



INTERNATIONAL ENGINEERING PLANT

AN ISO 9001-2008 ORGANIZATION

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INTERNATIONAL ENGINEERING PLANT

AN ISO 9001-2008 ORGANIZATION

OUR CUSTOMER LIST



McNally Bharat Engineering Co. Ltd.



NEELACHAL ISPAT NIGAM LTD.



ISO - 9001 : 2008

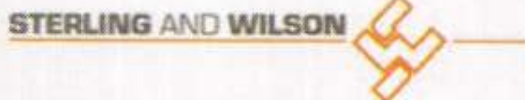


SIEMENS

VISA STEEL



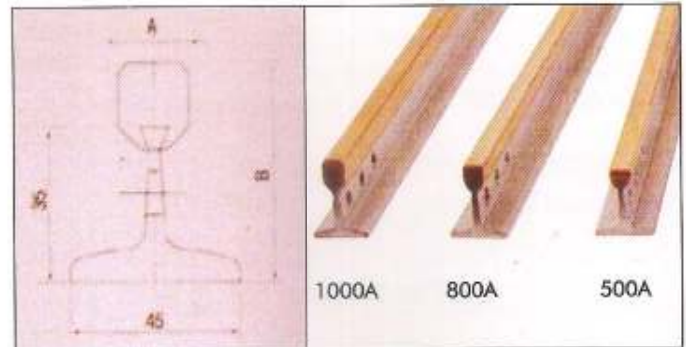
BSNL



COPPER HEAD CONDUCTOR RAILS

The Copperhead conductor Rail was DEVELOPED in India by P. MITRA, the founder of IEP and we at IEP developed many railway systems. The "T" or "hollow T" section and the extruded copperhead is drawn through a special die, which compresses the copper flanges around the dovetail head of the rail, connecting the two components to a 100% rigid unit.

These conductors have proven an outstanding success for safe power feeding of : Travelling cranes, Loading bridges, Container handling equipment, Monorails, Hoists, Coking machinery and many other application. The Copperhead Conductor Rails are available in sizes to meet individual current requirements from 200 to 4000 Amps. This system is installed at SAIL R.S.P., SAIL BSP, Bhushan, etc.



The main users are : Steel mills, Coking plants, Gas works, Cement industries, Ship yards and Dockside enterprise, Transit and People Mover System.

SOME ADVANTAGES OF IEP RAIL SYSTEMS

With IEP Systems you eliminate all drawbacks inherent in the conventional design of trolley wires, steel angles and steel rails.

- Copperhead Rails ensure an efficient and continuous contact,
- There is no sparking.
- The easy maintenance is a proven low factor.
- No losses due to interruption of service, no downtime,
- Negligible wear-almost unlimited life of conductors.
- Much lower resistance between copperhead and carbon pick-up shoe.

Adequate Ampere Capacity must be provided to carry the anticipated electrical loads:

Total Ampere load is determined from the nominal rated full load current reduced by the duty cycle (/ED) and by a diversity factor for non-simultaneous operation.

The average crane motor duty cycle is usually between 40% and 60%, depending on the type of application, A diversity factor of 0.4 to 0.7 can be used when there are more than one crane on the same runway.

Example:

3 cranes, each $I_n = 300$ Amps.

Length of runway: 100 m (330')

Assumed duty cycle: 60% (ED)

Assumed diversity factor: 0.7

Ampere load per crane: $I_n \times f_{ED} = 300 \times 0.78 = 234$ A

Ampere load for 3 cranes: $234 \times 3 = 702$ A

Total Ampere load when using

a diversity factor of 0.7: $702 \times 0.7 = 491.4$ A

Selected conductors : F35/100

or: F45/50



Formula for Voltage Drop Calculation:

AC : $\Delta u = \sqrt{3} \times I \times z$

DC : $\Delta u = 2 \times I \times R$

Δu = Voltage drop [V]

I = Ampere load [A]

z = Impedance [ohm/m]

R = Resistance [ohm/m]

L = Length from Power feed
to end of conductor [m]

L = System Length [m]

Selection of Conduors :

Duty Cycle	f_{ED}
100%	1.00
80%	0.90
60%	0.78
50%	0.71
40%	0.63

Other Criterion :

- Select the conductor cross section to carry the calculated total Ampere load and consider the voltage drop calculation to maintain the limits established by the motor manufactures. The conductor size and/or number of feed points should be increased in case the drop is exceeding the limitations. For very high Ampere loads, it may be necessary to provide booster cables.
- Specify the correct IEP conductor by considering the type of application and environment, such as heavy or light duty service, corrosion, heat, humidity, internal standards.

Effectice Length:

L = power feed located at the end of the system

$L/2$ = power feed located at the mid-point of the system

$L/4$ = power feed located at both ends of the system

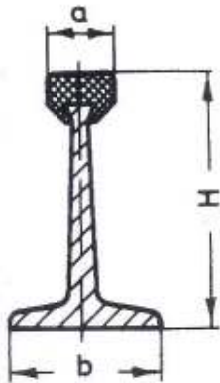
$L/6$ = power feed located at $L/6$ from each end of the system

Engineering Data:

