COMPENDIUM OF INDIAN STANDARDS

ON

THREADED FASTENERS — INDIAN STANDARDS ON NUTS

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Introduction

Nuts, bolts, and screws are the fundamental components of mechanical fastening systems, providing the means to assemble, secure, and disassemble components in every field of engineering, from heavy structural applications to intricate precision devices. These fasteners are designed to create strong, reliable, and often reversible joints, making them indispensable in manufacturing, construction, automotive, aerospace, and general engineering. Bolts and screws are externally threaded fasteners that are typically used in conjunction with nuts, which are internally threaded. This compendium provides an extensive list and brief requirements of Indian Standards available on nuts with metric threads.

IS 1363 (Part 3) : 2018/ISO 4034 Hexagon head bolts, screws and nuts of product grade C Part 3 (Style 1) Hexagon Nuts (Size Range M5 to M64)

SCOPE : This standard specifies the characteristics of hexagon regular nuts (style 1) with thread sizes ranging from M5 to M64, classified under Product Grade C. It applies to coarse pitch threads.

Key Highlights

1. Dimensions & Tolerances**:** Detailed specifications for thread pitch, nut height, width across flats/corners; tolerance class 7H as per IS 14962-1.
2. Material & Property Class**:** Made of steel; property class 5 for M5 to M39 nuts; for D > M39, class to be mutually agreed [refer IS 1367 (Part 6)].
3. Finish & Coatings**:** Supplied as-processed or with coatings per IS 1367-11 (electroplated) or IS 10683 (zinc flake) or IS 1367-13 (hot dip galvanized).
4. Inspection & Acceptance**:** Acceptance inspection in accordance with IS 1367 (Part 17).

IS 1364 (Part 3 to 6)
Hexagon head bolts, screws and nuts of product grades A and B

SCOPE : These standards define the characteristics, dimensions, materials, and performance of hexagon nuts of various styles (0, 1, 2) and grades (A and B).

They cover:

- IS 1364 (Part 3) – Style 1 (Regular nuts); sizes M1.6 to M64; Grades A & B
- IS 1364 (Part 4) – Style 0 (Thin, chamfered nuts); sizes M1.6 to M64; Grades A & B
- IS 1364 (Part 5) – Style 0 (Thin, unchamfered nuts); sizes M1.6 to M10; Grade B
- IS 1364 (Part 6) – Style 2 (High nuts); sizes M5 to M39; Grades A & B

Key Highlights

1 Material**:** Made of steel, stainless steel, or non-ferrous metals with mechanical properties per IS 1367 (Part 6)/IS 1367 (Part 14/Sec 2).
2 Design & Tolerances: Thread tolerance 6H, and product tolerances per IS 1367-2**.**
3 Finish & Coating: Supplied as-processed or coated per IS 1367-11 or IS 10683 or IS 10684**;** stainless steel passivation per IS 19056**.**

IS 15581 : 2018 "Hexagon nuts with flange, style 2 — Coarse thread (*first revision*)"

SCOPE : It specifies the characteristics of hexagon nuts with flange, style 2, with metric coarse threads from M5 to M20. It covers product grade A for threads up to and including M16 and product grade B for threads above M16.

Key Highlights

1. Dimensions: Specifies dimensions including flange diameter, width across flats, nut height, wrenching height, and chamfer angles.
2. Materials and Property Classes: Covers steel (property classes 8, 9, 10, 12 per IS 1367 (Part 6) and stainless steel [as per IS 1367 (Part 14)/Sec 2].
3. Threads and Tolerances: Thread tolerance 6H;
4. Finish and Coating: Steel nuts as processed, with optional electroplated (IS 1367-11), or zinc flake (IS 10683) or hot-dip galvanized (IS 1367-13) coatings. Stainless steel as processed; other finishes by agreement.

IS 13722 : 2018, IS 13723 : 2018, IS 13724 : 2018 Hexagon nuts with metric fine pitch thread — Product grades A and B (*second revision*)

SCOPE :

- IS 13722 – Hexagon regular nuts (Style 1); M8 to M64; Product Grade A (D ≤ 16 mm), B (D > 16 mm).
- IS 13723 – Hexagon high nuts (Style 2); M8 to M36; Product Grade A (D ≤ 16 mm), B (D > 16 mm).
- IS 13724 – Hexagon thin nuts chamfered (Style 0); M8 to M64; Product Grade A (D ≤ 16 mm), B (D > 16 mm).

Key Highlights

1. Dimensions: Specify thread sizes, nut height, width across flats, and chamfer angles.
2. Materials and property classes:
   Steel: Style 1 (Property class 6, 8, 10); Style 2 (Property class 8, 12 for D ≤ 16 mm, 10 for D ≤ 36 mm); Style 0 (Property class 04, 05).
   Stainless steel: As per IS 1367 (Part 14/Sec 2).
3. Threads and Tolerances: Tolerance class 6H (IS 4218-3, IS 14962-1); Product Grade A (D ≤ 16 mm), B (D > 16 mm), per IS 1367-2.
4. Finish: Steel (electroplated, IS 1367-11); Stainless steel (passivated, IS 19056); Non-ferrous (as processed); zinc flake coatings (IS 10683).

