

## BALAJI ELECTRO CONTROLS PVT LTD

		MANUFACTURING QUALITY PLAN FOR BUS DUCT							Aluminium Bus ducts							
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SL NO.	COMPONENT OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY				REMARKS		
1	2	3	4	5	M	C/N	6	7	8	9	D*	M	S	C	10	11
<b>Note</b> Make of the bought out items will be agreed for specific Projects Documents identified in the QP verification will be maintained. However, other documents i.e. QC records and suppliers QP maintained in the QP will also be maintained by Manufacturer which may verify on surveillance at the time of final inspection																
<b>1 RAW MATERIALS</b>																
1.1	Aluminum sheet	1. Aluminum grade	Major	Visual	100% per lot	100% per lot	appd Drg & data sheet	appd Drg & data sheet	Supplier's TC		V	V	V			
		2.Chemical composition	Major	chemical	1 sample per lot	1 sample per lot	IS 737 1986	IS 737 1986	Supplier's TC		V	V				
		3.Tensile strength	Major	Mech	1 sample per lot	1 sample per lot	IS 1816 1979	IS 1816 1979	Supplier's TC		V	V				
		4.% of elongation	Major	Mech	1 sample per lot	1 sample per lot	IS 1816 1979	IS 1816 1979	Supplier's TC		V	V				
		5.Bend Test	Major	Mech	sample as per IS 737	sample as per IS 738	IS 737 1986	IS 737 1986	Supplier's TC		V	V				
		6.Surface finish	Major	Visual	1 sample per lot	1 sample per lot	No manufacturing defect	No manufacturing defect	QC Record		P	V				
		7.Dimension check	Major	Measurement	1 sample per lot	1 sample per lot	Mnfr Standard	Mnfr Standard	QC Record		P					
1.2	Aluminium Busbar (channel/Flat)	1. Aluminium grade	Major	Visual	100% per lot	100% per lot	appd Drg & data sheet	appd Drg & data sheet	Supplier's TC		V	V				
		2.Chemical composition	Major	chemical	1 sample per lot	1 sample per lot	IS 5082 1998	IS 5082 1998	Supplier's TC		V	V				
		3.Tensile strength	Major	Mech	1 sample per lot	1 sample per lot	IS 1816 1979	IS 1816 1979	Supplier's TC		V	V				
		4.% of elongation	Major	Mech	1 sample per lot	1 sample per lot	IS 1816 1979	IS 1816 1979	Supplier's TC		V	V				
		5.Bend Test	Major	Mech	sample as per IS 737	sample as per IS 737	IS 5082 1998	IS 5082 1998	Supplier's TC		V	V				
		6.Surface finish	Major	Visual	1 sample per lot	1 sample per lot	No manufacturing defect	No manufacturing defect	QC Record		V	P				
		7.Dimension check	Major	Measurement	1 sample per lot	1 sample per lot	appd Drg & data sheet	appd Drg & data sheet	QC Record		P	P				
		8.Conductivity	Major	Elect	1 sample per lot	1 sample per lot	IS 5082 1998	IS 5082 1998	QC Record /Supplier's TC		V	P	V			
<b>2 Components</b>																
2.1	Space Heater	1.Voltage/Wattage rating	Major	Visual	10%	-	appd Drg & data sheet	appd Drg & data sheet	QC Record		P	P				
		2.HV test at 1.5KV for 1 min	Major	Elect	100%	-	IS 8623	IS 8623	QC Record		P	P				
		3.Funtional Test	Major	Elect	100%	-	Mfd Std	Mfd Std	QC Record		P	P				
<b>MANUFACTURER / SUB-CONTRACTOR</b>										<b>CONTRACTOR</b>		LEGEND: * RECORDS IDENTIFIED WITH TICK SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION. M: MANUFACTURER S: MATERIAL SUPPLIER C:CUSTOMER INDICATE " P " PERFORM " W " WITNESS AND " V " VERIFICATION				
<b>SIGNATURE:</b>										<b>FOR USE:</b>		<b>DOC NO.</b>				
												<b>NAME &amp; SIGN OF APPROVING AUTHORITY &amp; SEAL</b>				
										<b>REVIEWED BY:</b>						



