as the standard. The metric conversions are approximate and are based on the tables in BS 350, “*Conversion factors and tables*”. Precise metric conversions for engineering purposes should be based on the tables in BS 2856, “*Precise conversion of inch and metric sizes on engineering drawings*”.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 27 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 provides for lubricating nipples, nipple adaptors and limited supply plugs for use on machinery and vehicles as follows:

- a) *Lubricating nipples.*
 - i) Button head type threaded $\frac{3}{8}$ in. — 24 UNF — 2A and $\frac{1}{8}$ in. BSP.F. Medium Ext.
 - ii) Hydraulic type threaded $\frac{1}{4}$ in. — 28 UNF — 2A, $\frac{3}{8}$ in. — 24 UNF 2A, and $\frac{1}{8}$ in. BSP.F. Medium Ext. of straight, 45° , $67\frac{1}{2}^\circ$ and 90° nominal angle types.
- b) *Adaptors.* Threaded $\frac{3}{8}$ in. — 24 UNF — 2A and $\frac{1}{8}$ in. BSP.F. Medium Ext. and $\frac{3}{8}$ in. — 24 UNF — 2B and $\frac{1}{8}$ in. BSP.F. Normal Int. of straight and $67\frac{1}{2}^\circ$ nominal angled types.
- c) *Limited supply plugs.* Threaded $\frac{3}{8}$ in. — 24 UNF — 2A, and $\frac{1}{8}$ in. BSP.F. Medium Ext. with either “button head or “hydraulic type” head.

This British Standard does not specify requirements for lubricating nipples for use on aircraft. These are specified in BS SP 115-117: “*Hydraulic surface check type lubricating nipples for aircraft*”.

2 Nipples

- a) Button head nipples (formerly known as hexagon-headed nipples) shall be in accordance with Figure 1 and Table 1.
- b) Hydraulic nipples shall be in accordance with Figure 2, Table 2, Figure 3, Table 3, and Figure 8A, Figure 8B or Figure 8C, which give details of the three standard optional forms of hydraulic nipple head profiles. All three profiles can be serviced by current gun connectors of both U.K. and North American origin.

3 Adaptors

- a) Angle adaptors, to facilitate the application of a lubricating gun to nipples in a confined space, shall be in accordance with Figure 4 and Table 4.
- b) Straight adaptors, to increase the length of nipples, shall be in accordance with Figure 5 and Table 5.

4 Limited supply plugs

Limited supply plugs shall be in accordance with Figure 6, Table 6, and Figure 7, Table 7, and are primarily used for restricting the amount of lubricant injected in such machinery as that for the food and textile industries.

NOTE Limited supply plugs marked “GREASE” (see Clause 9) are intended to operate with greases of the type customarily used for the lubrication of ball or roller bearings under normal temperature conditions, whilst limited supply plugs marked “OIL” are normally suitable for use with oils having a viscosity between 500 and 2,500 centistokes at working temperature. The user should ascertain before adopting a limited supply plug that the particular model chosen is suitable for the intended lubricant.

5 Materials

- a) The bodies of “button head” nipples, limited supply plugs and adaptors shall be manufactured from free cutting brass, complying with BS 249, “*Free machining brass rods and sections*” or from brass or bronze having a diamond pyramid hardness between the values 110 HV5 and 190 HV5 determined according to BS 427, “*Diamond pyramid hardness numbers*” of a quality to be agreed between purchaser, and manufacturer. Alternatively the bodies shall be manufactured from mild steel complying with BS 970 En 1A, or other free cutting mild steel of a quality to be agreed between purchaser and manufacturer.
- b) The bodies of hydraulic nipples shall be manufactured from mild steel complying with BS 970 En 1A, or other free cutting mild steel of a quality to be agreed between purchaser and manufacturer. The head shall be case hardened to a depth of 0.003 in. to 0.005 in.
- c) The nipples of limited supply plugs shall comply with either a) or b) above whichever is appropriate.
- d) Nipples required for special uses (e.g. where resistance to electrolytic action and/or corrosion and specific non-magnetic properties are essential), shall be manufactured from such materials as may be agreed between manufacturer and purchaser.

6 Screw threads

Details of the screw threads for attaching the nipples are given in Figure 1 to Figure 7 and Table 1 to Table 7.

Seating of all nipples, adaptors and limited supply plugs into the tapped holes together with the directional location of the angle items, shall be achieved by tightening on runout threads. In these applications BS 1936 is not applicable, therefore:

- a) External threads of angle nipples shall have a full form thread to within $3\frac{1}{2}$ thread pitches of the shoulder and shall terminate in $2\frac{1}{2}$ threads runout.

- b) External threads of all straight nipples, adaptors and limited supply plugs shall have a full form thread extending to within $2\frac{1}{2}$ thread pitches of the shoulder and shall terminate in at least $1\frac{1}{2}$ threads runout.

