

# AXIS CONSULTANTS

<u>STANDARD CIVIL ENGINEERING SPECIFICATION</u>		
ISSUED: 15-09-2012	GENERAL REBAR SPECIFICATION	REV. - 0

## CONTENTS

<u>PARA NO.</u>	<u>DESCRIPTION</u>	<u>PAGE NO.</u>
1.0	<u>SCOPE</u>	2
2.0	<u>APPLICABLE CODES</u>	2
3.0	<u>PRIORITY OF REQUIREMENT</u>	2
4.0	<u>STORAGE</u>	3
5.0	<u>TESTS AFTER DELIVERY</u>	3
6.0	<u>REJECTION</u>	3
7.0	<u>INSPECTION</u>	3
8.0	<u>BENDING</u>	3
9.0	<u>LAPPING</u>	4
10.0	<u>SPACING, SUPPORTING AND CLEANING</u>	4
11.0	<u>WELDING</u>	5
12.0	<u>HARD DRAWN STEEL WIRE FABRIC</u>	5

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## **1.0 SCOPE**

This specification covers the general requirement of reinforcement steel.

## **2.0 APPLICABLE CODES**

**Note:** - Wherever reference is made to IS Codes, on any page of this Technical Specification (including annexures), applicable year of publication of IS Code is as stated below.

All work shall be strictly in accordance with the Technical Specifications, unless otherwise approved by the Engineer-in-Charge in writing.

The Indian standard codes applicable to this section shall include but not limited to the following:

IS 432 (Part 1) -1982 : Mild steel and medium tensile steel bars and hard drawn steel wire for  
concrete reinforcement : Part 1 Mild steel and medium tensile steel bars.

IS 432 (Part 2) -1982 : Mild steel and medium tensile steel bars and hard drawn steel wire for  
concrete reinforcement : Part 2 Hard-drawn steel wire.

IS 1566 - 1982 : Hard drawn steel wire fabric for concrete reinforcement.

IS 1786 – 1985 : High strength deformed steel bars and wires, for concrete reinforcement.

IS 2062 – 1992 : Steel for general structural purposes.

IS 2502 – 1963 : Code of practice for bending and fixing of bars for concrete reinforcement.

IS 2751 – 1979 : Recommended practice for welding of M.S.Plain and deformed bars for  
reinforced construction.

IS 4082 - 1996 : Stacking and storage of construction materials and components at site  
- Recommendations.

IS 9417 – 1989 : Recommendations for welding cold worked bars for reinforced Concrete construction.

## **3.0 PRIORITY OF REQUIREMENTS**

In case of any variation and discrepancy in condition between the special conditions, this specification and codes, order of priority shall be as under :-

- (1) Special conditions
- (2) This specification

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(3) Codes

## **4.0 STORAGE**

All reinforcement shall be stored clear of the ground by use of timber or other bearers. Where reinforcement is stored in the open for long periods it may be necessary to avoid excessive corrosion by protecting the reinforcement stack with tarpaulins.

The CONTRACTOR shall maintain the proper records of receipt, consumption. The records shall always be accessible to the Engineer-in-Charge for verification.

The reinforcement bars shall be stored in such a way as to avoid and prevent deterioration, corrosion, bending, twisting and wrapping.

In case of any damage occurring to the materials on account of faulty storage or negligence by the CONTRACTOR, same shall be borne by the CONTRACTOR himself at his own cost.

## **5.0 TESTS AFTER DELIVERY**

Materials supplied by the OWNER /BHEL or CONTRACTOR, shall, after delivery at site and at the discretion of Engineer-in-Charge, be subjected to any or all the tests, required by the relevant IS Codes. The CONTRACTOR shall carry out and bear the cost of such tests irrespective of the fact whether the material is procured by the OWNER/BHEL or CONTRACTOR. In any case, the CONTRACTOR shall get himself satisfied regarding its quality before using the same in his works at his own expense.

## **6.0 REJECTION**

The Engineer-in-Charge may reject at his discretion any material, notwithstanding the manufacturer's certificate or failing to meet the requirements of relevant IS Codes for testing of materials. He may similarly reject any material, which has deteriorated or corroded etc., due to improper storage, handling or transport. Defective materials shall not be used and removed from the site by the CONTRACTOR at his own expense.

## **7.0 INSPECTION**

Every bar shall be inspected before assembling on the works and any defective, brittle, excessively rusted or burnt bars shall be removed. Cracked ends of bars shall be cut out.

## **8.0 BENDING**

The CONTRACTOR shall prepare bar bending schedules as per details given in IS 2502 and get them approved before proceeding with cutting and bending of bars.

All bars shall be carefully and accurately bent by the CONTRACTOR, in accordance with the drawings and special care shall be taken such that :

- (a) The bars shall be placed in exact positions. The bars shall not be bent or straightened in any manner that will injure the material.
- (b) Bars incorrectly bent shall be used, only if means for straightening and rebending are such as not to injure the material.

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- (c) No reinforcement shall be bent when in position in the works without approval whether or not it is partially embedded in hardened concrete.
- (d) Hooks shall be unless stated otherwise in drawings :-
  - (i) complete semicircular turn with a radius of not less than 4 and not more than 6 bar diameters plus an extension of atleast 4 bar diameters at the free end.
  - (ii) or 90 degree bend having a radius of not less than 4 bar diameters plus an extension of 12 bar diameters.

