

*Indian Standard***TECHNICAL SUPPLY CONDITIONS FOR  
THREADED STEEL FASTENERS****PART VII MECHANICAL PROPERTIES AND TEST METHODS  
FOR NUTS WITHOUT SPECIFIED PROOF LOADS***( Second Revision )*

(Incorporating Amendment No. 1)

**1. Scope** — Covers the mechanical properties of nuts and similar threaded parts without specified proof load values which are not covered by the scope of IS : 1367 (Part VI)-1980 'Technical supply conditions for threaded steel fasteners: Part VI Mechanical properties and test methods for nuts with specified proof loads ( *second revision* )'.

**1.1** This standard does not apply to nuts requiring special properties, such as:

- Weldability,
- Corrosion resistance, and
- Ability to withstand temperature above + 300°C or below – 50°C.

**Note** — Nuts made from free cutting steel should not be used above 250°C.

**2. Designation System** — The property classes of such nuts are designated by a number suffixed by letter 'H'. The number indicates 1/10th of the minimum Vickers Hardness and the letter 'H' refers to the hardness ( *see* Table 1 ).

**TABLE 1 DESIGNATION SYSTEM OF PROPERTY CLASSES**

Property Class	14 H	17 H	22 H
Vickers hardness, <i>HV, Min</i>	140	170	220

**3. Raw Material**

**3.1 Forged and Machined Nuts** — The chemical composition for forged nuts shall be as given in Table 2. This may also be used for machined nuts if they are not made of free cutting steel.

**TABLE 2 CHEMICAL COMPOSITION OF FORGED AND MACHINED  
(FROM OTHER THAN FREE CUTTING STEEL) NUTS**

Property Class	Chemical Composition Limits (Check Analysis)			
	Carbon, <i>Max, percent</i>	Manganese, <i>Min, percent</i>	Phosphorus <i>Max, percent</i>	Sulphur, <i>Max, percent</i>
14H	0.50	—	0.110	0.150
17H	0.58	0.30	0.060	0.150
22H*	0.58	0.30	0.048	0.058

\*Nuts of property class 22H must be hardened and tempered in order to achieve the mechanical properties given in Table 4. If required, alloy steel may also be used.

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### 3.2 Machined Nuts ( with Free Cutting Steel )

TABLE 3 CHEMICAL COMPOSITION FOR NUTS MADE OUT OF FREE CUTTING STEEL

Property Class	Chemical Composition Limits (Check Analysis)			
	Carbon Max percent	Phosphorus Max percent	Lead Max percent	Sulphur Max percent
14H, 17H	0.50	0.12	0.35	0.34

### 4. Mechanical Properties

TABLE 4 MECHANICAL PROPERTIES

Mechanical Properties	Property Class		
	14H	17H	22H
Vickers <i>Min</i> hardness <i>HV5 Max</i>	140	170	220
	220*	250	300

\*260 Max for cold-forged nuts.

### 5. Test Method for Mechanical Properties

**5.1 Hardness Test** — The Vickers Hardness test shall be carried out in accordance with the provisions of IS : 1501-1968 'Method for Vickers hardness test for steel ( *first revision* )'.

### EXPLANATORY NOTE

Consequent to the decision to revise IS : 1367-1967 'Technical supply conditions for threaded steel fasteners' due to the work at international level, separate parts have been formulated for technical and drafting reasons alike. The different parts in the revision are listed in Part I Introduction and general information. The requirements for nuts, which are not amenable to proof loading either due to their geometry or application, are covered in this standard.

Although work is yet to be initiated at the international level on nuts without specified proof loads, the need for a national standard on the subject has been felt in view of a large number of nut-like threaded and formed products which are in use. Such products cannot be classified according to definite test loads or loading capacities, but only according to their hardness values. For this reason the minimum hardness has been adopted as the characteristic feature. Maximum values have also been specified to guard against a drop in the transverse toughness due to excessive hardness.

The property classes covered in this standard are applicable for nuts with one or more of the following characteristics:

- With nominal heights less than  $0.5 d$ ;
- With lesser across flats than those specified in IS : 9519-1980 'Dimensions for width across flats for hexagon head bolts and nuts';
- With threads other than triangular ISO metric threads;
- With nominal thread sizes above M39; and
- With special configuration.

The property class designation system based on hardness values is applicable to the type of products covered in the following Indian Standards:

IS : 3468-1975 Specification for pipe nuts

IS : 5368-1969 Specification for thin slotted and castle nuts (dia range 6 to 52 mm)

IS : 6731-1972 Specification for locknuts, narrow series and lockwashers with straight inner tab for rolling bearings ( *first revision* )

## **IS : 1367 (Part VII) - 1980**

While the above Indian Standards presently specify property class 4, 6, 8, etc, the same would be modified in their revisions.

In the preparation of the standard, assistance has been derived from DIN 267 sheet 4-1971 Schrauben, Mutten Und ahuliche Gewinde — und Formterte (Bolts, screws, nuts and similar threaded and formed parts — technical supply conditions of delivery — property classes and test methods for nuts of unalloyed or low alloy steels) issued by Deutsches Institut für Normung (DIN).

This edition 3.1 incorporates Amendment No. 1 (December 1984). Side bar indicates modification of the text as the result of incorporation of the amendment.