The length of thread shall be such that the length of plain shank between the end of the thread runout and the shoulder is not greater than one pitch of the thread.

7 Check valves

The design of the nipples and limited supply plugs shall incorporate a spring loaded check valve which, with its seat, will provide a seal against the ingress of dirt or other foreign matter, but will admit lubricant under pressure and prevent its escape.

The check valve shall be located at the surface of the nipple inlet head, to reduce to a minimum the possibility of dirt collecting in the lubricant orifice.

It is not intended that this valve should form a perfect seal against leakage under the pressure remaining in the bearing or lubricating passages after lubrication. If completely leak-proof nipples are required or working pressures higher than normal (see Appendix A) are likely to be encountered in lubrication, the construction of the nipple shall be the subject of agreement between purchaser and manufacturer.

8 Workmanship and finish

Screw threads shall be cleanly formed and free from imperfections. The finished nipple, adaptor or limited supply plug shall be free from defect.

Ferrous nipples, adaptors and limited supply plugs shall be electro-plated in accordance with BS 1706, "*Electroplated coatings of cadmium and zinc on iron and steel*". The coating shall be either cadmium, BS classification number Cd.2, or zinc, BS classification number Zn.2.

9 Marking

The nipple, adaptor or limited-supply plug, shall, if threaded with a Unified screw thread, be marked with contiguous circles in accordance with BS 1768, "*Unified precision hexagon bolts, screws, nuts (UNC and UNF threads) and plain washers. Normal series*".

A limited supply plug shall bear the word "OIL" or "GREASE", whichever is appropriate.

The container or package of the nipple, adaptor or limited-supply plug shall bear the following marking:

The number of this British Standard, BS 1486-1.
The relevant type number of this British Standard (e.g., "U11B" for Button Head Nipples threaded, $\frac{3}{8}$ in. — 24 UNF — 2A).

Appendix A Notes on the use of nipples

A.1 Precautions

The nipple head should always be cleaned before the gun connector is applied. Caution should be exercised at all times in the use of high pressure lubricating equipment, especially when power-operated.

A.2 Pressures

It should be noted that the nipples, adaptors and limited supply plugs specified in Clause 1 may be serviced at pressures of the following order:

Limited supply plugs	2 500 lb/in ² (gauge)
Adaptors	6 000 lb/in ² (gauge)
Button-head and hydraulic type nipples	6 000 lb/in ² (gauge)

It should also be noted that these items may be capable of withstanding pressures in excess of those stated above. Particular requirements for pressures in excess of those given above should, however, be subject to agreement between purchaser and manufacturer.

A.3 Grouping and clearance for connectors

Minimum spacing for nipples mounted in groups and clearance envelope dimensions to ensure accessibility for connectors (based upon current connector sizes) are given in Figure 9, Figure 10 and Figure 11 and Table 8, Table 9 and Table 10.

It is recommended that these dimensions be adopted wherever practicable.

A.4 Non-return valve

Where a nipple is used for the lubrication of a bearing under continuous fluid pressure a spring-loaded non-return valve should be fitted between the nipple and the bearing.

