



**PRODUCT MANUAL  
FOR  
HEXAGON HEAD BOLTS (SIZE RANGE M 1.6 TO M 64)  
ACCORDING TO IS 1364 (PART 1): 2018**

*This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure coherence of practice and transparency in operation of certification under Scheme-I of Bureau of Indian Standards (Conformity Assessment) Regulations, 2018 for various products. The document may also be used by prospective applicants desirous of obtaining BIS certification license/certificate.*

|    |   |   |   |
|----|---|---|---|
| 1. | <b>Product</b>                          | : | IS 1364 (Part 1): 2018/ ISO 4014: 2011  |
|    | <b>Title</b>                            | : | Hexagon Head Bolts (Size Range M 1.6 to M 64)   |
|    | <b>No. of Amendments</b>                | : | Nil   |
| 2. | <b>Sampling Guidelines:</b>             |   |   |
| a) | <b>Raw material</b>                     | : | As per Cl. 4 (Table 3) of IS 1364 (Part 1)  |
| b) | <b>Grouping guidelines</b>              | : | Please refer ANNEX – A  |
| c) | <b>Sample Size</b>                      | : | Five pieces of coated and two pieces without coating  |
| 3. | <b>List of Test Equipment</b>           | : | Please refer ANNEX – B  |
| 4. | <b>Scheme of Inspection and Testing</b> | : | Please refer ANNEX –C   |
| 5. | <b>Possible tests in a day:</b>         | : | Dimensions (Cl.3), Threads (Cl.4), Mechanical properties (Cl. 4) viz. Tensile test, Elongation, Yield stress, Proof load, Wedge load, Shear strength ,Hardness, Head soundness, Decarburization & surface integrity |
| 6. | <b>Scope of the Licence:</b>            | : | Please refer ANNEX –D   |

ANNEX--A

**Grouping Guidelines**

1. IS 1364 (Part 1):2018/ISO 4014:2011 specifies the characteristics of hexagon Head bolts with thread size from M 1.6 to up to and including M64 of product grade A and B. Also, Bolts may be of different property classes as specified in IS 1364 (Part 1):2018/ ISO 4014:2011. Further, the bolts may be of Steel, Stainless steel or a non-ferrous material as per Table 3.
2. Considering the above, the following grouping guidelines shall be followed for GoL/CSoL:
  - (a)One sample each of lowest thread size, any intermediate thread size and highest thread size of each property class and each product grade shall be tested for all requirements in order to cover the complete range of thread sizes of a particular property class and product grade.
  - (b) Bolts of each material viz. Steel, Stainless steel and Non-ferrous alloy used is required to be separately tested.
  - (b)If coated sample is tested for all requirements, corresponding uncoated thread sizes may also be covered.
- 3.The Scope of Licence may be restricted based on the Manufacturing and testing capabilities of the manufacturer.
- 4.During operation of licence, BOs shall ensure that all the property classes/ finish/thread sizes covered in the licence are tested in rotation, to the extent possible.

**ANNEX--B****List of Test Equipment***Major test equipment required to test as per the Indian Standard*

| <b>Sl. No</b> | <b>Tests used in with clause reference</b>                               | <b>Test equipment</b>   |
|---------------|--|---|
| 1             | Dimension, Cl. 3   | a)Micrometer<br>b)Scale<br>c)Dial gauge<br>d) Radius gauge              |
| 2             | Threads and tolerances, Cl. 4, Table 3                                   | a)Go-No Go gauges<br>b)Radius gauge , angle gauge<br>c)Thread gauge     |
| 3             | Finish, Cl. 4, Table 3   | a)Coat meter<br>b)Knife   |
| 4             | Tensile tests (9.1 to 9.5 & 9.7)   | a)UTM<br>b)Thread adapter<br>c)Wedge                                    |
| 5             | Proof load test (9.6)  | a)Tensile m/c   |
| 6             | Head soundness test (9.8)  | a)Solid block<br>b)Hammer   |
| 7             | Hardness test (9.9)  | a)Vickers or<br>b)Brinell or<br>c)Rock well                             |
| 8             | Decarburization test (9.10)<br>a)Microscopic method<br>b)Hardness method | a)Microscope<br>b)Vickers   |
| 9             | Carburization test(9.11)   | a)Grinding m/c<br>b)Vickers   |
| 10            | Re tempering test(9.12)  | a)Vickers<br>b)Timer<br>c)Heat treatment furnace<br>d)Quenching furnace |
| 11            | Torsion test(9.13)   | a)Torque wrenches   |
| 12            | Impact test(9.14)  | a)Impact m/c<br>b)Cooling apparatus                                     |
| 13            | Surface discontinuity (9.15)   | a)MPI<br>b)Liquid penetrate or other<br>c)NDT Methods                   |

