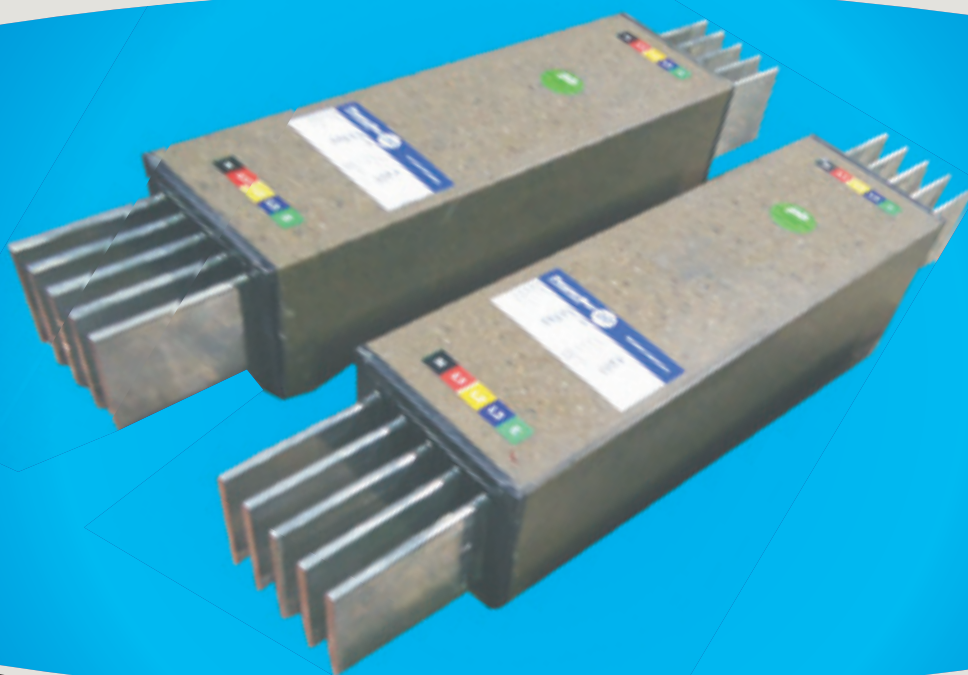


MESDUOT
the busbar specialist

PowerBar
quality busbar systems

For use in accordance to IEC standards



HIGH POWERBAR RESIN CAST - IP68

High Powerbar

Busbar Range

800A-6300A

High Power Distribution Made Easy

MES

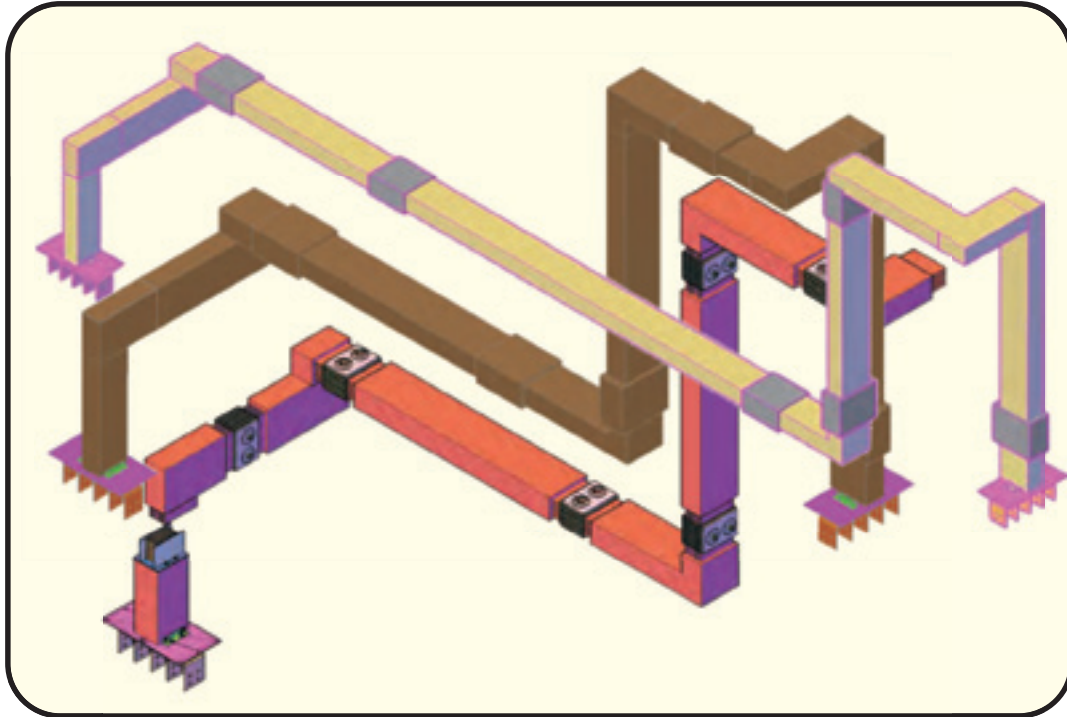
engineered solutions by AKO



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HPB - RC FEATURES



The E&I engineering group was established in 1986 and ever since the group has gone from strength to strength.

Powerbar HPB-RC is the latest development in the Powerbar range of busbar with our vast experience in high current, low Impedance busbar, HPB-RC is the next natural step for outdoor, hazardous or life safety Applications.

HPB-RC is a 1000V, maintenance free, totally insulated using polymer concrete for copper or aluminum busbar systems with a wide selection of accessories to suit the site requirements.

The busbar can be feeder / distribution or a combination of both with tap off units up to 630A.

The conductor is available in aluminum or copper, totally encapsulated in a fire retardant, self extinguishing and homogenous polymer concrete guaranteeing high resistance to fire, water, moisture, mechanical loads, chemical and extreme temperature (-40° to +60°C) conditions.

Key Advantages

- ✓ Wide current range from 800A to 6300A/1000V.
- ✓ IP68 Rated.
- ✓ High short circuit busbar withstand.
- ✓ Low voltage drop.
- ✓ Chemical resistance.
- ✓ UV resistance.
- ✓ Fire resistance (F180).
- ✓ EX/ ATEX approved.
- ✓ Fully insulated using polymer concrete.
- ✓ Suitable for indoor and outdoor aggressive atmospheres.
- ✓ Minimal overall dimensions and weight.
- ✓ Tailor made elements.
- ✓ Simple installation.
- ✓ Same polymer concrete used to produce the elements is utilized for joints on site to ensure insulation properties remain unchanged throughout the busbar runs.
- ✓ High mechanical strengths.
- ✓ Maintenance free.