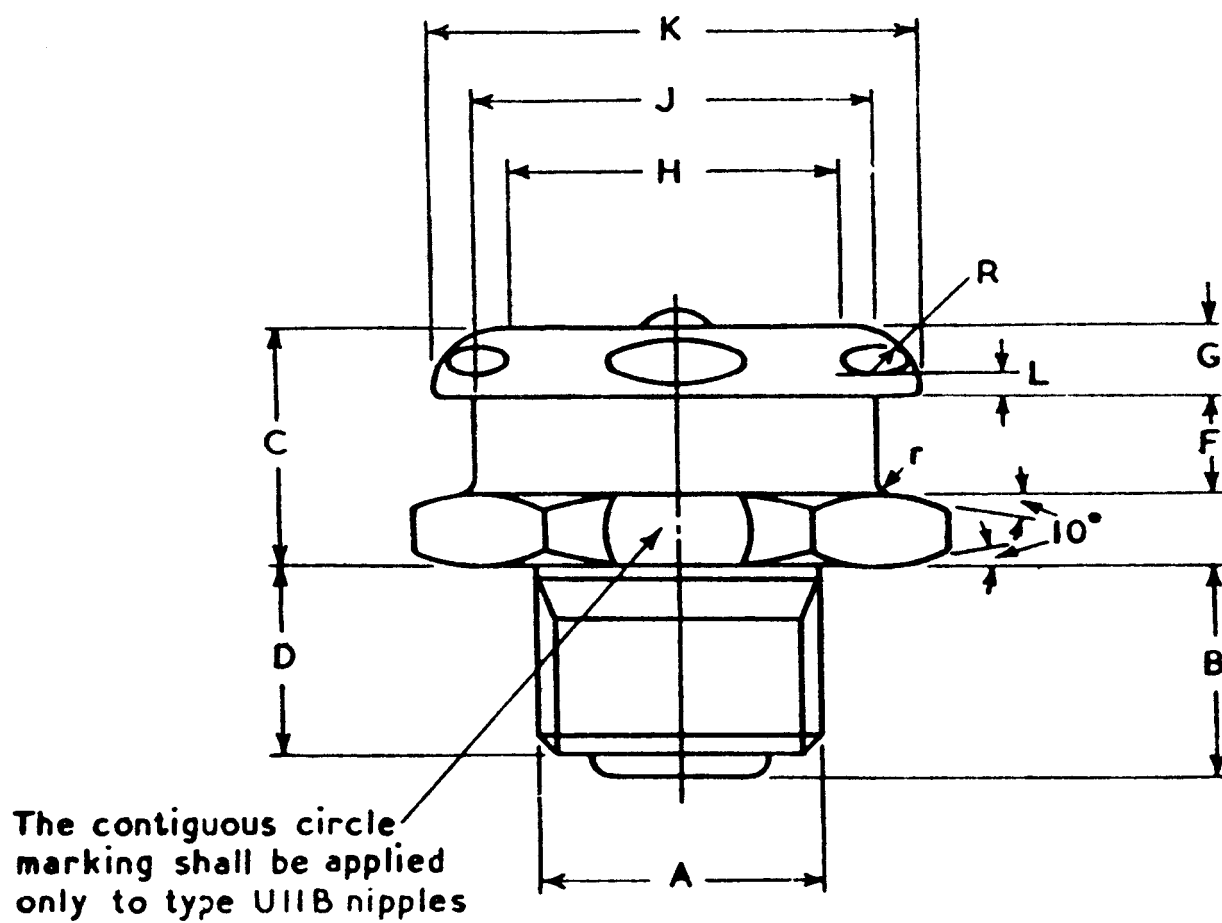
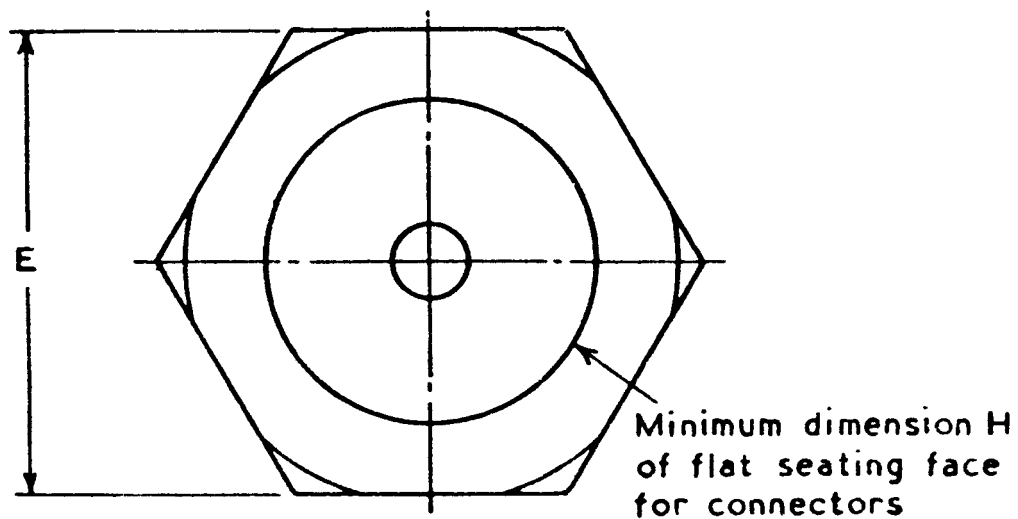


Figure 1 — Button head nipple

Table 1 — Dimensions of button head nipples

Inches

Type	A		B	C	D	
U11B	⅜ in. — 24 UNF — 2A		0.250 max	0.352 + 0 − 0.008	0.210 min.	
11B	⅛ in. BSP.F Med.Ext.					
Type	E	F	G	H	J	
U11B	0.625 + 0 − 0.008	0.127 + 0 − 0.004	0.100 + 0 − 0.004	0.450 min.	0.516 + 0 − 0.008	
11B	0.600 + 0 − 0.008					
Type	K	L	R radius	r radius		
U11B	0.654 + 0 − 0.008	0.020 min.	0.050 min.	0.016 + 0.008 − 0		
11B						

Metric equivalents millimetres

Type	A				B		C		D		
U11B	⅜ in. — 24 UNF — 2A				6.35		8.94 + 0 – 0.203		5.33		
11B	⅛ in. BSP. F Med. Ext.										
Type	E	F	G	H dia.	J dia.	K dia.	L	R radius	r radius		
U11B	15.875	3.225	2.54	11.43	13.106	16.611	0.51	1.27	0.41		
11B	15.24										