*The above list is indicative only and may not be treated as exhaustive.*

ANNEX C

**Scheme of Inspection and Testing**

**1. LABORATORY** - A laboratory shall be maintained which shall be suitably equipped (as per the requirement given in column 2 of Table 1) and staffed, where different tests given in the specification shall be carried out in accordance with the methods given in the specification.

1.1 The manufacturer shall prepare a calibration plan for the test equipments.

**2. TEST RECORDS** – The manufacturer shall maintain test records for the tests carried out to establish conformity.

**3. LABELLING AND MARKING** – As per the requirements of IS 1364 (Part 1): 2018.

**4. CONTROL UNIT** – All Bolts of same property class and designation manufactured in a day shall constitute a control unit.

**4.1 HEAT TREATMENT BATCH:** All the head screws of same property class and designation heat treated together at the same time shall constitute a heat treatment batch.

**5. LEVELS OF CONTROL** - The tests as indicated in column 1 of Table 1 and the levels of control in column 3 of Table 1, shall be carried out on the whole production of the factory which is covered by this plan and appropriate records maintained in accordance with paragraph 2 above.

All the production which conforms to the Indian Standard and covered by the licence should be marked with Standard Mark.

**6. REJECTIONS** – Disposal of non-conforming product shall be done in such a way so as to ensure that there is no violation of provisions of BIS Act, 2016.

TABLE 1

| (1)<br>Test Details |                         |                  | (2)<br>Test equipment<br>requirement   | (3)<br>Levels of Control                                |  |                     |   |
|---------------------|-------------------------|------------------|--|---|--|---------------------|---|
| Cl.                 | Requirement             | Test Methods     |  | R: required (or)<br>S: Sub-<br>contracting<br>permitted | No. of<br>Samples                                  | Frequency           | Remarks   |
|                     |                         | Clause           | Reference  |   |  |                     |   |
| 3.                  | Dimensions              | 3<br>(Table 1&2) | IS 1364 (Part 1)   | R   | As per sampling plan given in<br>IS 1367 (Part 17) |                     |   |
| 4.                  | Material                | 6<br>5           | IS 1367 (Part 3)<br>IS 1367(Part 14/<br>Sec 1)<br>ISO 8839 (for non-<br>ferrous) | S   | One  | Each<br>Consignment | No further testing is required, if<br>accompanied with test certificate or ISI<br>marked. |
| 4                   | General<br>Requirements | 4                | IS 1367 (Part 1)/<br>ISO 8992  | R   |  |                     |   |
|                     | Thread<br>requirements  | 4 (Table 3)      | IS 1364 (Part 1)<br><br>IS 4218 (Part 3)<br><br>IS 14962 (Part 1)                | R   | As per sampling plan given in<br>IS 1367 (Part 17) |                     |   |