## 9.0 **LAPPING**

As far as possible, bars of the maximum length available shall be used. Laps shown on drawings or otherwise specified by the Engineer-in-Charge shall be based on the use by the CONTRACTOR of bars of maximum length. In case the CONTRACTOR wishes to use shorter bars, laps shall be provided at the CONTRACTOR's cost in the manner and at the locations approved by the Engineer-in-Charge.

As and when necessary, welded laps shall be provided as specified by the Engineer-in-Charge.

## 10.0 **SPACING, SUPPORTING AND CLEANING**

- (a) All reinforcement shall be placed and maintained in the position, as shown on the drawings.
- (b) The CONTRACTOR shall provide approved types of supports for maintaining the top bars of the slab in position during concreting. All cover blocks shall be of concrete and of the same strength as that of the surrounding concrete and properly compacted. They shall be circular in shape and not square.
- (c) 18 SWG annealed steel wire shall be used as binding wire. All bars crossing one another shall be bound with this wire twisted tight to make the skeleton or network rigid, so that the reinforcement is not displaced during placing of concrete.
- (d) Bars shall be cleaned, before concreting commences, of all scale, rust or partially set concrete, which may be deposited there during placing of a previous lift of concrete. The bars shall be cleaned with dry gunny bags, if they are coated lightly with rust or other impurities. On no account shall the bars be oiled or painted, nor shall mould oil used on the formwork, be allowed to come in contact with the bars. Cement wash to bars shall not be permitted.
- (e) During placing of concrete, the greatest care shall be taken to prevent any displacement or bending of the bars, ties, links, stirrups or fabric.
- (f) A competent steel fixer shall be in attendance on the work to adjust and correct position of any reinforcement displaced.
- (g) Reinforcement shall not be supported by wires attached, to that portion of the formwork against which concrete is to be cast.
- (h) The vertical distances required between successive layers of bars in beams, shall be maintained by the provision of steel spacer bars inserted at such intervals, that the main bars do not perceptibly sag.

# AXIS CONSULTANTS

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<b>ISSUED: 15-09-2012</b>	<b>GENERAL REBAR SPECIFICATION</b>	<b>REV. - 0</b>

- (i) The cover to the reinforcement shall be, as specified in the drawings.

## **11. WELDING**

Welding of reinforcement shall be carried out only after obtaining the approval of Engineer-in-Charge.

In such cases all welding shall be carried in accordance with IS 2751 and IS 9417. Only qualified welders shall be permitted to carry out such welding.

For cold twisted reinforcement, welding operations shall be controlled to prevent a supply of large amounts of heat, larger than can be dissipated. The extreme non-twisted end portion shall be cut off before welding. Electrodes with rutile coating should be used.

The welding procedure shall be approved by the Engineer-in-Charge and tests shall be made to prove the soundness of the welded connection.

## **12. HARD DRAWN STEEL WIRE FABRIC**

- (a) Hard-drawn steel wire fabric shall be of the following two types:
- (i) Oblong mesh
  - (ii) Square mesh
- (b) The fabric may be designated as per IS 1566. Alternately a complete description of the fabric may be given.
- (c) When denoting the size of sheet or roll of oblong mesh fabric, the first dimension shall be the length of the main wires.
- (d) The wire used in the manufacture of fabric shall be hard drawn steel wire conforming, in all respects, to the requirements of IS 432 (Part II) and suitable for welding.
- (e) The fabric shall be formed by spacing the main and the cross wires, which shall be fixed at their points of intersection by electric welding. It shall be sufficiently stable to withstand normal handling in transport and during concreting, without displacement beyond the limits specified. It shall be fabricated to ensure accurate spacing and alignment of all members of the finished fabric to give substantial square or rectangular openings.
- (f) Butt joints in the wires of the fabric shall be electrically welded and the joints shall be staggered.
- (g) The width of the sheet or roll shall be such, as to fit in with the modular size of 10 cm module. The length of the sheet or roll shall be approved by Engineer-in-Charge.
- (h) The width of the fabric shall be considered end to end distance between outside longitudinal wires, unless otherwise specified. Transverse wire shall project beyond

# AXIS CONSULTANTS

<b><u>STANDARD CIVIL ENGINEERING SPECIFICATION</u></b>		
<b>ISSUED: 15-09-2012</b>	<b>GENERAL REBAR SPECIFICATION</b>	<b>REV. - 0</b>

the centre line of each longitudinal edge wire, for a distance equal to half the pitch of the main wire, unless otherwise specified.

- (i) Subject to the tolerances on wire diameter specified in IS 432 (Part 2), the tolerances shall be as in IS 1566.
- (j) All fabric reinforcement shall be delivered free from oil and grease, paint, scales, rust and other matter likely to adversely effect the bond with concrete. Limewash shall be permitted. A sheet shall not contain any broken wires, and no broken cross welds in excess of four percent of the total number of welded joints, or half of the welded joints in any wire.
- (k) Test Certificates shall be submitted to the Engineer-in-Charge as and when required.