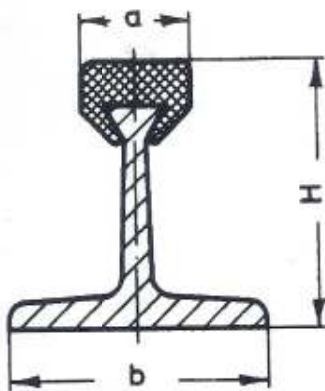
Conductor Type	Maximum Continuous Amps.	Resistance Ohm/ 1000 m	Impedance* Ohm/ 1000 m
IEP/F 45/50	495	0.178	0.266
IEP/F 45/100	620	0.119	0.223
IEP/F 45/150	728	0.089	0.203
IEP/F 45/200	826	0.072	0.194
IEP/F 45/300	1000	0.051	0.182
IEP/F 45/400	1156	0.040	0.174
IEP/F 45/500	1299	0.033	0.169
IEP/F 45/600	1432	0.028	0.165
IEP/F 45/700	1582	0.023	0.0681
IEP/F 45/800	1725	0.018	0.0445
IEP/F 45/1000	1869	0.013	0.0209

STEEL - COPPERHEAD RAILS

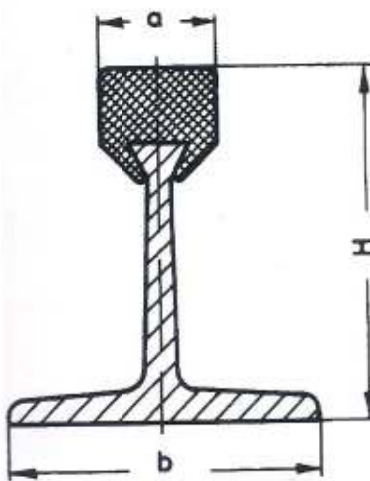
Scale 1 : 1



L 20



F 35



F 45

Type	Copper cross section mm ²	Steel cross section mm ²	Equival. total copper conductor mm ²	H mm	a mm	b mm	Weight kg/m	Max. continuous A	Catalog-No.
IEP/L 20/ 14-7	14	150	36	31	6.5	20	1.24	220	100.007
IEP/L 20/ 25-7	25	150	47	33	8	20	1.34	256	100.017
IEP/L 20/ 50-7	50	150	72	34	10	20	1.57	327	100.027
IEP/L 20/ 100-7	100	150	122	38.5	12	20	2.02	444	100.037

Standard lengths :
7 m (23')

Main application :
conductor system for hoists and monorails, down-shop
and cross travel supply for light cranes

Best applicable collectors : IEP/DVD 1 and IEP/DVD

Type	Copper cross section mm ²	Steel cross section mm ²	Equival. total copper conductor mm ²	H mm	a mm	b mm	Weight kg/m	Max. continuous A	Catalog-No.
IEP/F 35/ 30-7	30	265	69	32	14.2	35	2.34	320	104 317
IEP/F 35/ 50-7	50	265	89	33.1	14.6	35	2.52	410	100 047
IEP/F 35/ 100-7	100	265	139	36.0	15.3	35	2.97	529	100 057
IEP/F 35/ 150-7	150	265	189	38.3	17.3	35	3.42	632	100 067
IEP/F 35/ 200-7	200	265	239	40.8	17.3	35	3.87	724	100 077

Standard lengths :
7 m (23')

Main application :
conductor system for heavy and monorails, down-shop and
cross travel supply for medium duty cranes

Best applicable collectors : IEP/GSV 1, IEP/GSV 2, IEP/GSV 4 and IEP/GSV 8

Type	Copper cross section mm ²	Steel cross section mm ²	Equival. total copper conductor mm ²	H mm	a mm	b mm	Weight kg/m	Max. continuous A	Catalog-No.
IEP/F 45/ 50-7	50	355	102	41.1	14.6	45	3.23	495	100 087
IEP/F 45/ 100-7	100	355	152	46.0	15.3	45	3.68	620	100 097
IEP/F 45/ 150-7	150	355	202	48.3	17.3	45	4.13	728	100 107
IEP/F 45/ 200-7	200	355	252	50.8	17.3	45	4.58	826	100 117
IEP/F 45/ 300-7	300	355	352	56.3	17.6	45	5.48	1000	100 127
IEP/F 45/ 400-7	400	355	452	59.3	19.6	45	6.38	1156	100 137
IEP/F 45/ 500-7	500	355	552	64.3	19.6	45	7.28	1299	100 147
IEP/F 45/ 600-7	600	355	652	65.0	23.2	45	8.18	1432	100 157

Standard lengths :
7 m (23')

Main application :
conductor system for heavy and monorails, down-shop and
cross travel supply for medium duty cranes

