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संख्या : CBS/Self Locking Nuts

दिनांक: 16.03.2023

1. **GM Con/NFR,**
2. **Principal Chief Engineer,**
All Zonal Railways
3. **Chief Administrative Officer/Con,**
All Zonal Railways
4. **Managing Directors,**
IRCON, RVNL, DFCCIL, RITES, KRCL, HRIDCL, MRIDCL

विषय: Generic technical specifications for Self Locking Steel Nuts to be used in Hook Bolts of steel girder bridges over Indian Railways.

- संदर्भ:**
1. Railway Board approval conveyed to RDSO vide letter no. 2022/19/CE-III/BR/RDSO/1 dated 22.02.2023.
 2. Railway Board letter no. 2021/Tk-I/(P)/Cross Approval dated 13.05.2022.

Loosening of nuts of Hook Bolts under vibration of moving trains on steel girder bridges needs regular maintenance efforts being a safety concern for all inspection and maintenance officials. In view of satisfactory performance of Self Locking Steel Nuts to be used in Hook Bolts reported by various Zonal Railways during field trials, RDSO is now issuing "Generic specifications for Self Locking Steel Nuts to be used in Hook Bolts of Railway Steel Bridge Girders". These specifications cover technical requirements, manufacturing tolerances, inspection & supply conditions of these bolts. Any feedback regarding its use may kindly be sent to RDSO.

The above is being issued with the approval of Railway Board.

Enclosure: Specifications (7 pages
Including cover page)

Digitally Signed by (राजेश कुमार श्रीवास्तव)
Rajesh Kumar Srivastava
Date: 16-03-2023
Reason: कार्यकारी निदेशक / पुल एवं संरचना
Executive Director/B&S



GOVERNMENT OF INDIA

MINISTRY OF RAILWAYS

**GENERIC SPECIFICATIONS FOR SELF
LOCKING STEEL NUTS TO BE USED IN HOOK
BOLTS OF RAILWAY STEEL BRIDGE GIRDERS**

ISSUED BY

INFRA-II VERTICAL(B&S)

**RESEARCH DESIGNS AND STANDARDS
ORGANIZATION LUCKNOW – 226011**

GENERIC SPECIFICATIONS FOR SELF LOCKING STEEL NUTS TO BE USED IN HOOK BOLTS OF RAILWAY STEEL BRIDGE GIRDERS

1. SCOPE:

- 1.1. This specification covers the generic specifications/ performance parameters and functional requirements for Self-Locking Steel nuts to be used in Hook-Bolts of Railway Steel Bridge Girders. The specifications cover technical requirements, manufacturing, inspection, and supply conditions of these bolts.

2. GENERAL PRINCIPLE OF FUNCTIONING

- 2.1. Self-locking nut shall have a spring inserted in the nut. When the nut is fastened, the thread and the frictional direction of the spring function will be in positive direction, and it is conveniently fastened. When the nut is unscrewed, the spring action acts as a locking element and does not allow its loosening.
- 2.2. There is a locking element, which is an offset with respect to the standard thread. When this element is pressed, the nut can be easily loosened. No special wrench is required for this purpose. Normal Box-Spanner can be used to do tightening and un-tightening of these bolts.

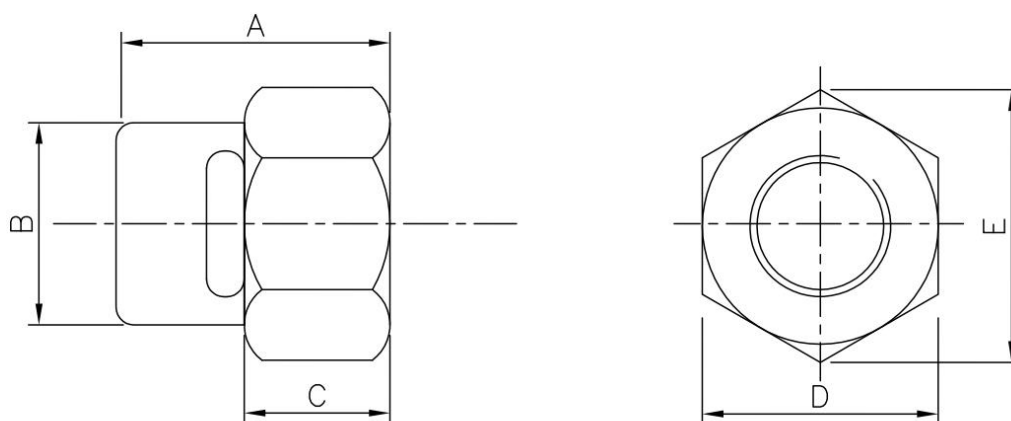
3. FUNCTIONAL REQUIREMENTS

- 3.1. The Self-Locking Steel nut shall be designed to withstand vibration and shocks encountered in service and display anti-loosening characteristics.

- 3.2. The locking arrangement shall not get damaged in multiple tightening and loosening cycles in case of re-usages. The Self-Locking Steel nut shall be reusable for several times without damage to locking arrangement and without significant loss of its anti-loosening properties under vibration.