The range is fully type tested to include the following Type tests

Type Tests

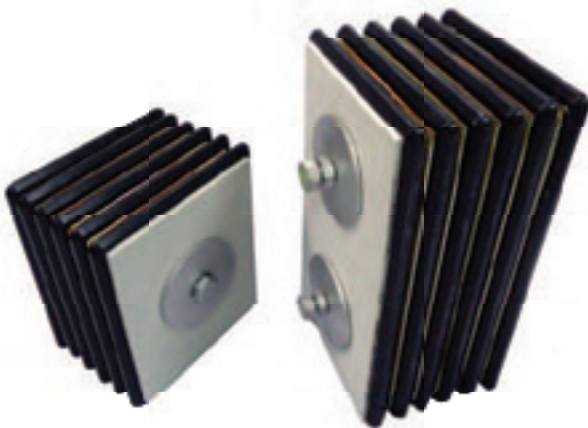
- 8.2.1 » Verification of temperature rise limits.
- 8.2.2 » Verification of the dielectric properties.
- 8.2.3 » Verification of the short circuit withstand strength.
- 8.2.4 » Verification of the effectiveness of the protective circuit.
- 8.2.5 » Verification of clearance & creepage distances.
- 8.2.6 » Verification of mechanical operation.
- 8.2.7 » Verification of the degree of protection.
- 8.2.9 » Verification of the electrical characteristics.
- 8.2.10 » Verification of structural strength.
- 8.2.12 » Verification of crushing resistance.
- 8.2.13 » Verification of resistance to abnormal heat.
- 8.2.14 » Verification of resistance to flame propagation.
- 8.2.15 » Verification of the fire barrier in building penetration.

Standards.

The product is manufactured in an ISO 9001 : 2008 and ISO 18001: 2007 certified facility. It is designed and manufactured in accordance with IEC60439-1 and IEC60439-2.

Configuration	Phases	Neutral	Earth
TP	100%	0%	
TP/N	100%	100%	
TP/E	100%	0%	100% or 50%
TP/NE	100%	100%	100% or 50%
TP/DN	100%	200%	
TP/DN/E	100%	200%	100% or 50%

Note: If no earth bar is specified earthing is to be provided by installation contractor.



ASTA Certified

Powerbar has completed extensive testing at ASTA accredited laboratories to ensure the product we supply meets the international requirements.



UL Classified

Powerbar has completed extensive testing at UL accredited laboratories to ensure the product we supply meets the UL requirements.

The range is fully type tested to include the following Type tests

Type Tests

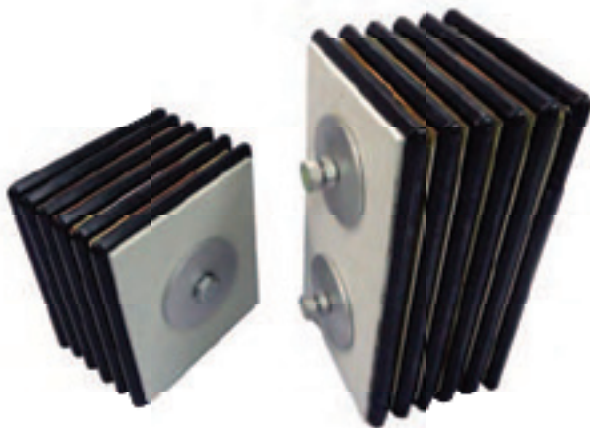
- 8.2.1 » Verification of temperature rise limits.
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Standards.

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Configuration	Phases	Neutral	Earth
TP	100%	0%	
TP/N	100%	100%	
TP/E	100%	0%	100% or 50%
TP/NE	100%	100%	100% or 50%
TP/DN	100%	200%	
TP/DN/E	100%	200%	100% or 50%

Note: If no earth bar is specified earthing is to be provided by installation contractor.



ASTA Certified

Powerbar has completed extensive testing at ASTA accredited laboratories to ensure the product we supply meets the international requirements.



UL Classified

Powerbar has completed extensive testing at UL accredited laboratories to ensure the product we supply meets the UL requirements.


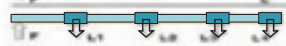
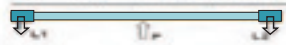
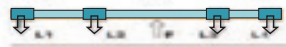
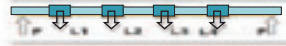
Technical Data-CR					
Technical Data Table -Copper					
RATING	800A	1000A	1250A	1400A	1600A
Rating Current (Amps)(Ith)	800	1000	1250	1400	1600
Rating Insulation Voltage (v)	1000	1000	1000	1000	1000
RATING SHORT TIME WITHSTAND CURRENT(Icw)					
1Second(KA)	40	40	50	65	65
Peak Value(KA)	88	88	105	143	143
CONDUCTOR C.S.A(mm2) COPPER (PHASE)					
Bar Dimensions	40mmx6mm	70mmx6mm(P)	75mmx6mm	90mmx6mm	115mmx6mm
Cross Sectional Area	240mm ²	328mm ²	450mm ²	540mm ²	690mm ²
CONDUCTOR C.S.A(mm2) COPPER (NEUTRAL)					
Bar Dimensions	40mmx6mm	70mmx6mm(P)	75mmx6mm	90mmx6mm	115mmx6mm
Cross Sectional Area	240mm ²	328mm ²	450mm ²	540mm ²	690mm ²
CONDUCTOR C.S.A(mm2) COPPER (INTEGRAL CLEAN EARTH 100% &50%)					
Bar Dimensions (100% Earth)	40mmx6mm	70mmx6mm(P)	75mmx6mm	90mmx6mm	115mmx6mm
Cross Sectional Area (100% Earth)	240mm ²	328mm ²	450mm ²	540mm ²	690mm ²
Bar Dimensions (50% Earth)	40mmx3mm	70mmx3mm(P)	75mmx3mm	90mmx3mm	115mmx3mm
Cross Sectional Area (50% Earth)	120mm ²	210mm ²	225mm ²	270mm ²	345mm ²
HEIGHT					
Height of the trunking (mm)	100	130	105	120	145
WEIGHT					
Weight of the trunking(4bar system)kg/mtr	25.2	33.4	34.9	41.0	51.1
RESISTANCE (mΩ/m)					
Resistance (mΩ/m)@20°C	0.0481	0.0516	0.0400	0.0332	0.0259
Resistance (mΩ/m)@80°C	0.0596	0.0643	0.0495	0.0411	0.0320
REACTANCE (mΩ/m)					
Reactance (mΩ/m)	0.0513	0.0472	0.0453	0.0396	0.0326
IMPEDANCE (mΩ/m)					
Impedance(mΩ/m)@80°C	0.0786	0.0797	0.0671	0.0570	0.0457
VOLT DROP PER METER (V/m)@FULL LOAD 50 Hz					
Volt drop to line pf= 0.7 (v/m)@80°C	0.155	0.136	0.145	0.138	0.127
Volt drop to line pf= 0.8 (v/m)@80°C	0.156	0.138	0.145	0.137	0.125
Volt drop to line pf= 0.9 (v/m)@80°C	0.153	0.136	0.139	0.131	0.119
Volt drop to line pf= 1.0 (v/m)@80°C	0.124	0.111	0.107	0.100	0.089
VOLT DROP PER METER (V/m)@FULL LOAD 60 Hz					
Volt drop to line pf= 0.7 (v/m)@80°C	0.168	0.148	0.159	0.152	0.140
Volt drop to line pf= 0.8 (v/m)@80°C	0.168	0.148	0.157	0.149	0.136
Volt drop to line pf= 0.9 (v/m)@80°C	0.162	0.143	0.148	0.140	0.128
Volt drop to line pf= 1.0 (v/m)@80°C	0.125	0.112	0.108	0.100	0.089