Best applicable collectors : IEP/GSV 1, IEP/GSV 2, IEP/GSV 4 and IEP/GSV 8

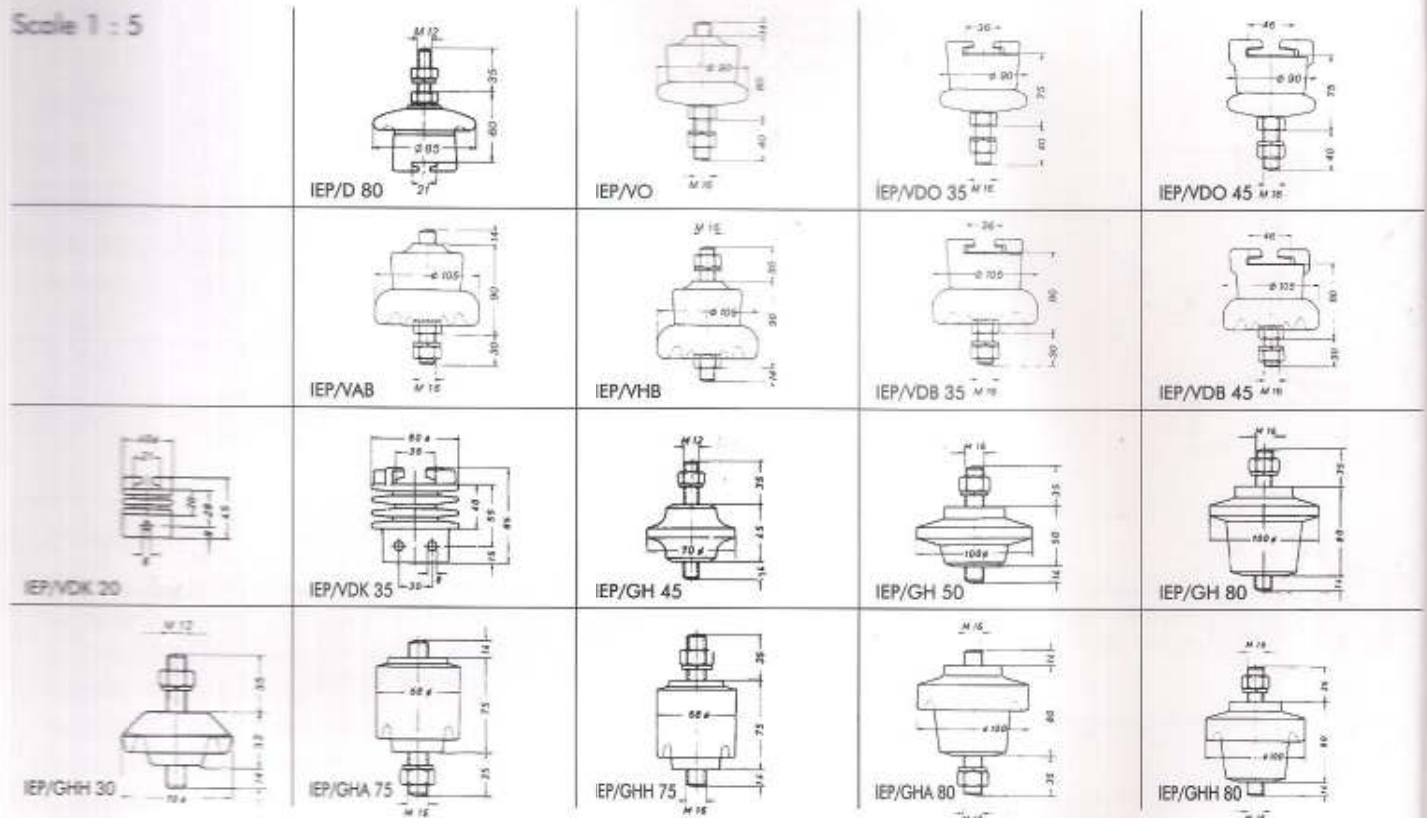


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INSULATORS UP TO 1000 V

Scale 1 : 5



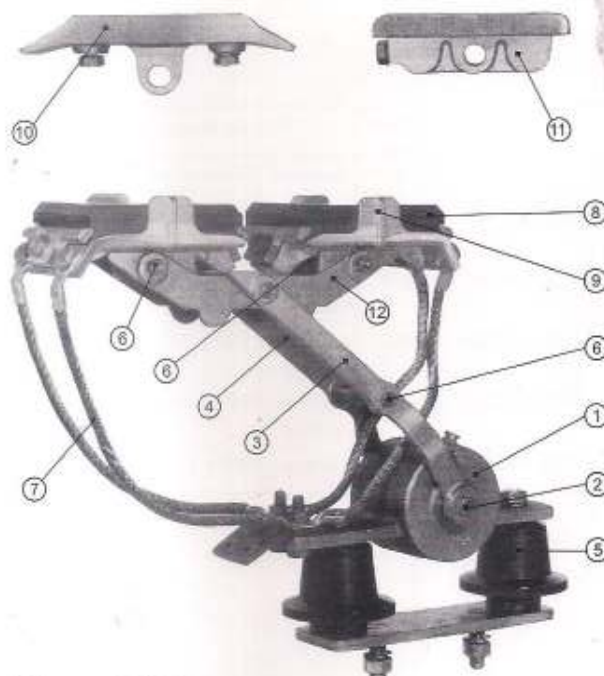
Type	for Rail base	Leakage-Distance mm	Rail Mounting Possibilities	Mechanical Strengths (kp)			Material	Weight kg	Catalog-No. for bolt lengths 30-40 mm		Catalog-No. for bolt lengths 70 mm	
				Tension	Compress	Cantilever			Phase	Ground	Phase	Ground
IEP/D 80	20 mm	60	T →	800	800	450		0.61	White 101 380	brown 101 390		
IEP/VO	all rails	60	⊥ T →	1800	1800	700	porcelain	1.02	105 667	105 668	White 101 400	brown 101 410
IEP/VDO 35	35 mm	60	⊥ T →	1800	1800	700		1.20	105 669	105 670	101 580	101 590
IEP/VDO 45	45 mm	60	⊥ T →	1800	1800	700		1.22	105 671	105 672	101 660	101 670
IEP/VAB	all rails	100	⊥ T →	2100	2100	770	porcelain	1.51	105 673	105 674	101 440	101 450
IEP/VHB	rails	100	⊥ T →	2100	2100	770		1.51	101 520	101 530	112 900	105 572
IEP/VDB 35	35 mm	100	⊥ T →	2100	2100	770		1.49	105 675	105 676	101 620	101 630
IEP/VDB 45	45 mm	100	⊥ T →	2100	2100	770		1.55	105 677	105 678	101 700	101 710
IEP/VDK 20	20 mm	60	⊥ T →	300			polyamid	0.04	light 101 780	yellow 101 790		
IEP/VDK 35	35 mm	160	⊥ T →	600				0.17	101 800	101 810		
IEP/GH 45	all rails	70	⊥ T →	1600	1500	600	resin	0.26	brown 101 820	yellow 101 830		
IEP/GH 50		80	⊥ T →	1800	2000	900		0.56	101 840	101 850		
IEP/GH 80		120	⊥ T →	2100	2000	950		0.82	101 860	101 870		
IEP/GHH 30		65	⊥ T →	1000	1500	450		0.16	106 090	106 091		
IEP/GHA 75		115	⊥ T →	1600	2000	650		0.64	101 900	101 910		
IEP/GHH 75		115	⊥ T →	1600	2000	650		0.64	101 880	101 890		
IEP/GHA 80		125	⊥ T →	2100	2000	950		0.87	104 650	104 660		
IEP/GHH 80		125	⊥ T →	2100	2000	950		0.87	104 630	104 640		

