INTER PLANT STANDARD – STEEL INDUSTRY		
IPSS	**GENERAL REQUIREMENTS FOR CURRENT COLLECTOR ASSEMBLY** *(SECOND REVISION)*	**IPSS: 1-10-008-08** Formerly: IPSS:1-10-008-00
	Corresponding IS does not exist	

0. FOREWORD

0.1 This Inter Plant Standard (First Revision) has been prepared by the Standards Committee on Electrical components and equipment, IPSS 1:10 with the active participation of the representatives of the steel plants major consultancy organizations and established manufacturers of Current Collectors and was adopted in May 2008.

0.2 Inter Plant Standards for steel industry primarily aim at achieving rationalization and unification of parts and assemblies used in steel plant equipment and accessories, and provide guidance in indenting stores or equipment (or while placing orders for additional requirements) by individual steel plants. For exercising effective control on inventories, it is advisable to select a fewer number of sizes/types from among those mentioned in this standard, for the purpose of company standards of individual steel plants. It is not desirable to make deviations in technical requirements.

0.3 Although both the gravity and the spring loaded types of current collectors are covered in this Inter Plant Standard, it is expected that in due course all the steel plants shall change over to the gravity type because of its simple design.

0.4 The Second Revision of the standard has been carried out after reviewing its first revision based on the experiences of user steel plants.

1. SCOPE

1.1 This Inter Plant Standard covers the terminology, general requirements and tests of current collector assembly used on electric overhead travelling (EOT) cranes and other equipment like transfer cars and ingot carriers wherein current collection is done by moving current collectors along stationary electric supply lines of both ac and dc.

1.2 This Inter Plant Standard does not cover circular current collectors, like ring current collector and special current collector used in ore bridge crane.

2. **TERMINOLOGY** – For the purpose of this standard, the following definitions shall apply :

2.1 **Down Shop Leads** – Power lines stretched horizontally and generally consisting of bare conductors in the form of mild steel angles, channels, rails and I-beams with associated insulators for feeding electric power to EOT cranes through the current collectors running along the shop for the long travel of the crane bridge.

2.1.1 *Trolley lines* – Power lines stretched horizontally and generally consisting of bare conductors in the form of mild steel angles, channels, rails and I-beams with associated insulators for feeding electric power to the trolley through the current collectors running on the crane bridge for the cross travel, hoist, etc.

2.1.1.1 *Main and auxiliary trolley lines* – In the case of EOT cranes having two trolleys, for example, teaming cranes, hot metal cranes, etc, there may be two sets of trolley lines which may be called as main and auxiliary trolley lines.

2.2 **Current Collector Assembly** – A device consisting of the assembly of a conducting shoe with associated insulators and mounting metal structure used for drawing electric power by the contact of the moving shoe with stationary supply lines.

2.2.1 *Down shop current collector* – Current collector used for current collection from the down shop leads.

2.2.2 *Trolley line current collector* – Current collector used for current collection from the trolley lines.

2.3 **Single Stage Current Collection System** – The system wherein current collection is only in one stage for the operation of the equipment as in the case of transfer car.

2.4 **Two Stage Current Collection System** – The system wherein current collection is in two stages for the operation of the equipment as in the case of EOT Cranes in which one stage is for feeding power to the crane bridge and the second stage is for feeding power to the mechanism situated on the trolley.

2.5 **Types of Current Collectors** – The current collectors are classified broadly into the following types :

a) *Gravity types* – The types of current collector where the collector shoe moves on the surface of the down shop leads/trolleys lines and the contact is established by the weight of the collector shoe or counter weight attached to other end.

b) *Spring loaded type* – The type of current collector where the contact between the collector shoe and the down shop leads/trolley lines is established by means of spring mechanism. In this case, the collector shoe may move on the top or below or on the sides of the down shop leads/trolley lines.

3. SERVICE CONDITIONS

3.1 The following shall constitute the normal service conditions for the purpose of this standard as stipulated in IPSS:1-02-020-84 'Basic parameters for standardization of steel plant equipment' :

3.1.1 *Ambient temperature* - The reference ambient temperature shall be 50°C. Maximum temperature 55°C.

3.1.2 *Altitude* - The altitude shall not exceed 1000 m.

3.1.3 *Ambient air* - The ambient air may contain large amount of conductive dust.

3.1.4 *Humidity* - The maximum relative humidity shall be 100%. However, both maximum ambient temperature and maximum relative humidity are not likely to occur simultaneously.

4. RATINGS

4.1 **Rated Voltage** – The rated voltage of the current collector shall be 415 V ac or 230 V dc or 460 V dc.

4.2 Rated Current

4.2.1 *Rated current of the down shop current collector* – The rated current of the down shop current collector shall be :

a) 500 A, 800 A or
b) 1000 A, 1200 A.