|   |                               |   |                                      |     |   |                                       |    |
|---|-------------------------------|---|--------------------------------------|-----|---|---------------------------------------|----|
| 4   | <b>Tests For Steel</b>        |   |                                      |     |   |                                       |    |
|   | Tensile Test                  | 9.1 to 9.5,<br>9.7  | IS 1367 (Part 3)/<br>ISO 898(Part 1) | R   | Two   | Every 7 <sup>th</sup><br>control unit | #  |
|   | Proof Load Test               | 9.6   |                                      |     |   |                                       |    |
|   | Head Soundness<br>Test        | 9.8   |                                      |     |   |                                       |    |
|   | Torsion Test                  | 9.13  |                                      |     |   |                                       |    |
|   | Impact Test                   | 9.14  |                                      |     |   |                                       |    |
|   | Hardness Test                 | 9.9   | IS 1367 (Part 3)<br>/ISO 898(Part 1) | R   | Three   | Every Heat<br>treatment<br>batch      | ## |
|   | Decarburization Test          | 9.10  |                                      |     |   |                                       |    |
|   | Carburization test            | 9.11  |                                      |     |   |                                       |    |
|   | Re tempering test             | 9.12  |                                      |     |   |                                       |    |
|   | Surface<br>discontinuity test | 9.15  | IS 1367 (Part 9/<br>Sec 1)           | R   | As per sampling plan given in<br>IS 1367 (Part 9/Sec 1) |                                       |    |
| <b>Tests for Stainless Steel and non-ferrous metals</b> |                               |   |                                      |     |   |                                       |    |
| Tensile Strength  | 7.2.2                         | IS 1367 (Part14/<br>Sec1):2018/<br>ISO 3506<br>(Part 1) :1997<br>(for stainless steel)<br><br>IS1367 (Part 3)/<br>ISO 898 (Part 1)<br>(for non-ferrous<br>metals) | R                                    | Two | Every 7 <sup>th</sup><br>control unit                   | #                                     |    |
| Stress at 0.2%<br>permanent strain                      | 7.2.3                         |   |                                      |     |   |                                       |    |
| Elongation after<br>fracture                            | 7.2.4                         |   |                                      |     |   |                                       |    |
| Breaking Torque<br>Test                                 | 7.2.5                         |   |                                      |     |   |                                       |    |

|   |   |       |  |   |                                      |                                    |   |
|---|---|-------|--|---|--------------------------------------|------------------------------------|---|
|   | Strength under wedge loading                    | 7.2.6 | IS 1367 (Part14/ Sec1):2018 /ISO 3506(Part 1):1997 | R | Two                                  | Every 7 <sup>th</sup> Control unit | This test is applicable for Stainless steel only. #   |
|   | Hardness  | 7.2.7 |  | R | Three                                | Every Heat treatment batch         | This test is applicable for Stainless steel only. ##  |
| 4 | <b>FINISH/ COATING</b>                          |       |  |   |                                      |                                    |   |
|   | Electroplating                                  |       | IS 1367 (Part 11)                                  | R | As per Sampling plan given in Note 1 |                                    | Different electroplating or other finish may be given as agreed between customer and supplier |
|   | Non Electrolytically applied zinc flake coating |       | ISO 10683  | R |                                      |                                    |   |

# In case of any failure, twice the number of sample shall be tested from the same control unit for those characteristics in which failure has occurred. In case of any further failure the control unit shall be rejected and shall not be marked with BIS standard mark. Further each control unit corresponding to the property class in which the failure had occurred shall be tested till samples from three consecutive control units pass after which the earlier frequency can be restored.

## In case of any failure, twice the number of sample shall be tested from the same heat treatment batch for those characteristics in which failure has occurred. In case of any further failure the heat treatment batch shall be rejected and shall not be marked with BIS standard mark. Further twice the sample from each heat treatment batch corresponding to the property class in which the failure had occurred shall be tested till samples from three consecutive heat treatment batch pass after which the earlier frequency can be restored.

**NOTE 1:** Sampling plan for Finish/coating test:

| Total number of head screws in batch | Number of test samples |
|--------------------------------------|------------------------|
| Upto and including 500               | 3                      |
| 501 upto and including 35,000        | 5                      |
| Over 35,000                          | 8                      |

**NOTE-2:** Sub-contracting is permitted to a laboratory recognized by the Bureau or Government laboratories empaneled by the Bureau.

**NOTE-3:** Levels of control given in column 3 are only recommendatory in nature. The manufacturer may define the control unit/batch/lot and submit his own levels of control in column 3 with proper justification for approval by BO Head.



**ANNEX D**

**Scope of Licence**

“Licence is granted to use Standard Mark as per IS 1364 (Part 1): 2018 with the following scope:

|  |                   |
|--|-------------------|
| Name of the product                              | Hexagon Head Bolt |
| Product grade(A/B)                               |                   |
| Property class                                   |                   |
| Thread Size                                      |                   |
| Material (Steel/Stainless steel/<br>Non-ferrous) |                   |
| Finish   |                   |