SPARE PARTS FOR CURRENT COLLECTORS

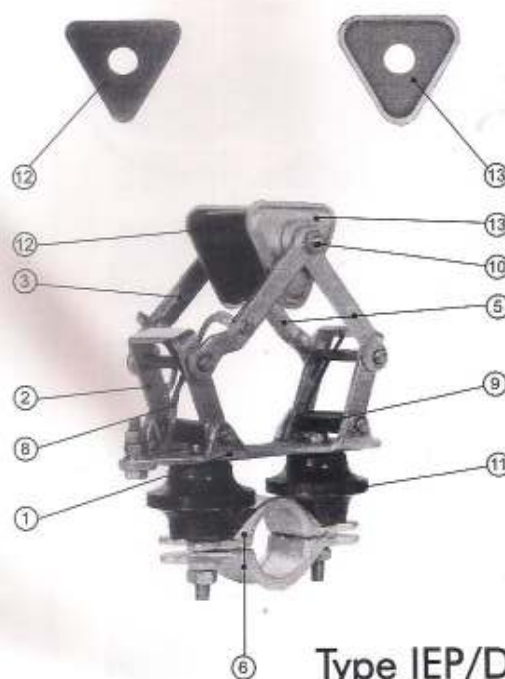
Description	Part No.	IEP/GSV 1 Catalog-No.	IEP/GSV 1 S Catalog-No.	IEP/GSV 2 Catalog-No.
Collector spring	1	102 640	102 640	102 800
Spring bolt	2	102 650	102 650	102 810
Lever w/thread, mod. 616	3	104 490	104 490	102 660
Lever w/boring, mod. 615	4	104 500	104 500	102 670
Insulator w/o bolts Phase ground	5	102 680	102 680	102 820
Insulator for N-series Phase		105 380	105 380	105 492
w/o bolts ground		-	-	102 830
Space tubes, 1 set	6	102 640	102 640	102 800
Copper shunt lead, 1 set	7	102 640	102 640	102 800
Carbon brush, graphite	8	102 720	102 770	102 870
Carbon brush, metal-impr.		102 730	102 780	102 880
Copper holder w/clamps	9	102 740	102 790	102 890
Pick-up shoe, (brass)	10	102 750	-	102 900
Pick-up shoe, (GG-20)	11	102 760	-	102 910

Description	Part No.	IEP/GSV 1 Catalog-No.	IEP/GSV 2 Catalog-No.
Collector spring	1	102 920	103 010
Spring bolt	2	102 930	102 930
Lever w/thread, mod. 616	3	102 660	102 660
Lever w/boring, mod. 615	4	102 670	102 670
Insulator w/o bolts Phase ground	5	102 820	102 820
Insulator for N-series Phase		105 492	105 492
w/o bolts ground		102 830	102 830
Space tubes, 1 set	6	102 940	103 020
Copper shunt lead, 1 set	7	102 960	103 040
Carbon brush, graphite	8	102 970	102 970
Carbon brush, metal-impr.		102 980	102 980
Carbon brush, metal-impr. (140 x 140 x 30)	9	104 190	140 190
Copper holder w/clamps		102 99	102 990
Copper holder w/clamps (140 x 140 x 30)	10	140 200	104 200
Pick-up shoe, (brass)		103 000	103 000
Swing, 1 set	12	-	103 050

Description	Part No.	IEP/DVD Catalog-No.
Base plate	1	103 190
Bow	2	103 200
Lever	3	103 210
Lever	5	105 690
Clip, Phase ground	6	106 019
		106 020
Copper shunt lead, 1 set	8	103 250
Tension spring	9	103 260
Spacer tube	10	103 270
Insulator Phase ground	11	103 150
		105 370
Triangular carbon, graphite	12	103 280
Triangular side plate	13	103 180



Type GSV



Type IEP/DVD

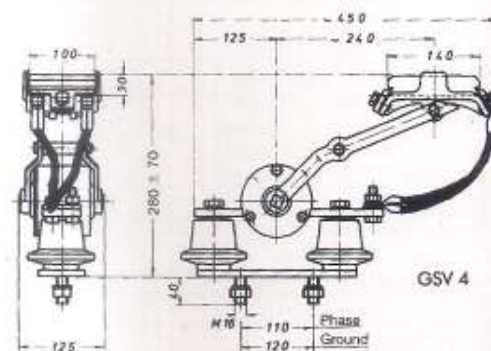


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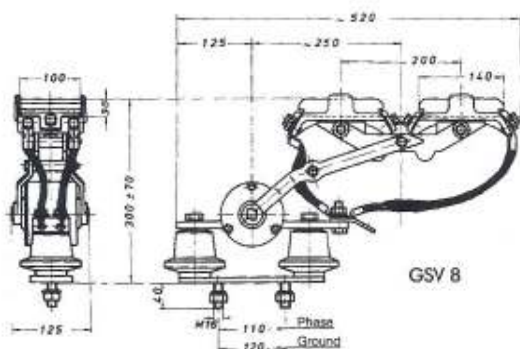
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HEAVY DUTY CURRENT COLLECTORS

