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IS 15947-2 (2012): Concrete Delivery Pipelines, Part 2: General Requirements for Pipeline Accessories [MED 18: Construction Plant and Machinery]

“ज्ञान से एक नये भारत का निर्माण”
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“Invent a New India Using Knowledge”

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“Knowledge is such a treasure which cannot be stolen”
Indian Standard
CONCRETE DELIVERY PIPELINES
PART 2 GENERAL REQUIREMENTS FOR PIPELINE ACCESSORIES

ICS 77.140.75; 91.100.30

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

September 2012
Price Group 3
FOREWORD

This Indian Standard (Part 2) was adopted by the Bureau of Indian Standards, after the draft finalized by the Construction Plant and Machinery Sectional Committee had been approved by the Mechanical Engineering Division Council.

Concrete delivery pipeline, as the name implies, is basically steel pipeline for delivery of pumped concrete from the concrete pump to the place of pouring. It consists of steel pipes and pipe bends which are connected with each other by quick locking pipe couplings.

The first piece of pipeline of stationary concrete pump is generally a reducer pipe to match the size of concrete pump outlet and the rest of the pipeline. However, if the size of stationary concrete pump outlet is same as that of the pipeline, the first piece of pipeline is a short piece of pipe of approximate length 500 mm.

For stationary pipelines of short length (up to 30 m), the reducer pipe (or short piece of pipe) is a normal piece without any extra provision of tightening by clamping device.

In case of lengthy pipelines (beyond 30 m), the reducer pipe (or short piece of pipe) is provided with eyes for tightening by clamping device. This arrangement of eyes for tightening by clamping device is to avoid difficulty of re-assembly of lengthy pipelines after their dismantling.

In addition to pipe couplings, the accessories of concrete delivery pipeline like delivery hoses, shut off valves (mechanical or hydraulic) and circular distributors are used during concreting operation. The accessories of concrete delivery pipeline like cleaning heads, cleaning balls and trap baskets (also called catch baskets) are used during cleaning operation of the pipeline after finish of concreting.

In view of the increasing use of concreting by concrete pump at construction projects and also in view of the fact that manufacture of concrete delivery pipeline has already been started in the country by some of the manufacturers, it is considered necessary to lay down standards for concrete delivery pipeline and general requirements for pipeline accessories.

To facilitate additions/alterations to the standard and for the convenience of the users, this standard has been formulated in two separate parts. The other part in the series is:

Part 1 Specification

The composition of Committee responsible for the formulation of this standard is given at Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 ‘Rules for rounding off numerical values (revised)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.
1 SCOPE
This standard (Part 2) covers salient features and general requirements of various accessories used in concrete delivery pipelines during concreting operation and during cleaning operation that is after finish of concreting. This standard covers only the commonly used pipeline accessories. The manufacturers may fabricate other additional accessories suiting to the specific requirements of the users.

2 REFERENCES
The standards listed below contain provisions, which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

<table>
<thead>
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<th>IS No.</th>
<th>Title</th>
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<tbody>
<tr>
<td>1239</td>
<td>Steel tubes, tubulars and other wrought steel fittings — Specification:</td>
</tr>
<tr>
<td>(Part 1) : 2004</td>
<td>Steel tubes (sixth revision)</td>
</tr>
<tr>
<td>(Part 2) : 1992</td>
<td>Steel sockets tubular and other steel pipe fittings (fourth revision)</td>
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<tr>
<td>1762 (Part 1) : 1974</td>
<td>Code for designation of steels: Part 1 Based on letter symbols (first revision)</td>
</tr>
<tr>
<td>2062 : 2006</td>
<td>Hot rolled low, medium and high tensile structural steel (sixth revision)</td>
</tr>
<tr>
<td>2102 (Part 1) : 1993</td>
<td>General tolerances: Part I Tolerances for linear and angular dimensions without individual tolerance indication (third revision)</td>
</tr>
<tr>
<td>2932 : 2003</td>
<td>Enamel, synthetic, exterior: (a) Undercoating (b) Finishing — Specification (third revision)</td>
</tr>
<tr>
<td>15947 (Part 1) : 2012</td>
<td>Concrete delivery pipelines: Part 1 Specification</td>
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3 ACCESSORIES USED DURING CONCRETING
Size of pipeline accessories shall match with the nominal size of concrete delivery pipeline. Salient features and general requirements of the pipeline accessories commonly used during concreting operation shall be as described hereunder.

3.1 Pipe Couplings
Cup tension type pipe couplings [see Fig. 1A and Fig. 1B] are used for connecting straight pipes, reducer pipes and pipe bends of concrete delivery pipeline.

3.1.1 The pipe couplings shall be quick locking type having arrangements for tightening by a lever (see Fig. 1A) or by means of a wedge (see Fig. 1B).
3.1.2 The dimensions of pipe couplings shall be compatible to the dimensions of flanges [see IS 15947 (Part 1)] so as to have tight grip of the pipe couplings with the straight pipes/reducer pipes/pipe bends of concrete delivery pipeline.

3.1.3 The pipe couplings shall be manufactured from carbon steel forgings conforming to IS 2004. Carbon composition of forgings shall comply with Class 2 designation.

3.1.4 The steel forgings shall be normalized at a temperature of 880-910°C before machining. Tolerance class medium as per IS 2102 (Part 1) shall apply to the machining surfaces of the pipe couplings.

3.2 Rubber Sealing Gaskets

Rubber sealing gaskets are used to prevent leakage of cement slurry from the joints of concrete delivery pipeline (that is from pipe couplings) during concreting operation and air/water during cleaning operation.

3.2.1 Rubber sealing gaskets shall be made from synthetic rubber resistant to water and cement.

NOTES

1 For Type A flanges of concrete delivery pipeline, the rubber sealing gaskets inserted in the grooves of the female flanges need not be removed and cleaned during subsequent assembly/dismantling of pipeline.