IS 14394 : 1996 "Industrial fasteners — Hexagon nuts of product grade C — Hot - dip galvanized —Specification (size range M12 To M36)

SCOPE : It specifies the requirements for hot-dip galvanized hexagon nuts of product grade C, with property classes 5 and 8, and thread diameters ranging from M12 to M36.

Key Highlights

1. Materials and property classes: Steel nuts with property classes 5 and 8.
2. Proof Load Values: stresses of 490–500 N/mm² (class 5) and 670–740 N/mm² (class 8).
3. Surface finish: Hot-dip galvanized coating per IS 1367 (Part 13) for corrosion resistance.

IS 7795 : 2004 "Hexagon nuts with collar — Specification (*first revision*)"

SCOPE : It specifies the requirements for hexagon nuts with collar in the size range of M8 to M36, with metric threads. These nuts, designed with a collar and 1.5 times the thickness of standard nuts, are of product grade A and intended for high-strength structural applications.

Key Highlights

1. Dimensions: Specifies hexagon nuts with collar for thread sizes M8 to M36, with dimensions like width across flats, nut height (m), collar diameter, and collar height.
2. Threads and Tolerances: Metric threads per IS 4218 (Parts 1, 2, 3, 4); tolerances as per IS 14962 (Parts 1, 2, 3).
3. Mechanical Properties: Property classes 8 or 10 as per IS 1367 (Part 6).
4. Finish: Dull black heat-treated with light oil coating as standard; optional hot-dip galvanization per IS 1367 (Part 13) for corrosion resistance

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IS 2585 : 2006 "Square head bolts, screws and square nuts of product grade C"

SCOPE : This standard covers the requirements of square head bolts, screws, and square nuts of product grade C in the size range of M6 to M39.

Key Highlights

1. Product Grade: Conforming to product grade C as specified in IS 1367 (Part 2).
2. Dimensions and Tolerances: Thread tolerances of 8g for bolts/screws and 7H for nut.
3. Mechanical Properties: Bolts and screws must conform to property class 4.6, while nuts conform to class 5 for M16 to M39.
4. Finish: The components must be supplied with a natural finish.

IS 8856 : 1991 Hexagon weld nuts

SCOPE : This standard covers the requirements for hexagon weld nuts for electrical resistance welding in the size range M3 to M16.

Key Highlights

1. Material: The nuts are to be made of steel with a maximum carbon content of 0.25%. Specific grades or alternative materials can be agreed upon between buyer and supplier.

2. Hardness: For sizes M3 and M4, hardness should be between 170 HV to 302 HV, and for sizes above M4, between 188 HV to 302 HV.
3. Surface Discontinuities: Must comply with IS 1367 (Part 10).
4. Finish: The components must be supplied with a natural finish.

IS 2687 : 1997 Cap Nuts (Product Grade A)

SCOPE: This standard covers the requirements for cap nuts of Product Grade A in thread sizes from M4 to M48, including both coarse and fine pitch threads.

Key Highlights

1. Mechanical Properties: For sizes < M36, the standard requires property class 5. For ≥ M36, mechanical properties are to be agreed upon. Minimum proof load: 300 N/mm².
2. Finish: Cap nuts may be supplied as produced, bright, or with electroplated/hot-dip galvanized coatings.
3. Surface Discontinuities: Must conform to IS 1367 (Part 10):1979, ensuring no harmful flaws on the nut surface.

IS 3460 : 1991 Knurled nuts

SCOPE: This standard covers the requirements for knurled thumb nuts of: Type A – Knurled nuts with a long neck (high type) Type B – Knurled nuts with a short neck (thin type)

Key Highlights

1. Thread Tolerances: For thread size < M1.4, tolerance is 5H. For ≥ M1.6, tolerance is 6H
2. Material Options: Knurled nuts may be made from steel, stainless steel, or non-ferrous metals such as brass or aluminium alloy.
3. Mechanical Properties: Minimum tensile strength required: 300 N/mm².
4. Finish and Surface Roughness: Nuts may be supplied as produced or electroplated.

IS 2636 : 1972 SPECIFICATION FOR WING NUTS

SCOPE: The document specifies requirements for two types of wing nuts—Type A (stamped or cast) and Type B (cold forged)—within a size range of 2 mm to 24 mm)

Key Highlights

1. Types: Type A: Manufactured by hot stamping or casting (e.g., brass, malleable iron, or hot steel). Type B: Manufactured by cold forging (usually from steel or brass)
2. Dimensions: Dimensions include parameters like wing span (a), height (h), body diameter, and others.
3. Mechanical Properties: Wing nuts made of steel must conform to property class 4 of IS 1367 (Part 3). Brass or nonferrous wing nuts must have a minimum tensile strength of 300 MN/m².