Type	Capacity A	Pick-up shoes		Weight Kg	Catalog - No. Ground		
		Material	Dimensions mm		Phase	Insul.	Unisol.
IEP/GSV 4	400	graphite carbon	100 x 140 x 30	11.72	102 300	102 310	104 020
IEP/GSV 4/mi	400	met.-impr. carbon	100 x 140 x 30	12.10	102 320	102 330	104 030
IEP/GSV 4/Nmi	400	met.-impr. carbon	100 x 140 x 30	11.58	102 340	102 350	104 070
IEP/GSV 4/Smi	400	met.-impr. carbon	100 x 140 x 30	13.16	102 040	104 050	104 060
IEP/GSV 4/Ms	400	brass	90 x 125 x 15	11.57	102 360	102 370	104 080



height of IEP/GSV 4/N : 250 ± 70



height of IEP/GSV 8/N : 270 ± 70

Type	Capacity A	Pick-up shoes		Weight Kg	Catalog - No. Ground		
		Material	Dimensions mm		Phase	Insul.	Unisol.
IEP/GSV 8	800	graphite carbon	100 x 140 x 30	15.34	102 380	102 390	104 090
IEP/GSV 8/mi	800	met.-impr. carbon	100 x 140 x 30	15.79	102 400	102 410	104 100
IEP/GSV 8/Nmi	800	met.-impr. carbon	100 x 140 x 30	15.43	102 420	102 430	104 140
IEP/GSV 8/Smi	800	met.-impr. carbon	100 x 140 x 30	18.16	104 110	104 120	104 130
IEP/GSV 8/Ms	800	brass	90 x 125 x 15	15.05	102 440	102 450	104 150

All malleable iron parts are galvanized. They can be plastic-coated for a small surcharge.
Insulators are high quality cast resin.

LIST OF FEW MAJOR ITEMS MANUFACTURED

ELECTRICAL ITEMS :

1. DSL System : Complete from Designing to Commissioning
2. Trolley Line System Complete from Designing to Commissioning
3. Festoon Cable Trolley Arrangement
4. Copper Headed Rail Bus Bar
5. Non Standard Rails of size 30 / 60 / 75 Lbs
6. Catenary Wire System - Complete from Designing to Commissioning
7. Grooved Power Conductor - Copper
8. Current Collector - Pantograph, Gravity, etc.
9. Copper Flexible Shunt
10. Copper Flexible Jumper
11. Moulded Slip Ring
12. Fabricated Slip Ring
13. LT Insulators - Porcelain / Epoxy / DMC / SMC
14. HT Insulator - Porcelain / Epoxy
15. Assorted spares for Motor as per Drawing :
Cooling Fan, Impeller, Brush Holder, Rocker Arm, End Shield, Terminal Box etc.
16. Fixed & Moving Contacts for Contactor, Relay, Switches - material Copper / Copper Cadmium / Silver / Bronze, etc.
17. LED based Indicating Lamps
18. Cable Lug, Cable Gland, etc.





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RAIL (I.U.)

WHENEVER YOU FAIL TO LOCATE OR FIND ANY SIZE PLEASE CONTACT US

RAILS (I.U.)
30 Lbs to 90 Lbs
As per IS : 3443 -1980

SPECIAL

Low temperature rolling imparts higher strength to the structure.

Piling and automatic tying of the structure ensure minimum damage handling and transport.

Invoicing : As per actual weight.

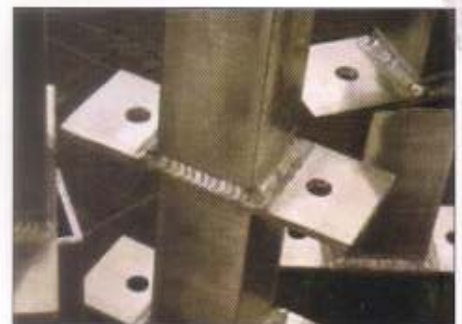


ITEM	SIZE(mm) in LBS (yd)	HEIGHT mm	BOTTOM mm	TOP mm	WEB mm
Rail	24 LBS	69.00	70.00	38.00	7.00
Rail	30 LBS	76.20	76.20	41.26	7.54
Rail	40 LBS	86.00	82.00	47.00	11.51
Rail	45 LBS	87.50	84.00	48.10	11.51
Rail	60 LBS	115.00	109.54	57.48	11.51
Rail	75 LBS	130.00	122.24	61.91	13.89
Rail	80 LBS	130.00	123.00	63.00	14.20
Rail	90 LBS	136.53	142.90	63.68	14.29