4.2.2 *Rated current of the trolley line current collector* – The rated current of the trolley line current collector shall be :

a) 100 A, 200 A, or
b) 300 A, 400 A

NOTE: The current collectors of this type can be used in place of the type mentioned in 4.2.1 for light duty cranes of class 1 (see 3 of IPSS:2-02-001-81 'Design parameters for cranes').

5. CONSTRUCTION AND DESIGN

5.1 The current collector frame shall be sturdy and fully galvanized.

5.2 Current collector frames shall have two holes for inserting pin through the frame and shoe for proper adjustment.

5.3 At least two holes shall be provided on the shoe for jumper connection. Spare holes should be plugged with stainless steel or non-corrosive bolts.

5.4 Shoes shall be effectively chamfered on both sides.

5.5 The current carrying arrangement from the current collector shoe to the frame and then to the external lead (through flexible jumper or the like) shall be such that it is suitable not only for conducting normal rated current but also short time over current without burning/sparking at the connection joints. Flexible jumper should be such that it will not cause any restriction to free movement of collector shoes.

6. GENERAL REQUIREMENTS

6.1 **Material of Shoe** – The material of the shoe of the current collector shall be one of the following. However, the material of the shoes shall be softer than the trolley lines :

a) *Cast iron* - The cast iron material shall conform to grade FG 200 of IS 210:1993 `Specification of grey iron castings (*fourth revision*)'. The thickness of galvanizing or tinning on the surface of the cast iron shoe wherever so specified by the purchaser, shall not be less than 20 microns.

b) *Cast steel* - The material shall conform to any one of the classes of cast steel specified in IS 2004:1991 `Carbon steel forgings for general engineering purposes (*third revision*)'.

c) *Brass, bronze or phosphor bronze* – The material shall conform to the following Indian Standard Specifications :

1) Brass – IS 6912:1985 `Copper and copper alloy forging stock and forgings (*first revision*) (*superseding IS 3488:1980*)'

2) Bronze – IS 305:1981 `Specification for aluminium bronze ingots and castings (*second revision*)`; and

3) Phosphor Bronze – IS 7811:1985 `Phosphor bronze rods and bars (*first revision*)'.

d) *Graphite* – It shall conform to IS 13584:1993 `Brush materials for electrical machinery [*superseding IS 3003(Part 2):1977*]'.

6.2 **Size** – The preferred size of cast iron and cast steel current collector shall be according to relevant Inter Plant Standard.

6.3 As the use of bronze, brass, phophor bronze and graphite for current collectors are limited, the sizes for these shall be as agreed to between the purchaser and the supplier.

6.4 **Fixtures For Current Collector Assembly** – If so desired by the purchaser, the current collector shall be supplied complete with the fixture. The different parts of the fixture shall conform to following material specifications :

a) *Ceramic Insulator* – IS 8765:1978 'Specification for ceramic insulating materials for electrical purposes'.

NOTE: Material of spring should be - cold drawn spring steel Grade-I of IS 4454 (Part 1) : 1981 'Steel wires for cold formed springs : Part 1 Patented & cold drawn steel wires-unalloyed (*third revision*)'.

b) *Spring washer* – IS 3063:1994 'Fasteners – Single coil rectangular section spring lock washers (*second revision*)'.

c) *Punched washer* – IS 2016:1967 'Specification for plain washers (*first revision*)'.

d) *Hexagon bolt, nut, stud, etc* – IS 1364:2002 'Hexagon head bolts, screws & nuts of product grades A & B'. These shall be made from Cd/Zn coated mild steel as required by the purchaser.

e) *Insulating washer and tubes* – Micanite or Teflon tube, sleeve, etc.

f) *Collector arm, collector pad, rod, clamp, pin, etc* – Fe 410-S Grade of IS 2062:1999 'Steel for general structural purposes *(fifth revision)* (*supersedes IS 226:1975*) '.

g) *MS split pin* – IS 549:1974 'Specification for split pins (*second revision*)'.

h) *Wooden block* – Teak wood, suitably treated for weather proofing and insulation.

i) *Cable lug, copper braided shunt etc* – Tinned copper.

j) *Mild steel channel* – IS 2062:1992.

7. The drawing of current collector assembly shall have the following information :

a) Rated voltage,
b) Rated current, ac or dc;
c) Material of shoe (6.1)
d) Reference to IPSS:1-10-008-08
e) Name of manufacturer, and
f) Sl. No. and year of manufacture.
g) Type of current collector
h) Reference No. of drawing which shall also be engraved by current collector assembly.

8. **SAMPLING** – Sampling shall be done according to IS 4905:1968 `Methods for random sampling'.

9. **TESTS**

9.1 **Visual Inspection** – The collector shoe shall be free from cracks, blow holes burrs, projections and other harmful defects. Blow holes and cracks which are deeper than 5 mm shall not have been rectified by welding. Micanite bushes shall be checked for satisfactory quality.

9.2 **Voltage Test** – The assembled unit shall withstand a voltage of 2 kV between the shoe and the stand for one minute.

9.3 Test certificate should be supplied along with the current collector.