Voltage Drop Calculation
Voltage drop of a busbar system can be calculated with the following formula taking into account the "CL" load distribution constant.

$$\Delta V = \alpha \sqrt{3} \cdot L \cdot I \cdot (R \cdot \cos\phi + X_L \cdot \sin\phi) \cdot 10^{-3} \text{ [V]}$$

ΔV = Voltage Drop (V)
 α = Load Distribution Constant
 L = Line Length (m)
 I = Line Current (A)
 R = Resistance (mΩ/m)
 X_L = Inductive Reactance (mΩ/m)
 $\cos\phi$ = Load Factor

Load Distribution Factor

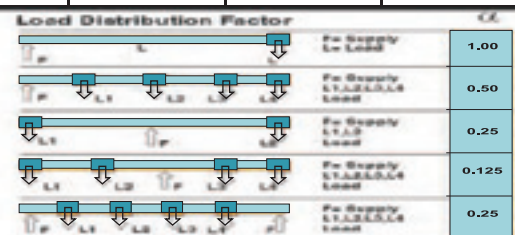
CL	CL
	1.00
	0.50
	0.25
	0.125
	0.25

Technical Data-CR						
Technical Data Table -Copper						
RATING	2000A	2500A	3200A	4000A	5000A	6300A
Rating Current (Amps)(Ith)	2000	2500	3200	4000	5000	6300
Rating Insulation Voltage (v)	1000	1000	1000	1000	1000	1000
RATING SHORT TIME WITHSTAND CURRENT(Icw)						
1Second(KA)	65	65	100	100	100	120
Peak Value(KA)	143	143	220	220	220	280
CONDUCTOR C.S.A(mm2) COPPER (PHASE)						
Bar Dimensions	145mmx6mm	180mmx6mm	2x125mmx6mm	2x150mmx6mm	2x200mmx6mm	2x250mmx6mm
Cross Sectional Area	870mm ²	1080mm ²	1500mm ²	1800mm ²	2400mm ²	3000mm ²
CONDUCTOR C.S.A(mm2) COPPER (NEUTRAL)						
Bar Dimensions	145mmx6mm	180mmx6mm	2x125mmx6mm	2x150mmx6mm	2x200mmx6mm	2x250mmx6mm
Cross Sectional Area	870mm ²	1080mm ²	1500mm ²	1800mm ²	2400mm ²	3000mm ²
CONDUCTOR C.S.A(mm2) COPPER (INTEGRAL CLEAN EARTH 100% &50%)						
Bar Dimensions (100% Earth)	145mmx6mm	180mmx6mm	2x125mmx6mm	2x150mmx6mm	2x200mmx6mm	2x250mmx6mm
Cross Sectional Area (100% Earth)	870mm ²	1080mm ²	1500mm ²	1800mm ²	2400mm ²	3000mm ²
Bar Dimensions (50% Earth)	145mmx3mm	180mmx3mm	2x125mmx3mm	2x150mmx3mm	2x200mmx3mm	2x250mmx3mm
Cross Sectional Area (50% Earth)	435mm ²	540mm ²	750mm ²	900mm ²	1200mm ²	1500mm ²
HEIGHT						
Height of the trunking (mm)	175	210	310	360	460	560
WEIGHT						
Weight of the trunking(4bar system)kg/mtr	63.3	77.5	110.4	130.7	171.2	211.8
RESISTANCE (mΩ/m)						
Resistance (mΩ/m)@20°C	0.0204	0.0163	0.0117	0.0098	0.0073	0.00583
Resistance (mΩ/m)@80°C	0.0253	0.0202	0.0145	0.0115	0.00904	0.00722
REACTANCE (mΩ/m)						
Reactance (mΩ/m)	0.0271	0.0211	0.0162	0.0139	0.01085	0.00893
IMPEDANCE (mΩ/m)						
Impedance(mΩ/m)@80°C	0.0371	0.0292	0.0217	0.0181	0.01412	0.01148
VOLT DROP PER METER (V/m)@FULL LOAD 50 Hz						
Volt drop to line pf= 0.7 (v/m)@80°C	0.128	0.126	0.120	0.127	0.122	0.125
Volt drop to line pf= 0.8 (v/m)@80°C	0.126	0.125	0.118	0.125	0.119	0.121
Volt drop to line pf= 0.9 (v/m)@80°C	0.120	0.119	0.112	0.117	0.110	0.113
Volt drop to line pf= 1.0 (v/m)@80°C	0.088	0.088	0.081	0.084	0.078	0.079
VOLT DROP PER METER (V/m)@FULL LOAD 60 Hz						
Volt drop to line pf= 0.7 (v/m)@80°C	0.142	0.140	0.133	0.141	0.136	0.139
Volt drop to line pf= 0.8 (v/m)@80°C	0.138	0.136	0.129	0.137	0.131	0.134
Volt drop to line pf= 0.9 (v/m)@80°C	0.128	0.127	0.120	0.126	0.12	0.122
Volt drop to line pf= 1.0 (v/m)@80°C	0.088	0.088	0.081	0.084	0.079	0.079

Voltage Drop Calculation
Voltage drop of a busbar system can be calculated with the following formula taking into account the "α" load distribution constant.

$$\Delta V = \alpha \sqrt{3} \cdot L \cdot I \cdot (R \cdot \cos\phi + X_L \cdot \sin\phi) \cdot 10^{-3} \text{ [V]}$$

- ΔV = Voltage Drop (V)
- α = Load Distribution Constant
- L = Line Length (m)
- I = Line Current (A)
- R = Resistance (mΩ/m)
- X_L = Inductive Reactance (mΩ/m)
- cosφ = Load Factor



An Integrated Approach

Intertek

Certificate of Registration

The following organization's Operations, Health and Safety Management System has been assessed and registered by Intertek. Certification is in accordance with the requirements of:

ISO 9001:2008

Organization:
POWERBAR GULF L.L.C
P.O. Box 10000, Fiska allén, Kista, S-161 21, Sweden

The Quality Management System is applicable to:
Design & Manufacturing of Electrical Busbar Trunking Systems.