RAIL OF VARIOUS SIZES



FABRICATED STRUCTURES



CABLE TRAY

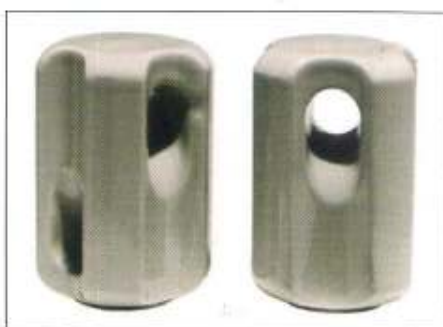




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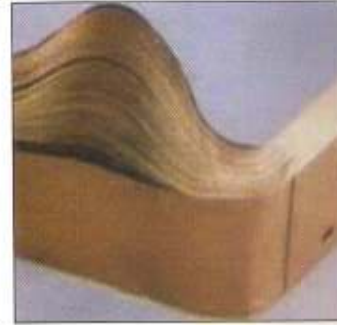
LT INSULATORS



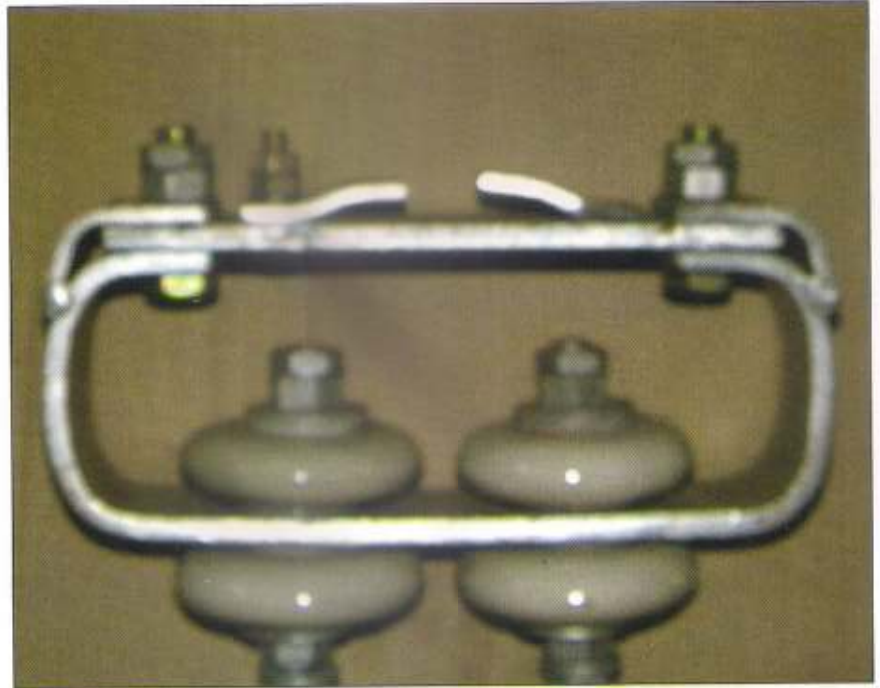
HT INSULATORS upto 400 KV



COPPER FLEXIBLE SHUNT



TROLLEY LINE HOLDER



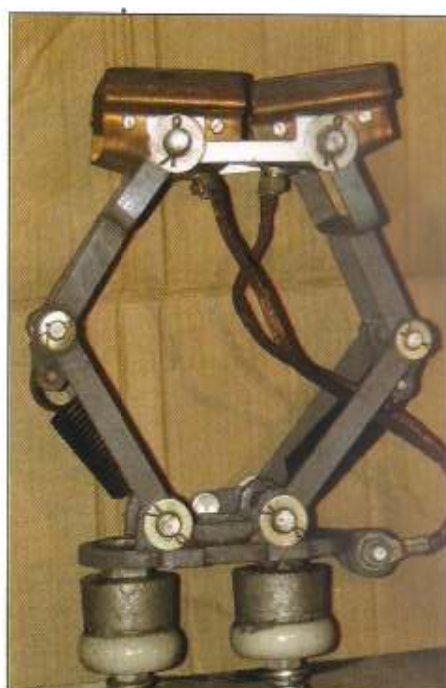


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JOCKEY ROLLER / CABLE TROLLEY / CABLE CAR



CURRENT COLLECTOR



LED BASED INDICATING LIGHTS



SLIP RINGS





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MECHANICAL SPARES / LUBRICATING EQUIPMENTS / STRUCTURAL FABRICATION

1. Roller, Bush, Shaft, Pinion, Cast Iron Items as per Drawings
2. Air operated Grease Pump
3. Hand operated Grease Pump
4. Motorised Grease Transfer Pump
5. Pipe Line Fittings
6. Cable Tray
7. Fabricated Structures



