

BUSBAR ENERGY DISTRIBUTION SYSTEMS

COMPARISION TABLE FOR COPPER AND ALUMINUM CONDUCTORED SYSTEMS

SUBJECT	COPPER CONDUCTORED BUSBARS	ALUMINUM CONDUCTORED BUSBARS	RESULT
Electrical features			
Performance and Current capacity	Copper and aluminum conductored busbar systems have same performance and current carrying capacity. Busbar Systems are defined by ratings. For example: 1000A,1250A,1600A,2000A,2500A,3000A,4000A.	Copper and aluminum conductored busbar systems have same performance and current carrying capacity. Busbar Systems are defined by ratings. For example: 1000A,1250A,1600A,2000A,2500A,3000A,4000A.	Heat dissipation is the most important point of the current carrying capacity of the busbar systems. Temperature rise limits are mentioned in IEC 60439-1/2 standards.Both of the Aluminum and Copper conductored busbar systmes are designed for maximum heat dissipation according to IEC standard and tested as per the temperature rise limits in mentioned standards. Both systems are acceptable.
Conductivity and conductor's cross section	Conductivity is better. Therefore lower cross sectioned conductors are used for copper busbar systems.For example : 2000A:910 mm², 2500A:1050 mm²	Higher cross sectioned conductors are used for aluminum busbar systems in order to permit carrying same ampacity. For example: 2000A:1400 mm², 2500A:1820 mm²	Copper conductored busbar systems have lower cross sections. For the same nominal amper rate , Aluminum Conductored busbar systems has higher cross sections on the conductors. Both systems are acceptable.
Resistance and Reactance	Resistance and reactance values are lower.	Resistance and reactance values are alittle bit higher. Therefore cross sectional are are increased in order to have similar resistance and reactance values.	Resistance(R) and Reactance (XL) values are mentioned at the catalogs for both CU and AL systems. Differences between the values are not important because during the design stage voltage drop calculatona are going to be done for general system checking. Both systems are acceptable.
Short circuit withstand	Mechanical short short circuit endurance depends on the design of the housing for the busbar systems. Housing of the busbar systems are made of Extrouted Aluminium metal so that its mechanical endurance is much better.Also for the termic short circuit currents, conductor cross sections are important..For example : 2000A:50 kA 2500A:100 kA	Mechanical short short circuit endurance depends on the design of the housing for the busbar systems. Housing of the busbar systems are made of Extrouted Aluminium metal so that its mechanical endurance is much better.Also for the termic short circuit currents, conductor cross sections are important..For example : 2000A:50 kA 2500A:100 kA	Aluminum conductored busbar systems have higher cross section then the copper systems for the same amper rate so aluminum systems has better short circuit endurance for some of the amper rates. For this reason aluminum systems can be preferred.

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Mechanical features			
Busbar weight	- Copper busbar systems are heavier than aluminum systems because of the higher density of the copper For Ex: 2000A:44 kg/mt 2500A:54 kg/mt	+ Aluminum busbar systems are lighter than copper busbar system because of lower density of the aluminum. For Ex: 2000A:36 kg/mt 2500A:44 kg/mt	Alumium busbar systems are approximately %20-%25 lighter than copper busbar systems. Because of this point, installation of the aluminum busbar systems are much more easier and it gives advantage on work-man hour costs.This point is very important to prefer
Busbar housing dimensions	+ Outer dimensions are smaller due to lower cross section of the copper conductors.For ex: 2000A:20*15 cm 2500A:25*15 cm	- Outer dimensions are bigger due to higher cross section of the aluminum conductors.For ex: 2000A:30*15 cm 2500A:36*15 cm	If there will be installation area problem then copper busbar systems can be preferred.But dimension differences between the Cu busbar systems and the Al busbar systems can be max 6-10cm that will not effect the installation so much.
Mechanical strength	■ Housing of busbar systems are made of Extruded Aluminium . Mechanical withstand is related with housing only regardless of conductors. All conductors are continuously tin plated which requires against corrosion.	■ Housing of busbar systems are made of Extruded Aluminium . Mechanical withstand is related with housing only regardless of conductors. All conductors are continuously tin plated which requires against corrosion.	There is no manufacturing differences between the both systems for mechanical strenght. So both system can be preferred for this point.
Fire rating	■ Housing material is main criteria against fire resistance.Since housing is made of steel sheet, it has higher melting degree against fire. Conductors do not have any preference agains fire resistance.	■ Housing material is main criteria against fire resistance.Since housing is made of steel sheet, it has higher melting degree against fire. Conductors do not have any preference agains fire resistance.	Busbar systems are same resistance against fire.

Economical features

Unit prices	- Copper raw material is heavy and expensive. (LME-CU: 8000-8200 USD/Ton)	+ Aluminum raw material is cheaper and lighter.(LME-AL: 2700-2900 USD/Ton)	Because of the Copper Raw material price is expensive and not to easy provide due to commercial and finacial troubles, Alumium busbar systems can be produced cheaper than copper busbar systems. This is the most important point to prefer the aluminum busbar systems.
Cost of transportation and installation	- Copper conductored systems are heavy which will cause expensive transportation and more workmanship.	+ Aluminum conductored systems are light which will cause cheap transportation and more workmanship.	Aluminum busbar systems have advantages on the transportation costs and the installation(workmanship) costs.This is also on of the reason to prefer the aluminum busbar systems.
RESULT	There are not major differences in both systems for Electrical and Mechanical withstand features. Aluminum conductored busbar systems are preferred due to easy installation (lighter) and total cheaper project cost (raw material cost)		