Certificate Number: 45501
Initial Certification Date: 25 May 2011
Certificate Issue Date: 25 May 2011
Certificate Expiry Date: 24 May 2014

Intertek Sermko Certification AB - Kista (Stockholm), Sweden

**We value
our customers**

...and our people

Intertek

Certificate of Registration

The following organization's Occupational Health and Safety Management System has been assessed and registered by Intertek. Certification is in accordance with the requirements of:

OHSAS 18001:2007

Organization:
POWERBAR GULF L.L.C
P.O. Box 10000, Fiska allén, Kista, S-161 21, Sweden

The Occupational Health and Safety Management System is applicable to the management of occupational health and safety risks associated with:
Design & Manufacturing of Electrical Busbar Trunking Systems.

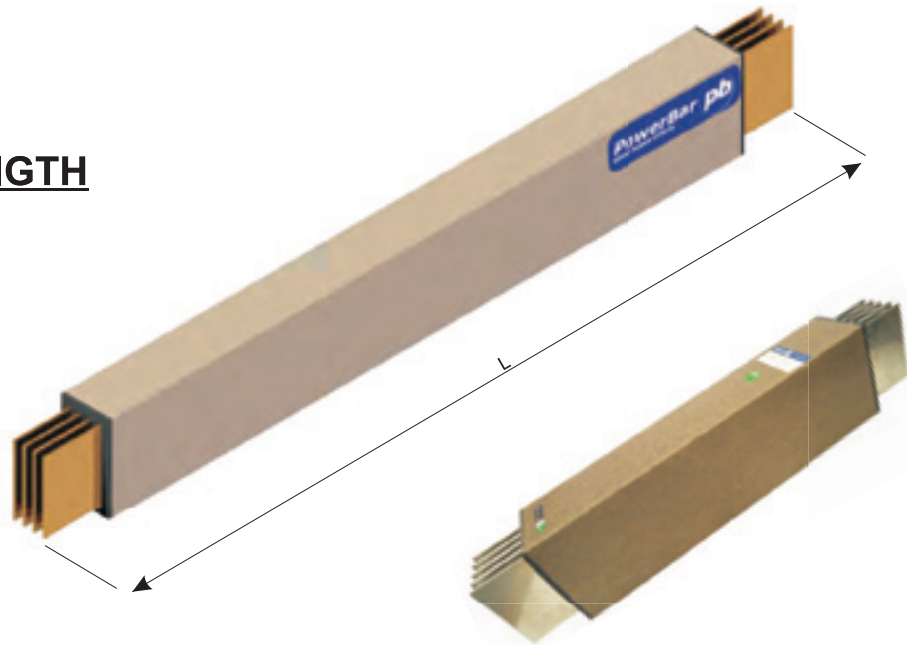
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Initial Certification Date: 25 May 2011
Certificate Issue Date: 25 May 2011
Certificate Expiry Date: 24 May 2014

Intertek Sermko Certification AB - Kista (Stockholm), Sweden



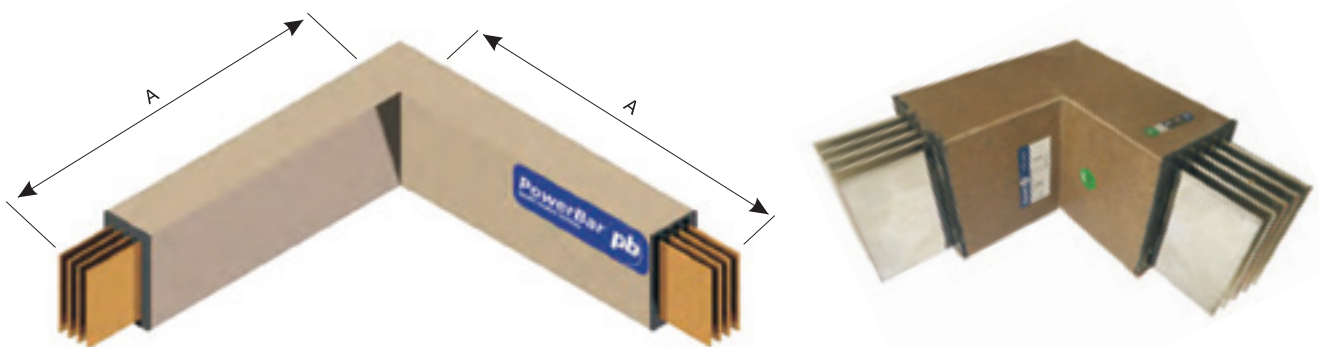
STANDARD ELEMENTS 800A-6300A

FEEDER LENGTH



SS Type	L=Min=500mm	Max=4000mm
DS Type	L=Min=500mm	Max=4000mm

EDGEWISE ELBOW

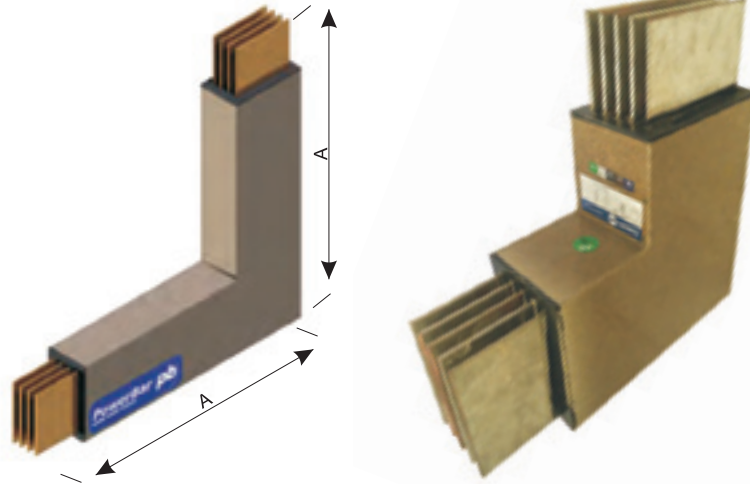


SS Type	L=Min=300mm/Max.1700mm/Total Max.2000mm
DS Type	L=Min=300mm/Max.1500mm/Total Max.2000mm