2 For Type B flanges of concrete delivery pipeline, the rubber sealing gaskets provided on the circumstance of pipeline flanges have to be removed during every subsequent assembly/dismantling of pipeline for their cleaning and removal of concrete residues from couplings.

3.3 Flexible Rubber Hoses

Flexible rubber hoses are heavy-duty hoses, which are used as end hoses to place concrete from the placement booms and as distribution hoses for fixed pipelines (also called stationary pipelines or ground pipelines).

3.3.1 Flexible rubber hoses shall be made from water and cement resistant synthetic rubber having at least three steel wire braids and one spiral of heavy-duty steel wire on the outer cover duly sheathed with rubber.

3.3.2 One end of the flexible rubber hose shall have an aluminum alloy flange joint suitable for quick locking type cup tension pipe coupling.

3.4 Circular Concrete Distribution

Circular concrete distributors (see Fig. 2) are connected with the last piece of fixed pipeline for distribution of concrete at the place of pour.

3.4.1 The circular concrete distributor shall be provided with a double-bend swivel joint coupled with straight pipes and mounted on heavy-duty steel structure fabricated from steel conforming to IS 2062.

3.4.2 Pipes and pipe bends of the circular distributors shall conform to IS 15947 (Part 1).

3.5 Shut-off Valves

Shut-off valves are used in the fixed pipelines for upward or downward placing of concrete to prevent uncontrolled running empty of the pipelines.

3.5.1 Mechanically actuated shut-off valves (see Fig. 3) shall be used for delivery height of concrete upto 30 m. For higher delivery heights (above 30 m), hydraulically actuated shut-off valves shall be used.

3.5.2 The shut-off valves shall be fabricated from abrasion resistant steel of steel designation 20 C 8 (or higher grade of abrasion resistant steel) conforming to IS 1762 (Part 1).

3.5.3 The connecting pieces of steel pipes and the flanges of the shut-off valves shall conform to IS 15947 (Part 1), suitable for quick locking type cup tension pipe coupling.

NOTES

1 For vertical placement of concrete, the shut-off valve is installed in the pipeline before the pipes start ascending.

2 For downwards placement of concrete, the shut-off valve is installed in the pipeline below (or a little away from) the last descending pipe.

3 The hydraulically actuated shut-off valve, powered by a separate power unit or by the hydraulic system of the concrete pump, may be operated with a remote control by the pump operator.

4 ACCESSORIES USED DURING CLEANING OPERATION

Size of pipeline accessories shall match with the nominal size of concrete delivery pipeline. Salient features and general requirements of the pipeline...
accessories commonly used during cleaning operation of the concrete delivery pipeline shall be as described hereunder:

4.1 Pipe Cleaning Balls
Pipe cleaning ball is used for clearing of concrete from the pipeline and cleaning the inside surface of concrete delivery pipeline after finish of concreting.

4.1.1 The pipe cleaning balls shall be made from sponge rubber. Pipe cleaning balls made from plastic shall not be acceptable.

4.1.2 The diameter of pipe cleaning ball shall be such that it goes tight fitting in the concrete delivery pipeline to prevent flow of compressed air / water into concrete.

NOTES
1 Cleaning of placement booms may be performed by sucking the concrete back. As such, soft sponge rubber balls shall be used for cleaning of placement booms.
2 Long stationery pipelines are cleaned by blowing out with air or water. As such, hard sponge rubber balls shall be used for cleaning of long stationery pipelines.

4.2 Pipe Cleaning Heads
Pipe cleaning head (see Fig. 4) is used to push the sponge rubber ball in the concrete delivery pipeline during its cleaning operation.

4.2.1 A standard pipe cleaning head shall be equipped with the fittings/accessories mentioned below:
   a) Pipe connection with a valve for compressed air hose;
   b) Large dimensioned air drain cock;
   c) Pressure gauge; and
   d) Water connection with shut-off valve.

4.2.2 The pipe cleaning head shall be fabricated from structural steel conforming to IS 2062. Connection pipes and pipe fittings for compressed air/water shall conform to IS 1239 (Parts 1 and 2). Male flanges of the pipe cleaning head shall conform to IS 15447 (Part 1) and shall be suitable for quick locking type cup tension pipe coupling.

4.3 Catch Baskets (Trap Baskets)
Catch basket (see Fig. 5) is used when stationary concrete delivery pipeline is blown out with compressed air to arrest the pipe cleaning rubber ball and to keep the pipeline outlet closed after its cleaning to prevent explosion like escape of compressed air.

NOTES
1 Cleaning of placement booms may be performed by sucking the concrete back. As such, soft sponge rubber balls shall be used for cleaning of placement booms.
2 Long stationery pipelines are cleaned by blowing out with air or water. As such, hard sponge rubber balls shall be used for cleaning of long stationery pipelines.

5 PAINTING
The outside surface of metallic pipeline accessories shall be thoroughly cleaned to remove dirt, dust, grease, etc before application of two coats (each of minimum 20 µ thick) of anti-corrosive primer and two coats (each of minimum 20 µ thick) of synthetic enamel paint of light colour shade. The colour shade shall be as per agreement between the purchaser and the supplier. Synthetic enamel paints shall conform to IS 2932.
ANNEX A  
(Foreword)

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Construction Plant and Machinery Sectional Committee, MED 18

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Airport Authority of India, New Delhi  
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Amendments Issued Since Publication

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BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110 002

Telephones : 2323 0131, 2323 3375, 2323 9402
Website: www.bis.org.in

Regional Offices:

Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg
NEW DELHI 110002

Eastern : 1/14 C.I.T. Scheme VII M, V. I. P. Road, Kankurgachi
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