LUBRICATING PUMP & SHAFTS



SHAFTS & PENIONS



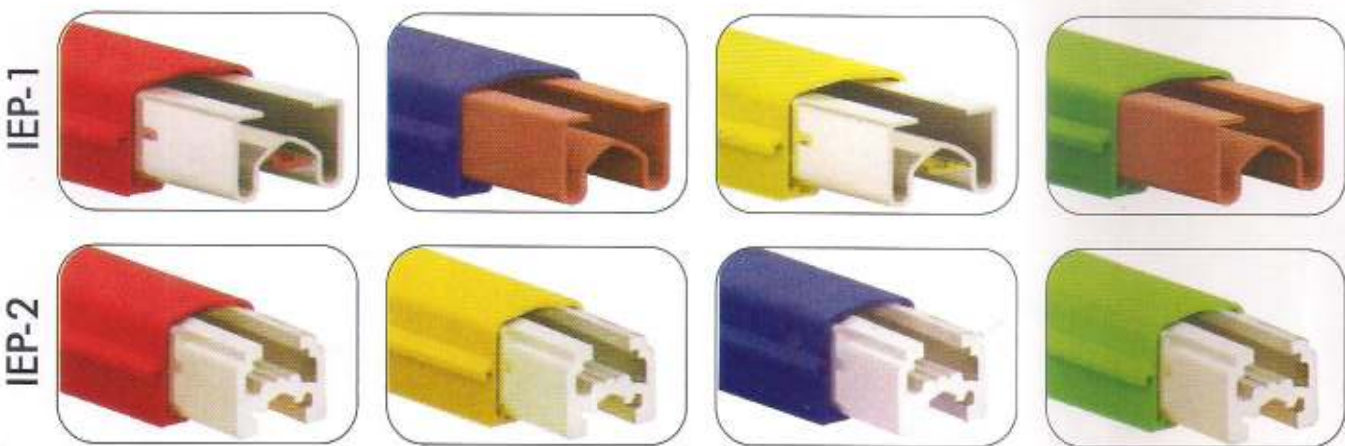


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Down Shop Lead System (DSL) Conductor bar - track are super finished and cross section is maintained to achieve required ampere. The material for track is Copper, Aluminum & Galvanize. Conductors shall be accurately aligned to ensure positive electrical contact between the collector and the conductor. Separate conductors shall be provided for each phase. Insulation cover shall be rigid PVC, self extinguishing, with a heat distortion point of 70°C at 260 psi. These conductors are compact, insulated & touch proof. Do not expose live parts. Standard length 4.5 Mtr.

Bolt Jointed Type Busbar



Galvanize : 80 to 125 Amp. | Copper : 125 to 315 Amp. | Aluminum : 200 to 350 Amp.

Accessories

Hanger Clamp

Snap fit type hanger clamp with hardware, required per meter. The conductors bars are clipped in to the hanger clamp. We offer Single Pole, 3 Pole & 4 Pole Hanger clamps.



Anchor Clamp

Fall proof protection to the busbar. Required at each 50 Mtr.



Conductor Joint

Bolted type jointer provide at each conductor joints. We offer four bolted type jointer with 80mm Length to perfect joint of conductors.



Conductor Joint Cover

Conductor joints are covered with joint cover, snap fitting with locking arrangement. Required on each conductor Joints



End Power Feed

This accessory is used for incoming power and is fully insulated. Simple clamp type is easily installed at the end of the busbar.



Center Power Feed

This accessory is used for incoming power easily installed anywhere in the system for incoming power to the conductor rails joint. One or more power feed points are possible to reduce voltage drop.



End Cap

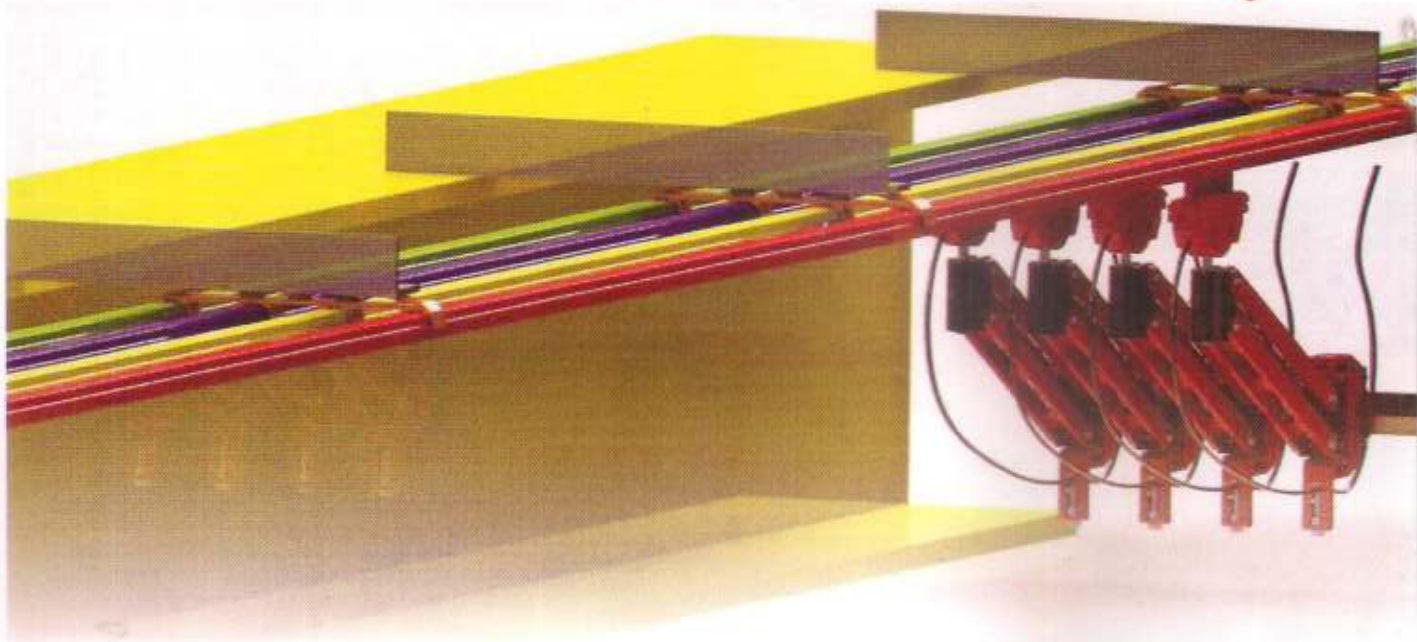
Used to close the end of the conductors, to cover exposed conductor and avoid live contact.



Expansion Joint

In order to accommodate the effects of temperature change, it is necessary to provide expansion joints. These accessories are required in a single bay length where area is more than 150 Mtrs and above. Maximum gap of the expansion joint is 50 mm.