Note
SS-Single Stack
DS-Double Stack

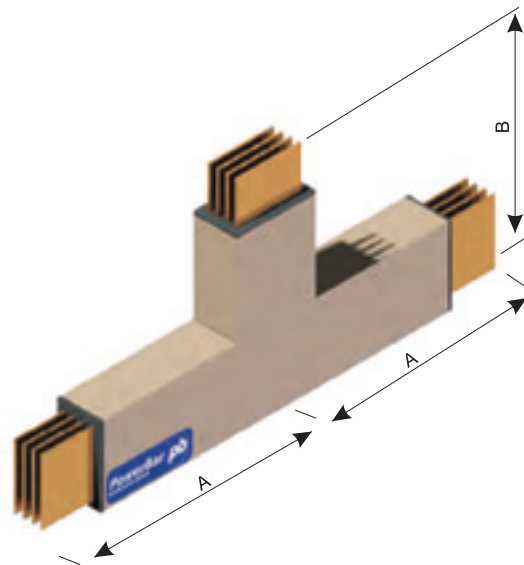
STANDARD ELEMENTS 800A-6300A

FLATWISE ELBOW



SS Type L=Min=300mm/Max.1700mm/Total Max.2000mm
 DS Type L=Min=500mm/Max.1500mm/Total Max.2000mm

FLATWISE TEE



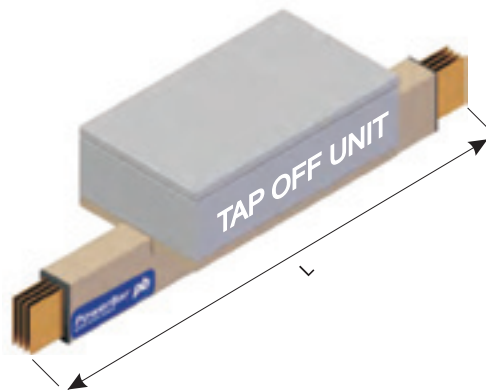
SS Type A=Min=300mm/Max.1500mm/B=Min.300mm/Max.1000mm/Total=Max.2000mm
 DS Type A=Min=500mm/Max.1500mm/B=Min.500mm/Max.1000mm/Total =Max.2000mm

Note
SS-Single Stack
DS-Double Stack

STANDARD ELEMENTS

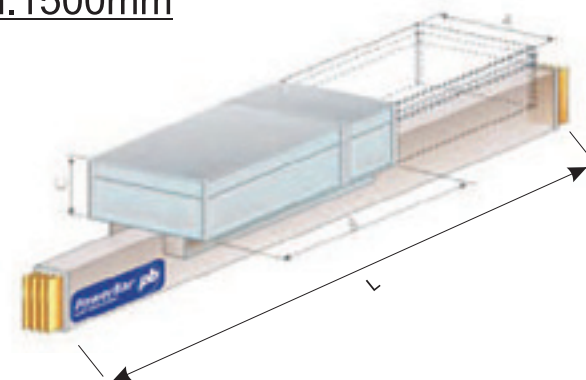
Distribution Length IP68

L = 1000mm

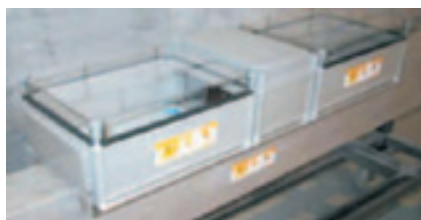


L=max.3000mm/min.1500mm

Tap off unit



Powerbar glass-matt reinforced polyester tap off units are available as an empty box or equipped with MCCB

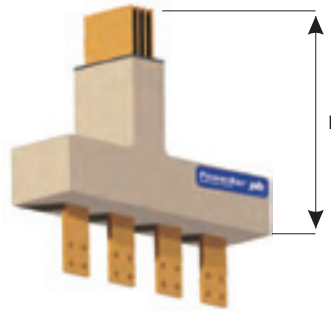


- High impact strength
- Resistant to adverse climate conditions
- Resistant to UV radiation
- Flame retardant
- 125A-800A
- IP68

