INTER PLANT STANDARD IN STEEL INDUSTRY		
IPSS	**DESIGN PARAMETERS FOR GALLERIES AND TUNNELS FOR BELT CONVEYORS IN STEEL PLANTS**	**IPSS:2-03-001-20 *(*Second *Revision)***
	Based on IS 11592:2000	Formerly: IPSS: 2-03-001-97 (First Revision)

0. FOREWORD

0.1 This Interplant Standard has been prepared by the Standards Committee on Conveyors, IPSS 2:3, with the active participation of the representatives of all the steel plants, reputed consultants and established manufacturers of conveyors and conveyor equipment and subsequently revised with second revision in **September, 2020**.

0.2 This standard attempts at prescribing uniform parameters for the design of galleries and tunnels for general purpose belt conveyors used in steel industry. It is expected that this standard will help in minimizing the lead time in designing of the general stretch of the conveyor (that is, where special installations are not present), so that the designer can proceed with the design without waiting for the data from the equipment suppliers as well as the steel plant. For the specific stretches where special installations like trippers, vertical take-ups, magnetic separators and metal detectors, belt weighers, etc., are envisaged, the designer may have to work after the requisite data becomes available. The details of design approach for civil and structural works have not been covered in this standard, for which guidance shall be taken from the relevant Indian Standards.

0.3 This standard is essentially futuristic, in nature and as such the developments in technology have been incorporated in it to the extent possible. Hence for new steel plants and in the expansion program of the existing steel plants, deviation from the stipulations of this standard is not desirable. However, if the present situation in any existing steel plants so demands, the designer may deviate from the stipulations of this standard with respect to the dimensions, construction, etc.

0.4 This standard was originally published in 1981. In the light of the experience gained in the usage of this standard since then and after

extensive discussions with the executives in the steel plants and captive mines, consultancy organizations and the experts from the conveyor system fabricating organizations, through a Workshop on Conveyors held on 21 January 1995, and thereafter it was revised with first revision in the year 1997. The major changes include:

a) inclusion of provision for conveyors with belt width 1800 mm and 2000 mm

b) Harmonization with IS 11592:2000, 'Code of practice for selection and design of belt conveyors'.

1. SCOPE

1.1 This Inter Plant Standard covers the design parameters and related aspects of galleries and tunnels for general purpose belt conveyors for transporting bulk materials.

1.2 The standard does not cover galleries for conveyors provided with tripper or other special installations.

NOTE-The provisions mentioned in this standard for galleries are equally applicable to tunnels also unless specified otherwise.

2. GENERAL FEATURES

2.1 **Dimensions** - Main clearance dimensions, such as gallery width, clear headroom and width of walkways, shall be according to Table-1 and 2 read with Fig-1 and 2 respectively.

2.2 **Construction** –

2.2.1 All overhead conveyor galleries shall be of steel construction and shall be suitably painted for protection against corrosion.

2.2.2 Tunnels shall be of RCC construction with suitable water proofing.

2.2.3 Roofing and side sheeting shall be of galvanized corrugated steel or color coated sheets for protection against rain. For better natural illumination, every sixth sheet on side shall be of perapex or fibre reinforced plastic and shall be staggered on the opposite side wall. Gaps of 300 mm and 150 mm shall be provided at the top of the side sheeting below the roof sheeting and at the bottom of the side sheeting above the gallery floor, respectively, to allow natural ventilation and lighting. The roof sheeting shall be suitably extended to prevent entry of rain water through the top opening.

2.2.4 Continuous flooring shall be provided along the entire length and width of the gallery and there shall be no uncovered opening on the gallery floor except to allow for vertical take-up. Gallery walkways shall be covered with chequered plates or cast in-situ or precast RCC slabs with antiskid finish and the flooring below the conveyor shall be of 3.15 mm (minimum) steel sheets. Wooden flooring shall not be used for covering the floor.

2.2.5 If hydroflushing is envisaged, a minimum slope of 1.5 percent in the horizontal portion of the gallery shall be provided as shown in dotted lines in Fig-1 and 2.