**MANUFACTURING QUALITY PLAN FOR BUS DUCT**

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**Aluminium Bus ducts**

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					M	C/N				D*	M	S	C	
1	2	3	4	5	6		7	8	9	10				11
2.2	Thermostat	1.Rating plate	Major	Visual	100%	-	appd Drg & data sheet	appd Drg & data sheet	QC Record		P	P		
		2.operational test	Major	Elect	do	-	Mfd Std	Mfd Std	QC Record		P	P		
2.3	EPDM Bellow /Synthetic rubber /Neoptene gasket	1.Dimension & make	Major	Measurement	10%	10%	Spec	Spec	Supplier's TC		V	V	V	
		2. Surface Finish	Major	Visual	100%	100%	No cracks & mfg defect	No cracks & mfg defect	Supplier's TC		V	V	V	
		3.Shore hardness	Major	Mech	1 sample per lot	1 sample per lot	IS 3400(II) 1995/IS 11149	IS 3400(II) 1995/IS 11149	Supplier's TC		V	V		
		4.Ageing test	Major	Mech	1 sample per lot	1 sample per lot	IS 3400(II) 1995/IS 11149	IS 3400(II) 1995/IS 11149	Supplier's TC		V	V		
		a. Tensile strength before & after ageing	Major	Mech	1 sample per lot	1 sample per lot	IS 3400(II) 1995/IS 11149	IS 3400(II) 1995/IS 11149	Supplier's TC		V	V	V	
		b.Shore hardness before & after ageing	Major	Mech	1 sample per lot	1 sample per lot	IS 3400(II) 1995/IS 11149	IS 3400(II) 1995/IS 11149	Supplier's TC		V	V	V	
2.4	Paint	1. Type & grade of paint	Major	Verify	100%	100%	IS 101 1964	IS 101 1964	Supplier's TC		V	V		
		2. All routine i.e., flash point ,viscosity etc	Major	Chem/Visual	1 sample per lot	1 sample per lot	do	do	Supplier's TC		V	V		
		3.Shade & make	Major	Verify	100%	100%	IS 5 1994/ appd Drg	IS 5 1994/ appd Drg	QC Record		P	P		
2.5	Busbar support insulator(FRP)	1. Tensile strength	Major	Mech	1 sample per lot	1 sample per lot	IS 10192 1982	IS 10192 1982	Supplier's TC		V	V	V	
		2. Cross breaking strength	Major	Mech	1 sample per lot	1 sample per lot	IS 10192 1982	IS 10192 1982	Supplier's TC		V	V	V	
		3. Compressive strength	Major	Mech	1 sample per lot	1 sample per lot	IS 10192 1982	IS 10192 1982	Supplier's TC		V	V	V	
		4.Comparative tracking index	Major	Mech	1 sample per lot	1 sample per lot	IS 2824 1975	IS 2824 1975	Supplier's TC		V	V	V	
		5.HV test (Flatwise & edgewise)	Major	Elect	5 sample per lot	5 sample per lot	IS 10192 1982	IS 10192 1982	Supplier's TC		P	V	V	
		6. IR test	Major	Elect	5 sample per lot	5 sample per lot	IS 10192 1982	IS 10192 1982	Supplier's TC		P	P	P	
		7.Dimension	Major	Measurement	5 sample per lot	5 sample per lot	appd Drg	appd Drg	appd Drg		P	P	V	
		8.Surface Finish	Major	Visual	5 sample per lot	5 sample per lot	No mfg defect	No mfg defect	appd Drg		P	V	V	
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**Aluminium Bus ducts**