STANDARD ELEMENTS

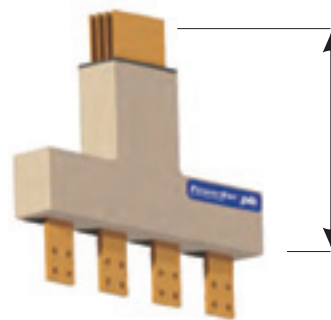
Panel FlangeT2

L=min.500mm/max.1000mm



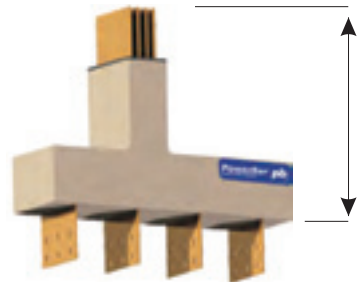
Panel FlangeT3

L=min.500mm/max.1000mm



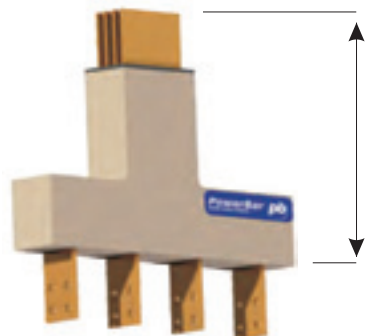
Panel FlangeT4

L=min.300mm/max.1000mm



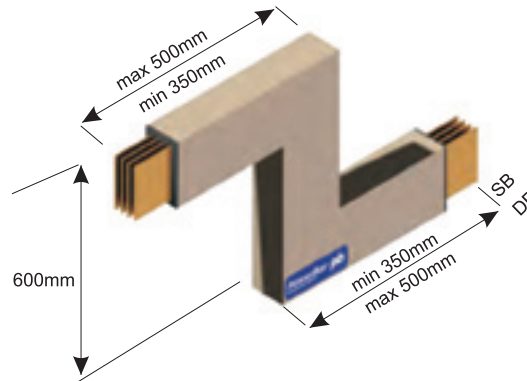
Panel FlangeT5

L=min.300mm/max.1000mm

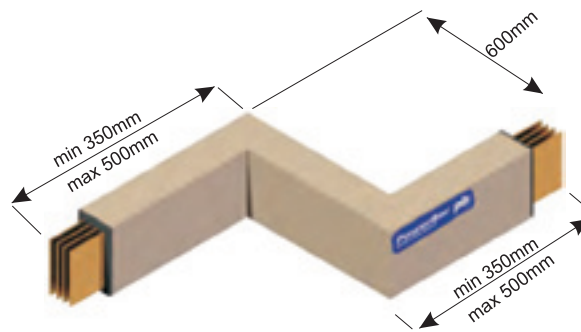


NON STANDARD ELEMENTS

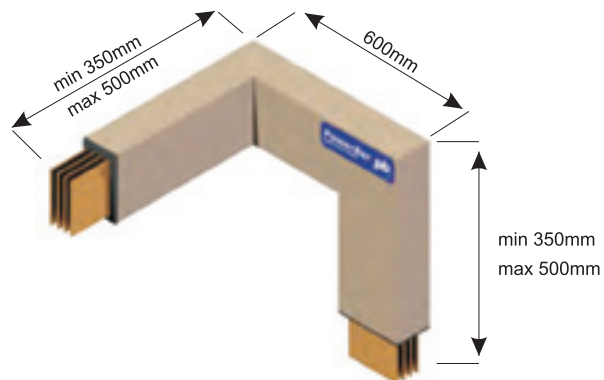
Flatwise offset



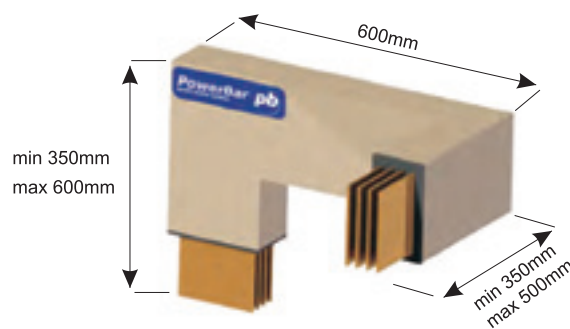
Edgewise offset



Flatwise/Edgewise offset



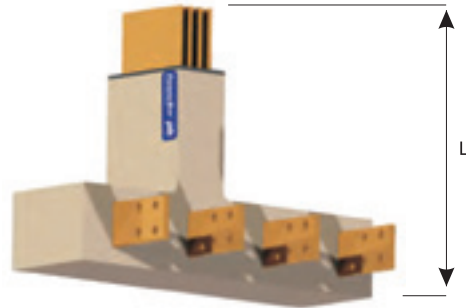
Edgewise/Flatwise Offset



NON STANDARD ELEMENTS

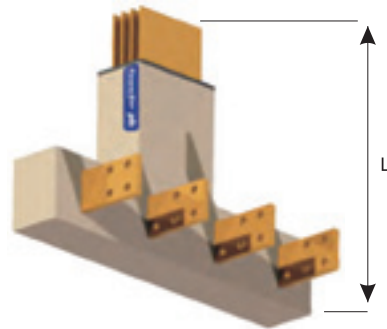
Panel Flange T6

L=min.500mm/max.1000mm



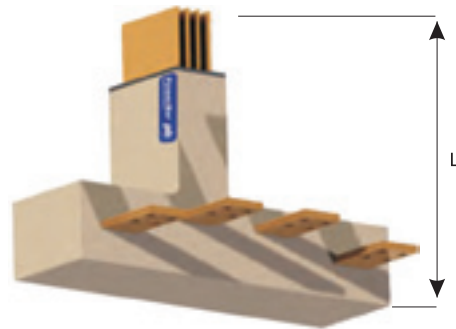
Panel Flange T7

L=min.500mm/max.1000mm



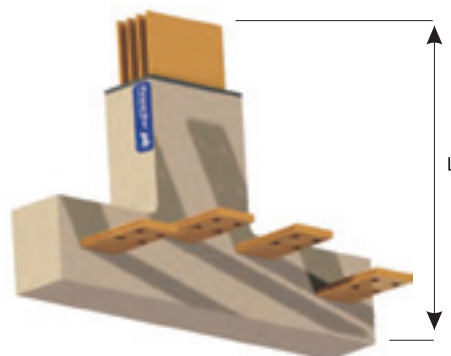
Panel Flange T8

L=min.300mm/max.1000mm



Panel Flange T9

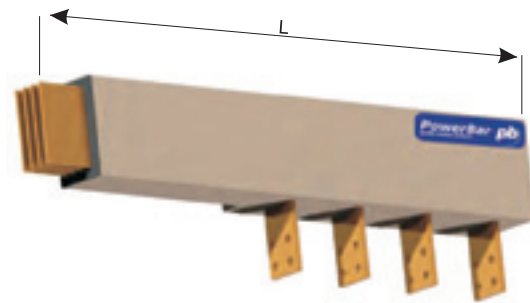
L=min.300mm/max.1000mm



NON STANDARD ELEMENTS

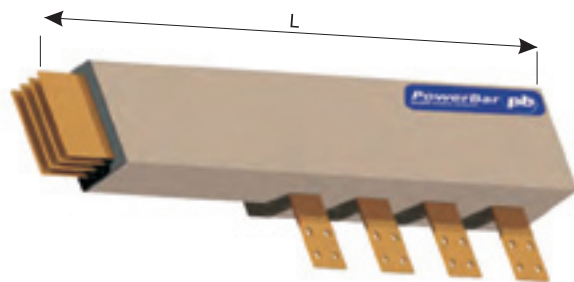
Panel FlangeT10

L= max.2000mm



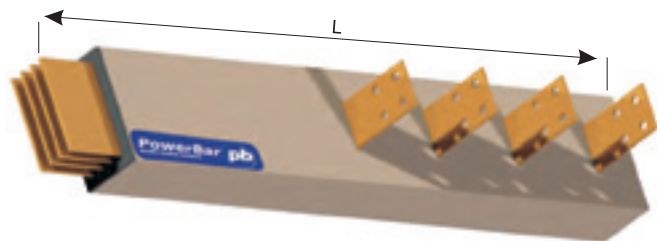
Panel FlangeT11

L= max.2000mm

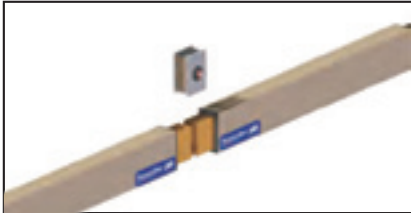


Panel FlangeT12

L= max.2000mm



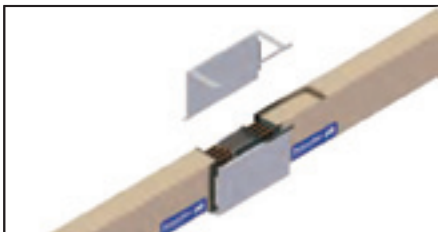
Installation instruction straight length connection



Busbar and conductor ends should be aligned correctly. The distance between the conductor ends may be adjusted between 32-40mm, slide the monoblock between the conductor ends and adjust accordingly. Megger both busbar components and the monoblock before assembly.