Pin Jointed Type Busbar

IEP-3



Accessories

Hanger Clamp

Snap fit type hanger clamp with hardware, required per meter. The conductors bars are clipped in to the hanger clamp. We offer Single Pole & 4 Pole Hanger clamps.



Anchor Clamp

Fall proof protection to the busbar. Required at each 50 Mtr.



End Cap / End Power Feed

This accessory is used for incoming power and is fully insulated. Simple bolted type is easily installed at the end of the busbar. Used to close the end of the conductors, to cover exposed conductor and avoid live contact.



Center Power Feed

This accessory is used for incoming power, which is easily installed anywhere in the system for incoming power to the conductor rails joint. One or more power feed points are possible to reduce voltage drop.



Conductor Joint Cover

Conductor Joins are covered with joint cover, Required on each conductor joining.





Current Collector For DSL

Collectors - Current collector assembly consists of a spring loaded sliding contact type shoe of sintered copper graphite. Heavy duty double arm current provides multi axis degree of flexible movement. Exposed parts of current collectors shall be grounded and of corrosion-resistant material. Current collector assembly shall be designed to operate through gaps, splices, switches and shall be self-centering.



IEP CCV-20 (20AMP)



IEP CCV-125 (125AMP)



IEP CCW-125 (125AMP)



IEP CCV-250 (250AMP)



IEP CCV-250 (250AMP)

Gravity Type Current Collector For Angle Type DSL



IEP CCAT 125AMP



IEP CCAT 250AMP

Towing Arm & Busbar Mounting Brackets



IEP TA-40



IEP TA-25



IEP TA-12

MS Angle with slotted hole for mounting of hanger clamp. The towing arm can carry maximum 4 double current collectors. For higher loads please contact us.



IEP-500



IEP-400



IEP-300

C-Rail [Festoon] System



Festoon Systems are used to electrify various types of mobile equipment. They can be designed not only to support and protect flat and round electrical cables, but air and water hoses as well. Systems can be pre-assembled at the factory to ease installation and reduce time. Festoon systems are typically used on overhead cranes, port cranes and other material handling applications. We also have a solution for extremely corrosive environments. Our product range includes as well as accessories for the various cable management systems. Standard length 4.5 Mtr



Hanger Clamp



Jointer



Cable Trolley Type: S



Starting Trolley



End Cap



Bracket Set

Trolley

IEP offer superior quality overhead C-Rail & I-beam trolleys that are expandable to various I-beam sizes, in various load capacity. It consists of a carriage with four wheels containing anti-friction bearings, which are rigidly connected to I-Beam and T-channel.



CT-Type: M



CT-Type: H



CT-Type: H



CT-Type: H



INTERNATIONAL ENGINEERING PLANT

AN ISO 9001-2008 ORGANIZATION

CONDUCTOR BAR	GALVANIZED STEEL				COPPER	
Current Rating At + 35° C CDF 100%	80A	100A	125A	160A	250A	400A
Current Rating At + 35° C CDF 40%	100A	140A	200A	300A	360A	580A
Cross Sectional Area mm ²	56 (0.8)	68 (1.0)	105 (1.6)	56 (0.8)	68 (1.0)	105 (1.6)
Max. System Voltage	500V AC / 600V DC	500V AC / 600V DC	500V AC / 600V DC	500V AC / 600V DC	500V AC / 600V DC	500V AC / 600V DC
Coefficient of expansion	0.0000122	0.0000122	0.0000122	0.0000162	0.0000162	0.0000162
Impedance in OHMS/M	0.0030	0.0029	0.0018	0.0035	0.0030	0.0018
Resistance in OHMS/M	0.0028	0.0024	0.0020	0.0031	0.0028	0.0016
Standard Length	4.5 Mtr.	4.5 Mtr.	4.5 Mtr.	4.5 Mtr.	4.5 Mtr.	4.5 Mtr.

Voltage Drop.

The voltage drop on our conductor system should be restricted to 2.5 to 5% of the nominal supply voltage.

Three Phase Alternating Current (3ph AC): $\Delta U = 3 \times FL \times | \text{total} \times Z$ (Volts)

Single Phase Alternating Current (AC): $\Delta U = 2 \times FL \times | \text{total} \times Z$ (Volts)

Direct Current (DC): $\Delta U = 2 \times FL \times | \text{total} \times R$ (Volts)

$$U\% = \frac{\Delta U}{U_n} \times 100\%$$

Where U = Voltage Drop

| total = Total Currents [Amps]

R = Resistance of conductor [ohms/Mtr.]

Z = Impedance of conductor [ohms/Mtr.]

FL = Feeder Length [Meters]

L = System Length [Meters]

Un = Operating Voltage

If the voltage drop is too high, then either the number of feed points or the cross section of the conductor rail should be increased to reduce the Voltage drop along the system.

Multiple feed-in points

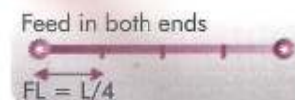
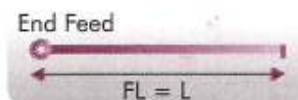
FL = L feed from one end

FL = L/2 feed from the center

FL = L/4 feed from the both ends

FL = L/6 two feed-in positions, L/6 from each end

FL = L/10 feed - in points in the center and at the L/10 from both ends



Other possibilities to arrange the feed positions can be selected. For very high current, cables can be connected in parallel (booster cables)

Note : When considering ΔU calculations any effects of additional temperature caused by either, Heating of the conductor due to duty cycle, A rise in ambient temperature above 35° C must be considered.