2.2.6 The conveyor stringer supports shall be spaced 3.0 m apart to correspond to the gallery cross members. This distance may, however, be reduced to suit specific requirements. The supports shall be welded or bolted to the cross members of the gallery floor. In tunnels, the supports may be fixed on the insert embedded on the concrete floor or by grouting in the pockets left for the purpose.

2.2.7 Walkway having inclination between 6^0 to 12^0 shall be provided with cross ribs (with no sharp edges) on the floor at an interval of 250-300 mm. Wooden battens shall not be used as ribs. Where gallery inclination is more than 12^0, walkways shall be provided with regular steps. Cross ribs or steps shall cover the whole width of walkways. Hand railing shall be provided along the gallery trusses. The railing shall consist of toe guard minimum 75 mm high and top rail with/without mid rail. The top rail shall be made out of tubes of 40 mm diameter and supported between members of gallery truss. Steel strip of dimension 75x6 mm may be used as the mid rail. The top rail shall be located at a height not less than 1000 mm above the floor level.

NOTE: With a view to avoid discomfort in walking along the steeped portion of the gallery, the rise shall not be more than 200 mm.

2.2.8 Emergency escapes with suitable stairs, having access from gallery floor to ground level or nearby safe area shall be provided at a maximum interval of 150 m. Cross-overs shall be provided over the conveyors at the location at emergency escapes. Underpassage may also be provided in lieu of cross-overs. Minimum bottom level of the cross over above the floor shall be 2000 mm. The cross over shall be provided with complete flooring and hand railing of height 1000 mm (minimum). Headroom over the cross over shall be 1800 mm (minimum). Width of the cross over shall not be less than 600 mm.

2.2.8.1 Cross overs shall not be provided in the concave portion of the conveyor.

2.2.9 The location where the gallery has to house conveyor having a concave curvature, the gallery shall be designed in such a manner that it would closely follow the contour of the belt in order that the belt line anywhere shall not be higher than 1500 mm above the gallery floor and also the belt would not foul with the underside of the gallery anywhere. Adequacy of this provision shall be rechecked on receipt of the general arrangement drawings of the conveyor from the equipment supplier.

2.2.10 Where the tunnels emerge at the ground level, a penthouse with suitable cross-overs, access doors, etc. shall be provided.

2.2.11 Special provisions shall be made in the tunnels for:

a) Prevention of flooding,
b) Regular disposal of seepage water and sludge,
c) Effective ventilation - in such a manner that air circulation shall not make the dust air-borne.
d) Adequate lighting,
e) Fire/explosion prevention arrangements,
f) Fire fighting arrangements, and
g) Power points as per the provisions of IPSS: 2-03-009-20. Maintenance facilities in conveyor system.

2.2.12 ***Service Lines*** - The service lines shall be provided in the space at the top as shown Fig-1 and 2 or on the sides, ensuring that the clear headroom shall not be less than 2500 mm.

3 LOADS & CAPACITIES

3.1 The loads and capacities shall confirm to the provision of IS 11592:2000.

3.1.1 *Dead Load*s. - The indicative dead loads per running metre of the empty belt conveyor i.e., without the conveyed material for various belt widths are given in TAble-3. For the purpose of design, this or the actual loading, whichever is less, shall be adopted. These loads are only indicative for guidance in design. These shall be reviewed on receipt of the load data from the equipment suppliers.

3.1.2 The live load per metre length of the conveyor shall be calculated by the following formula:

Weight of material carried per running metre in kg = A x p x 1.2

Where A = Area of cross section of load stream completed according to IS 4776 (Part-1):1977 Specification for Troughed belt

Conveyors, Part 1 Troughed belt conveyors for Surface installation (*first revision*)

P = Bulk density of the material carried kg/m^2

NOTE: 1.2 in the above formula is the non-uniformity factor

3.1.3 The live load over the walkway portion of the gallery floor due to spillage and operating personnel shall be taken as 300 kg/m^2 and that on the portion under the conveyor shall be taken as 75 kg/m^2 to cater for spillage.