Tighten the monoblock bolt until the outer head shears off at the preset torque rating of (70 NM).



Apply the mould release agent thinly on the inner surface of the steel mould and install the mould over the joint as shown. Pour Part A and B epoxy components into the bucket provided and mix for 5 Mins(follow the instruction sheet included). Megger assembled busbar sections before casting the joint.



Pour the mixture immediately into the mould until the mixture levels are at the top of the mould. Smooth over the top surface with the spatula provided. Remove mould after 6-12 Hrs.

Clean any excess with abrasive Disc / Grinding Wheel.

Installation instruction straight length connection

Fixings

Busbar can either be installed on its "Flat" or on its "Edge". The decision of how to run the busbar is governed by a number of factors.

- Busbar route
- Type of installation
- Available space
- Rating of the busbar

The modular design of the Powerbar HPB RC busbar system lends itself ready to either type of installation.

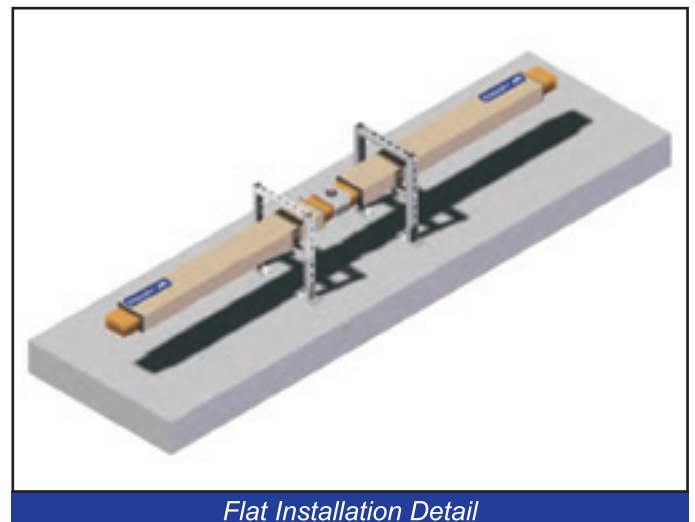
Edge installation

This is the preferred method of installation for the smaller rating busbar system. It is also the main method used to install distribution busbar in building risers as the rising busbar needs to run the "Neutral" on the left hand side as you look at the front face of the busbar. This is to ensure the tap off face of the busbar is exposed to accept the tap off units.

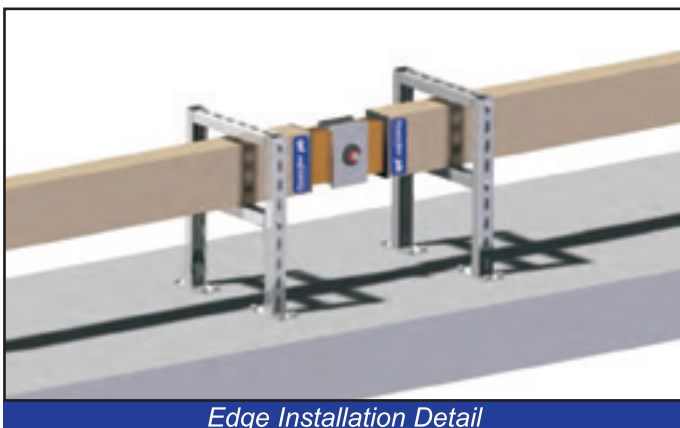
For edge installation the larger HPB RC fixing bracket (Vertical) is used.

Flat Installation

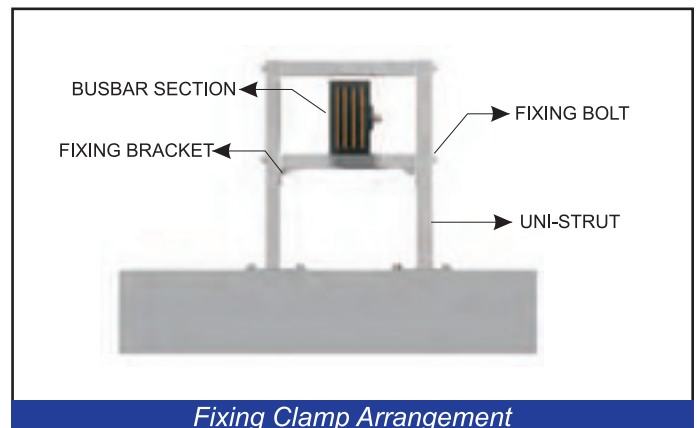
This tends to be the preferred method of installation for the higher rating busbar system. The multi-stack systems which have the larger cross sectional areas. When coordinated throughout the building on its flat any busbar rating only has a height of 140mm irrespective of rating.



Flat Installation Detail



Edge Installation Detail



Fixing Clamp Arrangement

Spring Hanger

Spring Hangers are used to support vertical busbar runs on each floor and they also compensate for minimal building movement and thermal expansion. The maximum distance between the spring hangers may not exceed 3m. The recommended installation method is pictured. For multistack arrangement please contact our engineering department for details.