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1	2	3	4	5	6		7	8	9	10				11
2.6	Hardware													
	a) HT bolt & nut Gt 8.8 for busbar	1.Dimension	Major	Measurement	Random		IS 1363,1364 & IS 1367	IS 1363,1364 & IS 1367	QC Record		p			
	b) HT bolt & nut Gt 4.6 for structure	2.Threading	Major	Visual	sample	-	IS 1363,1364 & IS 1367	IS 1363,1364 & IS 1367	QC Record		p			
	c) Plan & Spring washer	3.Electroplating (Galvanizing)	Major	chemical	sample	-	IS 1363,1364 & IS 1367	IS 1363,1364 & IS 1367	Supplier's TC		p			
<b>3 In-Process inspection</b>														
3.1	Welder Qualification	1.WPS	Critical	-	100%	100%	ASME-IX	ASME-IX	QW-482		P		V	
		2.PQR	Critical	-	100%	100%	ASME-IX	ASME-IX	QW-483		P		V	
		3.Welder qualification	Critical	-	100%	100%	ASME-IX	ASME-IX	QW-483		P		V	
3.2	Fabrication of Enclosure	1. Marking	Major	Measurement	100%	-	Fabrication Drawings	Fabrication Drawings	QC Record		P			
		2.Cutting	Major	Measurement	100%	-	Fabrication Drawings	Fabrication Drawings	QC Record		P			
		3.Bending	Major	Measurement	100%	-	Fabrication Drawings	Fabrication Drawings	QC Record		P			
		4.Tacking	Major	Measurement	100%	-	Fabrication Drawings	Fabrication Drawings	QC Record		P			
		5.Welding quality	Critical	DP Test & RT Test(circumferential Butt joint)	DP 10% RT 2%	DP 10% RT 2%	As Per GD&CD 198-79	As Per GD&CD 198-79	QC Record		P		W	
		6.Inside painting thickness check							QC Record					
		a)primer	Major	Measurement	100%	100%	Mfgr's std	Mfgr's std	QC Record		P			
		b) Black paints & matt finish	Major	Measurement	100%	100%	Mfgr's std	Mfgr's std	QC Record		P			
		7. Drilling & dressing	do	Visual	100%	100%	Fabrication Drawings	Fabrication Drawings	QC Record		P			
3.3	Conductor & fish plate fabrication	1.Marking Dimension	Major	Measurement	100%	100%	Fabrication Drawings	Fabrication Drawings	QC Record		P		P	
		2.Cutting & preparation	Major	Measurement	100%	100%	Fabrication Drawings	Fabrication Drawings	QC Record		P			
		3.Bolting & overlap check	Major	Measurement	100%	100%	Fabrication Drawings	Fabrication Drawings	QC Record		P			
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3.4	Assembly & Busbar supporting arrangement	1.Supporting insulator "C" to "C" distance	Major	Measurement	100%	100%		Fabrication Drawings	Fabrication Drawings	QC Record		P							
		2. Completeness	Major	Measurement	100%	100%		appd Drg	appd Drg	QC Record		P							
3.5	Aluminium Flexible	1. Marking Lamination bunch after deburring	Major	Counting	100%	100%		Fabrication Drawings	Fabrication Drawings	QC Record		P							
		2.Lamination bunch bending	Major	Visual	100%	100%		Fabrication Drawings	Fabrication Drawings	QC Record		P							
		3.palm plate tracking	Major	Measurement	100%	100%		Fabrication Drawings	Fabrication Drawings	QC Record		P							
		4.Quality of butt joint welding	Major	NDI(DP ) NDI(RT)	10%	2%	10%	2%	GDCD 198-79 GDCD198-79	GDCD 198-79 GDCD198-79	QC Record		P		W				
<b>4 Final Inspection</b>																			
<b>Type Test</b>		<b>Type Test clearance from Engg. To be overified by Rlo</b>																	
4.1	Busduct section	Routine Tests																	
		1.Check on assembly w.r.to a.Busbar Location b.Earth bus Location c.Manhole inspection Window,Flange,hole.	Critical	Measurement	100%	one full run per offered lot		appd Drg	appd Drg	QC Record		P		W					
		2. Dimension,general arrangement and Marking	Critical	Measurement	100%	100%		appd Drg	appd Drg	QC Record		P		W					
		3.Busbar Support center line distance	Critical	Measurement	100%	100%		appd Drg	appd Drg	QC Record		P		W					
		4. Busbar flexible joint DP test	Critical	Visual	At random	At random		GDCD 198	GDCD 198	QC Record		P		W					
		5.Insulator tightness by torque measure	Critical	Measurement	At random	At random		appd Drg	appd Drg	QC Record		P		W					
		6.Ph to Ph and Ph to earth clearance	Critical	Measurement	At random	At random		appd Drg	appd Drg	QC Record		P		W					
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