3.1.4 The wind, dynamic and other loads shall be computed from the relevant Indian Standard.

TABLE 1

DIMENSIONS Of' GALLERIES HOUSING SINGLE CONVEYORS

(Clause 2.1 & to be read with Fig-I)
(All Dimensions in Millimetres)

Sl. No.	Belt Width	A	B(min)	l_1	C	W
1.	500	1000	900	790	1000	2900
2.	650	1000	1050	1000	1000	3050
3.	800	1000	1200	1090	1000	3200
4.	1000	1000	1400	1290	1000	3400
5.	1200	1000	1610	1500	1000	3610
6.	1400	1000	1810	1700	1000	3810
7.	1600	1000	2060	1900	1200	4260
8.	1800	1000	2300	2150	1200	4500
9.	2000	1000	2550	2350	1200	4750

NOTE 1: The dimension B is only indicative and is based on IS 8598:1987 'Specification for idlers and idler sets for belt conveyors (first revision). However, dimension W need not be revised in-case there is a reduction or increases in this dimension B as a result of the particular manufacturing practice.

NOTE 2: The dimensions A and C indicate the distance between the centre line of the conveyor support post to the gallery structure / tunnel wall. The clear walkway widths shall not be less than 800 mm and 900 mm for the auxiliary and the main walkway, respectively.

NOTE 3: Adequate space in the gallery (minimum clear space) for hot belt jointing shall be provided preferably near belt feeding point.

TABLE 2

DIMENSIONS Of' GALLERIES HOUSING DOUBLE CONVEYORS
(Clause 2.1 & to be read with Fig-2)
(All Dimensions in Millimetres)

Sl. No.	Belt Width mm	A	B	l_1	D (min)	W (min)
1-	500 + 500	1000	900	790	1000	4800
2.	650 + 650	1000	1050	940	1000	5100
3.	800 + 800	1000	1200	1090	1000	5400
4.	1000 + 1000	1000	1400	1290	1000	5800
5.	1200 + 1200	1000	1610	1490	1000	6220
6.	1400 + 1400	1000	1810	1690	1000	6620
7.	1600 + 1600	1200	2060	1900	1200	7720
8.	1800 + 1800	1200	2300	2100	1200	8200
9.	2000 + 2000	1200	2550	2300	1200	8700

NOTE 1 The dimension B is only indicative and is based on IS 8593:2019.

NOTE 2 The dimension A and D indicate the distance between the centre line of the conveyor support post to the gallery structure / tunnel wall. The clear walkway widths shall not be less than 800 mm and 900 mm for the auxiliary and the main walkway, respectively.

NOTE 3 The minimum values for the dimensions of W have been given since these may vary due to arrangements of other Installations like tail end, discharge and drive, etc.

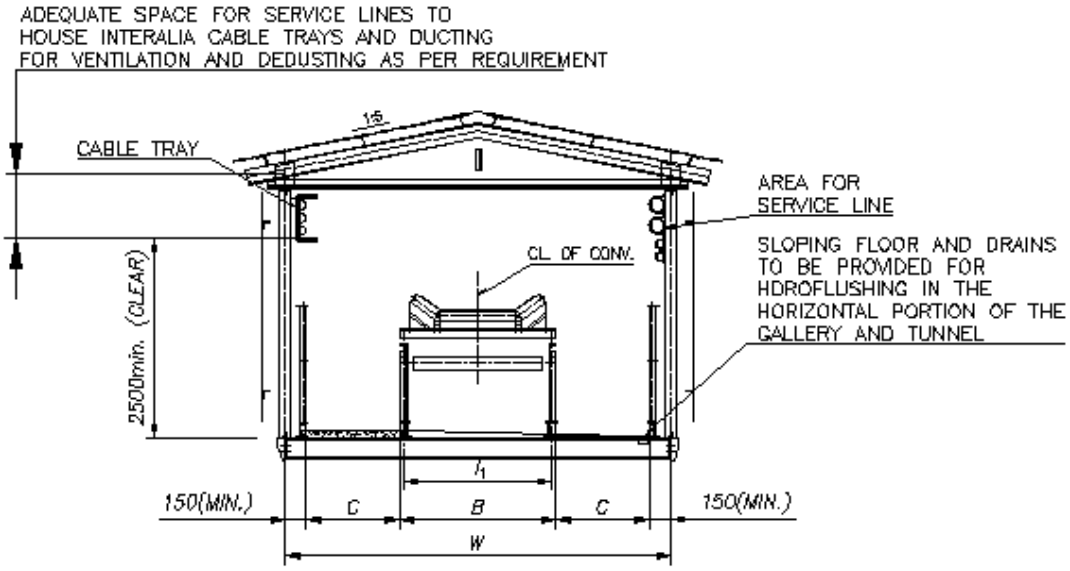
NOTE 4 Where the number of belt conveyers in a gallery is more than two, the dimension B and D shall be suitably repeated to arrive at the gallery width W.