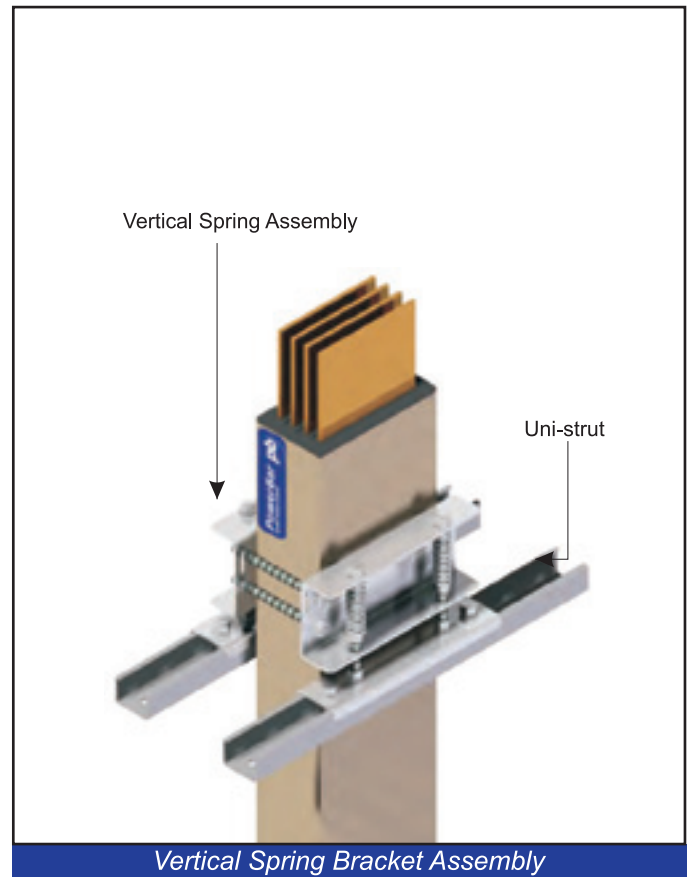
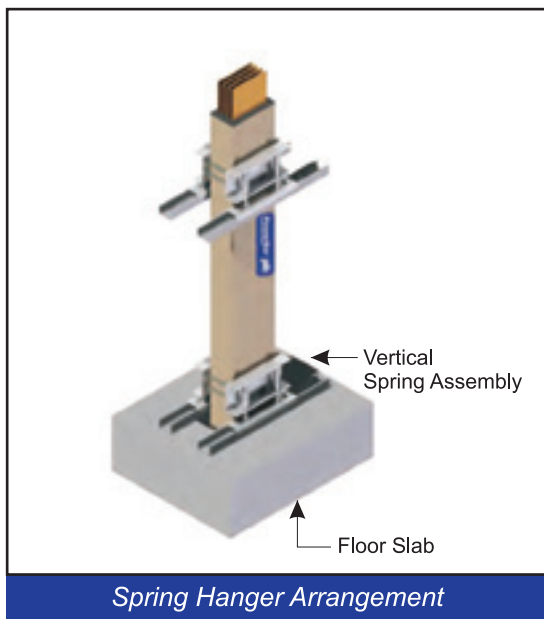
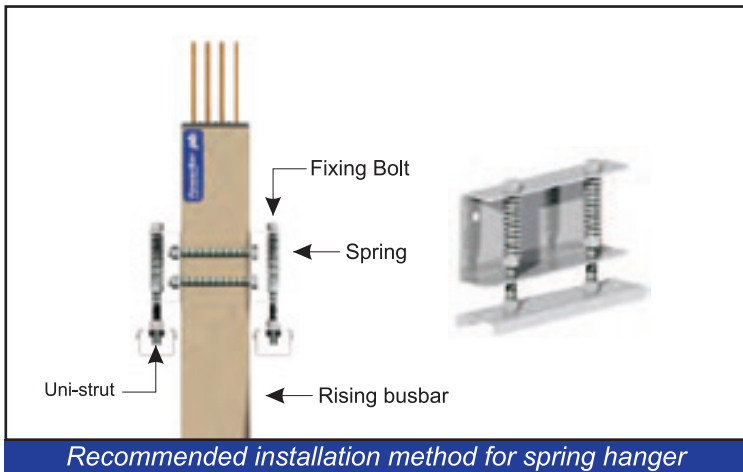
Specification Details

Spring

- Max load 50Kg per spring
- OVD-17.5mm
- VD -11.0mm
- Wire diameter- 3.66mm
- Free length -77.0mm
- Maximum deflection -11mm(4.55Kg/mm)

Busbar

- 2500A TP/N 4 pole busbar system
- Maximum weight / meter=81.5kg
- Approximate weight of 3 meter busbar section=244.5 kg (4x Spring Hangers req)
- Maximum load on each spring = 30.56kg (8Xspring=50X8=400Kg)



CHEMICAL RESISTANCE

The test results carried out at the supplier's laboratory are shown below: Results are based upon the conditions prevailing during testing carried out at 20°C & fully immersed. The detailed results below have been prepared to the best of our knowledge. However, we cannot assume liability for usage in any specific case. Individual application must be discussed with Powerbar.

Chemicals	Cleaning		
	Directly	After 24 hrs	More than 48 hrs
Boric acid	B	B	B
Hydrochloric acid 10%	B	A	A
Sulfuric acid 10%	B	B	B
Citric acid	B	A	A
Lactic acid 5%	B	A	A
Formic acid 10%	A	A	A
Nitric acid 10%	B	A	A
Acetic acid 10%	A	A	A
Milk	B	B	B
Water distilled	B	B	B
Water	B	B	B
Beer	B	B	B
Vegetable oil	B	B	B
Sugared water	B	B	B
Fruit juice e.g. orange juice	B	B	B
Ethanol	B	B	B
Acetone	B	C	C
Calcium chloride	B	B	B
Fuel, diesel	B	B	B
Ester	B	A	B
Ether	B	C	C
Formalin 37%	A	A	A
Glycerol	B	A	A
Ammonia (10%)	B	B	B
Ammonia (30%)	B	A	A
Sodium hydroxid 10%	B	B	B
Sodium hydroxid 50%	B	A	A
Blood	B	B	B
Soap water	B	B	B
Urine	B	B	B
Lubricant	B	B	B
Engine oil	B	B	B
Pentane	B	B	B
Toluene	B	A	A
Chlorinated hydrocarbons	A	A	A
Javel water	B	B	B

B	Resistant
A	Affected
C	Evaporated fairly fast

Please state the following points below when making general enquiries on chemical resistance:

1. The chemical material, if possible with formula, and in case of trade names, the manufacturer.
2. The mixing ratio with solvent, usually water.
3. The temperature, including temperature changes with the corresponding time intervals.
4. Period of exposure.

Critical Dimensions

Busbar passing through a wall, ceiling or floor:

- Centerline of the joint to the wall, ceiling or floor
Min=190mm.
- Joints cannot be positioned inside a wall, ceiling or floor, joints must be accessible for maintenance.

Feeder Busbar clearances:

- From the top of busbar to the ceiling, floor, wall, or other busbar min 200mm to allow joint pouring.

Distribution Busbar clearance:

- Clearance must be given to provide for access and operations off the Tap off unit.
- Otherwise clearance for the feeder busbar apply.

Feeder Busbar Length:

- Minimum length =600mm
- Maximum length= 4000mm

Distribution Busbar Length:

- Minimum length =600mm
- Maximum length= 4000mm

Flatwise Elbow Section:

- Minimum leg length=Varies depending on the busbar rating and conductor material.
- Maximum leg length=750mm

Edgewise Elbow Section:

- Minimum leg length = 255mm
- Maximum leg length=600mm
- Combination and Offset elbow

Critical Details

- Busbar drawings must have a relevant dimensions.
- Centerline dimensions are expected(Please note any dimensions that are not centreline dimension).
- Walls and floor must be located and shown(Wall / Floor thickness must be given).
- The front of the switch boards must be given and provide the phasing for any existing boards.
- Transformer connections require full details.
- When using rising busbar please note the phase orientation of the distribution sections.
- Horizontal distribution busbar run on the " Flat" should always be oriented with the Neutral Phase to the top face.