

INCH-POUND

MIL-DTL-32689/4
w/AMENDMENT 1
28 July 2022
SUPERCEEDING
MIL-DTL-32689/4
19 November 2021

DETAIL SPECIFICATION SHEET

CONNECTORS, ELECTRICAL, HEX NUT FOR JAM-NUT MOUNTED RECEPTACLE

This specification is approved for use by all Departments
and Agencies of the Department of Defense.

The requirements for acquiring the product described herein
shall consist of this specification sheet and MIL-DTL-32689.

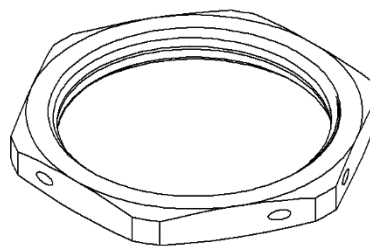
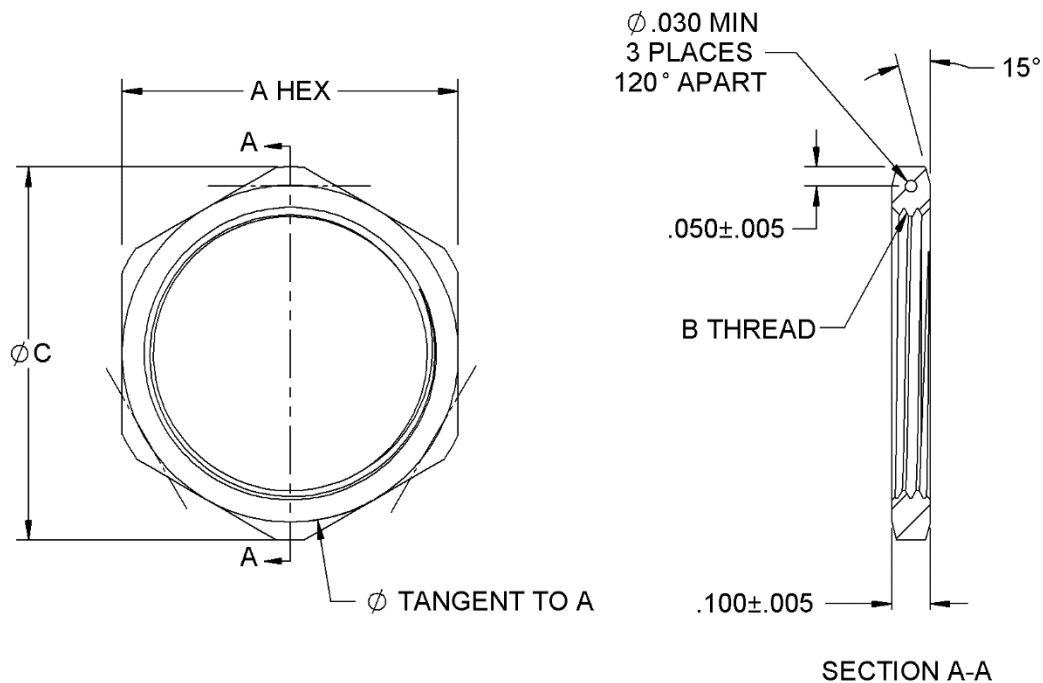


FIGURE 1. Hex nut dimensions.



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Dash Number Major Dia. (in 16 th of an inch)	A +.010, - .000	B thread UN-28 2A Major dia. ASME B1.1	ØC REF
09	.688	.5625	.755
11	.813	.6875	.898
12	.875	.7500	.970
13	.938	.8125	1.030
16	1.125	1.0000	1.200
19	1.313	1.1875	1.415
20	1.375	1.2500	1.490
24	1.625	1.5000	1.750

Notes

1. All burrs and sharp edges shall be removed.

FIGURE 1. Hex nut dimensions – Continued.

REQUIREMENTS:

Dimensions and configuration: see figures.

Material: Determined by Class.

Finish: Determined by Class.

Safety wire: Drilled safety wire hole.

Notes (non-mandatory):

- Crimped safety wire nut is not currently under the purview of this specification sheet.
- Maximum nominal safety wire diameter is .022" (nominal size)
- Maximum actual safety wire diameter is .026" (nominal plus variation)

Qualification. Qualification shall be in accordance with MIL-DTL-32689, except only the following tests shall be required:

- Examination of product
- Salt spray (corrosion)
- Safety hole pull-out (defined below)

Group A inspection shall consist of examination of product and safety wire pull-out. Sampling for group A inspection shall be as specified in table I.

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TABLE I. Group A sampling plan.