IS 3468 : 1991 Pipe nuts — Specification

SCOPE: This standard specifies the requirements for pipe nuts within the size range G 1/8 to G 6, including dimensions, tolerances, material, mechanical properties, and designation methods

Key Highlights

1. Material Options: Pipe nuts may be made from steel, stainless steel, or brass, with applicable standards: Steel: IS 1367 (Part 7), Stainless steel: IS 1367 (Part 14).
2. Hexagon and Octagon Types: Pipe nuts up to G4 size are of hexagonal shape. Sizes G5 and G6 are specified as octagonal to accommodate tooling or functional requirements.

IS 6623 : 2004 High strength structural nuts — Specification

SCOPE: This standard covers the requirements for large series hexagon high strength structural steel nuts of property classes 8 and 10 in the size range M12 to M36, suitable for use in both friction-type and bearing-type structural steel connections.

Key Highlights

1. Material and Hardening: All nuts must be made of steel, hardened, and tempered at ≥ 425°C. They must meet the mechanical properties of IS 1367 (Part 6).
2. Mechanical Properties: Proof loads and hardness values are specified.
3. Finish: Standard finish is dull black heat-treated with a light oil coat. Hot-dip galvanized finish allowed for 10S nuts as per IS 1367 (Part 13).
4. Anti-Seizing Requirement: Hot-dip galvanized nuts must pass an anti-seizing test to ensure the effectiveness of their lubricant coating during assembly.

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

SCOPE: This Indian Standard specifies the requirements for thin slotted and castle nuts of precision and black grades in the diameter range from 6 mm to 52 mm.

Key Highlights

1. Grades: Nuts are classified into two grades: Precision (P) grade, Black (B) grade.
2. Mechanical Properties: Manufactured from materials complying with property classes 4, 6, or 8.
3. Dimensions: Separate values for precision and black grades, including parameters like slot depth, width across flats, nut height, and slot dimensions.
4. Slot Geometry: The slot undersides may be round, flat with rounded corners, or flat with chamfered corners, based on manufacturer preference.
5. Split Cotter Compatibility: Nut dimensions are designed to suit standard split cotter pins, ensuring proper mechanical locking.

IS 7790 : 1991 Domed Cap Nuts – Specification (*first revision*)

SCOPE: The standard specifies requirements for domed cap nuts in the size range M4 to M24. It outlines dimensions, materials, mechanical properties, tolerances, and finish requirements.

Key Highlights

1. Materials : Permissible materials: Steel, Stainless Steel, and Non-ferrous metals (e.g., Brass or Aluminium Alloy).
2. Mechanical Properties: For steel: Conform to Property Class 5 (IS 1367 Part 6). For non-ferrous: Minimum tensile strength of 300 N/mm². For stainless steel: Refer IS 1367 (Part 14).
3. Finish Options: Supplied as produced or electroplated. Phosphating is allowed and denoted by suffix "P" in designation.
4. Dimensional Specifications: Covering dome height, wrenching height (m′), width across flats (s), diameter (dk), and thread runouts/undercuts.

IS 2232 : 1969 Specification for Slotted and Castle Nuts *(First Revision)*:

SCOPE: It prescribes the technical and dimensional requirements for slotted and castle nuts in precision and black grades. Slotted Nuts**:** Precision Grade: M4 to M39, Black Grade: M12 to M33. Castle Nuts**:** Precision & Black Grades: M12 to M100.

Key Highlights

1. Materials : Must comply with property classes 4, 6, or 8 as per IS: 1367.
2. Grades : Precision (P) and Black (B) as per IS: 1367.
3. Design & Dimensions: Multiple tables specify dimensions (width, height, slot dimensions, across flats) for each type and grade. Slot design is left to the manufacturer's discretion (flat, rounded, or chamfered).
4. Thread Tolerances: M4–M39: Tolerance Class 6H as per IS: 4218, M42–M100: Tolerance Class 6H as per IS: 3139.

IS 7002 : 2018 Prevailing Torque Type Hexagon Regular Nuts (With Non-Metallic Insert) — Property Classes 5, 8 and 10 *(Third Revision)*:

SCOPE: his standard specifies the characteristics, mechanical properties, dimensions, and performance of prevailing torque type hexagon regular nuts with non-metallic inserts,

Key Highlights

1. Materials : Nut body: Steel. Insert: Typically polyamide (non-metallic)
2. Product grades : Grade A for threads up to and including M16. Grade B for threads above M16.
3. Dimensions: Based on IS 1364 (Part 3) hex nuts plus additional torque feature. Full dimension table provided for M3 to M36
4. Surface Requirements: Surface discontinuities: as per ISO 6157-2. **C**oatings**:** Electroplated or Zinc flake if specified.