NOTE 5 For determining the width W of the galleries housing conveyers of different belt widths, the dimensions B and D shall be taken from above, where the dimension D shall correspond to the higher belt size.

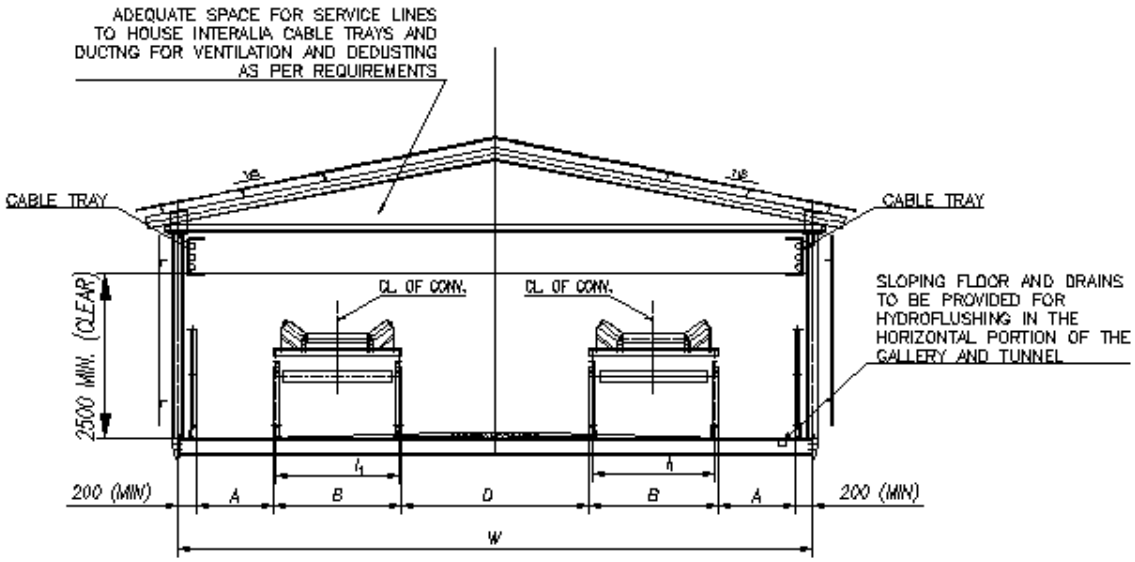
TABLE 3

DEAD LOAD OF A CONVEYOR (INSTALLATION IN GALLERY/ TUNNELS}

Sl No.	Belt Width mm	Dead Load per Running Metre kg
1.	500 and 650	150
2.	800 and 1000	200
3.	1200	250
4.	1400 and 1600	300
5.	1800 and 2000	400



ALL DIMENSIONS IN MILLIMETERS
FIG. 1 SINGLE CONVEYOR GALLERY



ALL DIMENSIONS IN MILLIMETERS
FIG. 2 DOUBLE CONVEYOR GALLERY