4. TECHNICAL SPECIFICATIONS

- 4.1. Shape and Dimensions: The dimensions of the self-locking nut used for hook bolts shall be as follows-



Nut Size : for 28mm dia. hook bolts used in Indian Railway Steel Bridges					
Legend	A	B	C(standard)	D(standard)	E
Size in mm	37.5	41.0	22.0	41.0	47.3
Tolerances in mm	+1.0/-1.0	+1.0/-1.0	+1.0/-1.0	+1.0/-1.0	+1.0/-1.0
Spring Dia.	2.2mm or as required to achieve perfect matching grip.				
Nut Size : for 22mm dia. hook bolts used in Indian Railway Steel Bridges					
Legend	A	B	C(standard)	D(standard)	E
Size in mm	30.5	32.0	18.0	32.0	37.0
Tolerances in mm	+1.0/-1.0	+1.0/-1.0	+1.0/-1.0	+1.0/-1.0	+1.0/-1.0
Spring Dia.	1.8mm or as required to achieve perfect matching grip.				

- 4.2. Vibration Test: As per DIN 65151-Dynamic testing of the locking characteristics of fasteners under transverse loading conditions (Vibration Test) or NAS3350(National Aerospace Standard)- Vibration Test requirements for high quality, self-locking nuts, used at temperatures up to 800 °F or ISO 7481:2000 Aerospace — Nuts, self-locking, with maximum operating temperature less than or equal to 425 degrees C.
- 4.3. Corrosion Protection: Electro galvanizing or hot-dip galvanizing or nickel alloy coating etc. to provide the nut corrosion free service life.
- 4.4. The pitch of threads is to match with Isometric Coarse Pitch Screw threads of 28mm/22mm nominal diameter hook bolts as given in RDSO Drawing number RDSO/B-1636/5.

5. CONSIGNEE INSPECTION AND ACCEPTANCE

- 5.1. Visual check: Consignee to ensure by visual inspection that the surface is free from defects such as surface flaws, burrs and rust. The nuts to be completely free from any visible defects.
- 5.2. Documents to be submitted at the time of supply-
- a) The supplier shall produce manufacturer's test certificates for the lot supplied, to the satisfaction of the consignee. The manufacturer's certificates shall cover the specifications laid down in this document.
 - b) In addition, the supplier shall produce satisfactory Inspection Certificate from RITES or similar third-party inspection agency (PSU) as decided by the consignee.

- 5.3. Sampling: Following criteria is to be followed by the inspecting agency while taking samples – -

Number of nuts	Sample quantity (Minimum Nos.)
1-150	3
151-1200	5
1200-10000	8
10000+	13

The sample collection shall be random. Effort shall be made to ensure that not more than one sample is taken from a lot of 50 nuts.

6. MARKING:

- 6.1. Each nut shall have legible marking to trace back the manufacturer's name/ Trade Mark and Batch/ Grading System.

7. QUALITY ASSURANCE:

- 7.1. Quality assurance shall be as per ISO 9000.

8. GUARANTEE:

- 8.1. The manufacturer/Supplier shall guarantee the nuts for their satisfactory performance for the period of 05 (Five) years from putting into service or 05 (Five) years from supply whichever is earlier. All aspects of workmanship and material will be covered by this guarantee.

9. PACKING AND DELIVERY:

- 9.1. The nuts shall be prepared and packed in such a manner as will properly protect them from damage or deterioration during transit and

storage prior to installation. A storage period of at least 24 months shall be considered.

- 9.2. One box wrench with arm shall be supplied with every lot size of 50 nuts.

10. TRAINING:

- 10.1. After supply of material, the supplier will arrange on site training for Railway Staff for proper usage of these Self-Locking nuts.

11. MATERIALS

11.1. NUTS:

- 11.1.1. The material used in the nut shall be Steel conforming to chemical composition, mechanical and physical properties mentioned in JIS S45C, ISO (C45 or C45E4 or C45M2) or equivalent ensuring the performance requirements of Indian Railways as mentioned in this document.

11.2. SPRING COIL:

- 11.2.1. The material used in the spring coil shall be steel conforming to chemical composition, mechanical and physical properties mentioned in ISO 6931-1-International Standard for Stainless Steel for Springs, Part 1: Wire or equivalent ensuring the performance requirements of Indian Railways as mentioned in this document.

12. PERFORMANCE MONITORING AND REVIEW:

- 12.1. For this purpose, after full tightening of nuts to its final position, a paint line/ line by permanent marker shall be drawn in such a way that the single straight line is continued on nut as well as shaft of hook bolt.
- 12.2. During service, any non-alignment between the line part drawn on nut and line part drawn on shaft of hook bolt represents loosening of nut.
- 12.3. This non-alignment can never be more than 360° .
- 12.4. In case the said non-alignment exceeds above values, the nut needs replacement. Although as an immediate safety measure re-tightening is recommended.
- 12.5. These specifications shall be reviewed after one year based upon inputs received from Zonal railways and Industry.

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