'APPENDIX D' ii

Railway Stores Specification No. 6.0.5

GENERAL SPECIFICATIONS FOR STEEL BOLTS & NUTS

1. SCOPE
This standard specifies the dimension and requirements for Bolts & Nuts to use with flat bottom rails.

2. MATERIALS
The steel shall conform to the requirements having property class 6.8 of table 3 (having tensile strength of 600N/mm^2) and having chemical composition limits as per table 2 indicated in BSEN 20898-1-1992.

3. MANUFACTURE
Bolts & Nuts shall be produced by hot forging. Nut shall be hot forged. Welding is not permitted. Fasteners shall be clearly finished full in form and free from burrs and harmful defects.

4. HEAT TREATMENT
Fasteners may be supplied under full heat treated condition and details of the heat treatment shall be given in the manufacturer's certificate.

5. MECHANICAL PROPERTIES
After manufacture under heat treatment, a selected number of fasteners shall be tested to ascertain the mechanical properties of the batch. The sample or test pieces prepared there from shall not be subjected to additional heat treatment prior to testing. For acceptance purpose, all testes according to the table 5 of BSEN 20898-1-1992 test programme B shall be carried out.

5.1 BOLTS

5.1.1 Tensile test for full size Bolts.
The above shall be carried out as per Clause 8.2 of BSEN 208-1-1992.

5.1.2 Hardness test.
The above test shall be carried out as per Clause 8.3 of BSEN 20898-1-1992.

5.1.3 Proofing Load Test for full size Bolts.
The above test shall be carried out as per Clause 8.4 of BSEN 20898-1-1992.

5.1.4 Test for strength under wedge loading of full size Bolts.

The above test shall be carried out as per Clause 8.5 of BSEN 20898-1-1992.
The fracture shall occur in the shank of thread of the Bolt and not between

5.2 **NUTS**

Nuts shall conform and tested with BSEN 20898-2-1994 having property class 6.

6. **DIMENSIONS**

As per Drawing Nos. 16324 A and 18750/1 for Crossing Bolts & Nuts and Bridge Hook Bolts & Nuts respectively.

7 **SCREW THREAD**

The thread form shall, unless otherwise specified by the purchaser conform to the medium class tolerance in accordance with BS 84.

As an alternative to the spanner test the bolts and nuts may be ordered to comply with the "Tight fit" tolerance specified in Clause 12 below and should be BSW thread as required by the purchaser.

8. **GAUGING**

Gauges used to establish compliance with dimensions and tolerance shall be included in the manufacturer's calibration system for periodic checking to confirm their accuracy and traceable to national standards.

9. **QUALITY CONTROL**

Option 1:

If the bidder is not a manufacturer, offer should be supported with a certificate from the manufacturer acceptable to Sri Lanka Railways giving the mode of manufacturer and the physical and chemical properties of the materials before and after heat treatment. Bids not complying with above would be considered as unacceptable.

The manufacture shall, as part of his quality control procedure, carry out sufficient inspections and tests to ensure that the specified requirement under BS 5750/ISO 9001:2008 are attained and maintained.

When sample plans are used in the selection of samples they shall be statistically viable.

The result of all inspections and tests shall be recorded and identified to the fasteners they represent and if required made available to the purchaser.

Option 2:

The inspection of all batches of bolts and nuts shall be undertaken by one of the

(a) The purchaser or their authorized inspectors shall inspect all batches of bolts and nuts ordered and witness any of the tests (see Clause 05.), or

(b) The application of quality assurance system (see the forward make reference to BS 5750/ISO 9001:2008 in the forward).

10. MARKINGS

Each bolt shall be marked on the head in embossed letter and with the trade (identification) marks of the manufacture, SLR and last two digit of the year of manufacture as per Clause 9 of BSEN 20898 – 1 – 1992. (Further on bridge hook bolts stem end side an arrow mark shall be impressed as shown in the drawing No. 18750 "ELEVATION FROM X" this arrow head shall indicate the direction of hook (elongated) portion of the bolt head.)

11. PROTECTIVE COATING

Before dispatch the finished fasteners shall be protected from atmospheric corrosion, under normal storage conditions by a protective medium. The head of all bolts shall be painted in red and a coat of linseed oil shall be applied for the items.

12. TOLERANCES

12.1 Tolerance on Nominal Length

Nominal Length		Tolerance on length
Over	Up to and including	
mm	mm	mm
30	50	±1.25
50	80	±1.50
80	120	±1.75
120	180	±2.00
180	250	±2.30
250	315	±2.60
315	400	±2.85
400	500	±3.15

12.2 Tolerance on unthreaded shank

Diameter

19mm to 24mm	±0.84mm
24mm to 26mm	±0.84mm

12.3 Tolerance for washers diameter (mm)

Diameter of the bolt (mm)	Interior diameter of the Washer (mm) Allowable tolerance	Quarter diameter of the Washer (mm) Allowable tolerance
19 mm	±0.2	±0.75
22 mm	±0.2	±0.75
24 mm	±0.2	±0.75
26 mm	±0.2	±0.75

12.4 Allowable tolerance for thickness of washers

Diameter of the bolt (mm)	Allowable tolerance
19 mm to 24 mm	±0.2
22 mm to 26 mm	±0.2

12.5 Tolerance of Hexagon Nuts

Dimensions in millimeter

Nominal size and thread diameter	Width Across Flats	Width across Corners	Thickness of Nut	Tolerance on squareness
19 mm	±0.5	±1.0	±0.65	0.61
22 mm	±0.5	±1.0	±0.65	0.61
24 mm	±0.5	±1.01	±0.65	0.70
26 mm	±0.5	±1.3	±0.65	0.78

12.6 Pitch of Thread (for metric thread)

Nominal size and thread diameter	Pitch of thread (coarse pitch series)
19 mm	2.5
22 mm	2.5
24 mm	3.0

13. TIGHTENING OF NUTS TO BOLTS

Nuts of all bolts shall be fixed (tighten) to half length (middle of the thread) of thread of the bolts before commencing packing for dispatch. Tightening of nuts should be done only with a prescribed spanner.