Lot size	Sampling size
1 to 13	100 percent
14 to 150	13 units
151 to 280	20 units
281 to 500	29 units
501 to 1,200	34 units
1,201 to 3,200	42 units
3,201 and up	54 units

Safety wire pull-out: Safety wire shall not pull out of safety wire hole when tested. Only a complete pull out shall be considered a failure. Safety wire shall be 0.51 mm (.020 inch) diameter in accordance with NASM20995 and meet one of the following material specifications:

- NI-CU alloy (MONEL™) (UNS NO4400)
- NI-CR alloy (INCONEL™) (UNS NO6600)

Safety wire shall be threaded through one of the hex nut safety wire holes and a pull of 30 lb minimum is applied. Pulls shall be applied in following direction and quantity

Direction 1: 1 pull with force direction defined by all of the following criteria:

- perpendicular with the axis of the nut
- perpendicular with the axis of the safety wire hole
- outward: from safety wire hole away from center point of the nut

Direction 1 is tested as the weakest direction with the least amount of material and represents the worst case direction. The direction shall be maintained $\pm 5^\circ$ from the center of the safety wire hole.

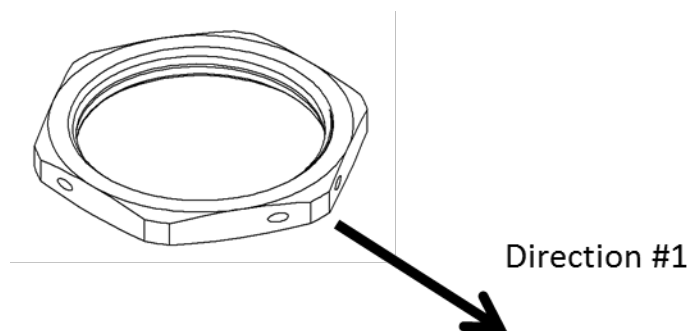


FIGURE 2. Safety wire pull-out test applied force direction.

The safety wire is passed through the safety wire hole leading to two wire ends coming out of the nut. The application of force can be performed in 2 configurations:

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- One-sided pull: One wire end is anchored. This could be accomplished with a ferrule, effectively anchoring to the nut itself. This could also be accomplished by attachment to a fixed body other than the nut such as a point on testing fixture. Location of the point is important as it changes geometry and forces exerted on the safety wire hole. The full force is applied to the other wire end.
- Two-sided pull: Both wire ends are brought together at a single point. The force is exerted on the wire end pair. This effectively applies ½ of the force on each wire (½ of the force on each end of the safety wire hole).

The joining (union) of the two wire ends at a single point creates an angle (θ) for each wire end which deviates from the nominal applied force direction. This angle is a force multiplier increasing the applied force on the nut. The angle is determined by the distance from the center of the safety wire hole to wire end union. If the wire end are too short, the angle is larger, and force multiplication larger. The angle (θ) shall be no larger than 5° for testing consistency. This sets the minimum distance from safety wire hole to the wire end union:

$$\theta = 5^\circ$$

$$distance_{min, \text{ safety wire hole-wire union}} = \frac{\text{safety wire hole length}}{2 * \tan(\theta)}$$

The ends of the safety wire holes are at the angle of the hex nut shape making the length of the safety wire hole vary. The length of safety wire hole shall be taken from the two points the wire interfaces with the wire making the length dependent on the direction of applied force. For a force:

- perpendicular to the axis of the safety wire hole
- at an angle (φ) to Direction 1

The length is:

$$\text{safety wire hole length} = \tan(60^\circ) * \left(A * \left(\frac{1}{\cos(30^\circ)} - 1 \right) - \text{hole dia.} * \cos(\varphi) \right)$$

$$\text{hole dia.} = .030, \quad \varphi = 0^\circ$$

Dash Number	safety wire hole length	distance _{min, safety wire hole-wire union}
09	0.132	0.757
11	0.166	0.948
12	0.182	1.043
13	0.199	1.139
16	0.249	1.426
19	0.300	1.714
20	0.316	1.809
24	0.383	2.191

A two-sided pull shall be used for testing.

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Part or Identifying Number (PIN) example:

M32689/4 - W 09

<u>M32689/4</u>	"M" prefix, base spec number, "/", and specification sheet number
<u>W</u>	Class
<u>09</u>	Dash Number (see Jam-Nut Mounted Receptacle for corresponding shell size/thread pattern)

Referenced documents. In addition to MIL-DTL-32689, this document references the following:

NASM20995
ASME B1.1

CONCLUDING MATERIAL

Custodians:

Army – CR
Navy - AS
Air Force – 85
DLA - CC

Preparing activity:

DLA - CC

(Project 5935-2022-146)

Review activities:

Navy - EC, SH

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <https://assist.dla.mil>.