

General Information—Accessory Catalog Numbers Aluminum Bolted Accessories

ACCESSORY	PIPE SIZE						
	1"	1 - 1/2"	2"	2 - 1/2"	3"	3 - 1/2"	4"
Support							
Double Ring	PSD100-5-CH-AA	PSD150-5-CH-AA	PSD200-5-CH-AA	PSD250-5-CH-AA	PSD300-5-CH-AA	PSD350-5-CH-AA	PSD400-5-CH-AA
End - 3" BCM	PSV100-3-AA	PSV150-3-AA	PSV200-3-AA	PSV250-3-AA	PSV300-3-AA	PSV350-3-AA	PSV400-3-AA
5" BCM	PSV100-5-AA	PSV150-5-AA	PSV200-5-AA	PSV250-5-AA	PSV300-5-AA	PSV350-5-AA	PSV400-5-AA
Expansion Support	XBCW100-5-CH-AA	XBCW150-5-CH-AA	XBCW200-5-CH-AA	XBCW250-5-CH-AA	XBCW300-5-CH-AA	XBCW350-5-CH-AA	XBCW400-5-CH-AA
Couplers							
Expansion SPS	XCW100-AA	XCW150-AA	XCW200-AA	XCW250-AA	XCW300-AA	XCW350-AA	XCW400-AA
Expansion EHPS	XCW100E-AA	XCW150E-AA	XCW200E-AA	XCW250E-AA	XCW300E-AA	XCW350E-AA	XCW400E-AA
Coupler	CP100-AA	CP150-AA	CP200-AA	CP250-AA	CP300-AA	CP350-AA	CP400-AA
Elbow - 45°	EP100-45-AA	EP150-45-AA	EP200-45-AA	EP250-45-AA	EP300-45-AA	EP350-45-AA	EP400-45-AA
90°	EP100-90-AA	EP150-90-AA	EP200-90-AA	EP250-90-AA	EP300-90-AA	EP350-90-AA	EP400-90-AA
Terminal - Offset	TP100-4N-AA	TP150-4N-AA	TP200-4N-AA	TP250-4N-AA	TP300-4N-AA	TP350-4N-AA	TP400-4N-AA
45°	TPA100-4N-45-AA	TPA150-4N-45-AA	TPA200-4N-45-AA	TPA250-4N-45-AA	TPA300-4N-45-AA	TPA350-4N-45-AA	TPA400-4N-45-AA
90°	TPA100-4N-90-AA	TPA150-4N-90-AA	TPA200-4N-90-AA	TPA250-4N-90-AA	TPA300-4N-90-AA	TPA350-4N-90-AA	TPA400-4N-90-AA
Expansion Terminal							
Center Form SPS	—	XLW150-4N-AA	XLW200-4N-AA	XLW250-4N-AA	XLW300-4N4-AA	XLW350-4N4-AA	XLW400-4N4-AA
EHPS	—	XLW150E-4N-AA	XLW200E-4N-AA	XLW250E-4N-AA	XLW300E-4N4-AA	XLW350E-4N4-AA	XLW400E-4N4-AA
Offset SPS	—	XLWO150-4N-AA	XLWO200-4N-AA	XLWO250-4N-AA	XLWO300-4N4-AA	XLWO350-4N4-AA	XLWO400-4N4-AA
EHPS	—	XLW150E-4N-AA	XLW200E-4N-AA	XLW250E-4N-AA	XLW300E-4N4-AA	XLW350E-4N4-AA	XLW400E-4N4-AA
Tee-Tap - Parallel	PFTS100-1-4N-AA	PFTS150-1-4N-AA	PFTS200-1-4N-AA	PFTS250-1-4N-AA	PFTS300-1-4N4-AA	PFTS350-1-4N4-AA	PFTS400-1-4N4-AA
End Plug							
Drive - SPS	—	CI150-AA	CI200-AA	CI250-AA	CI300-AA	CI350-AA	CI400-AA
EHPS	—	CI150E-AA	CI200E-AA	CI250E-AA	CI300E-AA	CI350E-AA	CI400E-AA
Bolt - SPS	—	16205	16206	16207	16208	16209	16210
EHPS	—	16225	16226	16227	16228	16229	16230

Aluminum Welded Accessories

ACCESSORY	PIPE SIZE						
	2"	2 - 1/2"	3"	3 - 1/2"	4"	5"	6"
Support							
Double Ring	WPS200-5-CH-AA	WPS250-5-CH-AA	WPS300-5-CH-AA	WPS350-5-CH-AA	WPS400-5-CH-AA	WPS500-5-CH-AA	WPS600-5-CH-AA
Single Ring	PLHS200-5-CH-AA	PLHS250-5-CH-AA	PLHS300-5-CH-AA	PLHS350-5-CH-AA	PLHS400-5-CH-AA	PLHS500-5-CH-AA	PLHS600-5-CH-AA
Hook	HPS200-5-CH-AA	HPS250-5-CH-AA	HPS300-5-CH-AA	HPS350-5-CH-AA	HPS400-5-CH-AA	HPS500-5-CH-AA	HPS600-5-CH-AA
End	WPSV200-5-AA	WPSV250-5-AA	WPSV300-5-AA	WPSV350-5-AA	WPSV400-5-AA	WPSV500-5-AA	WPSV600-5-AA
Expansion Support	WXBC200E-5-AA	WXBC250E-5-AA	WXBC300E-5-AA	WXBC350E-5-AA	WXBC400E-5-AA	WXBC500E-5-AA	WXBC600E-5-AA
Expansion Coupler							
SPS	XWWC200-AA	XWWC250-AA	XWWC300-AA	XWWC350-AA	XWWC400-AA	XWWC500-AA	XWWC600-AA
EHPS	XWWC200E-AA	XWWC250E-AA	XWWC300E-AA	XWWC350E-AA	XWWC400E-AA	XWWC500E-AA	XWWC600E-AA
Coupler							
SPS	WWC200-AA	WWC250-AA	WWC300-AA	WWC350-AA	WWC400-AA	WWC500-AA	WWC600-AA
EHPS	WWC200E-AA	WWC250E-AA	WWC300E-AA	WWC350E-AA	WWC400E-AA	WWC500E-AA	WWC600E-AA
Elbow - 45°	WEPI200-45-AA	WEPI250-45-AA	WEPI300-45-AA	WEPI350-45-AA	WEPI400-45-AA	WEPI500-45-AA	WEPI600-45-AA
90°	WEPI200-AA	WEPI250-AA	WEPI300-AA	WEPI350-AA	WEPI400-AA	WEPI500-AA	WEPI600-AA
Terminal							
Center Form	WTPC200-4N-AA	WTPC250-4N4-AA	WTPC300-4N4-AA	WTPC350-4N4-AA	WTPC400-4N4-AA	WTPC500-4N4-AA	WTPC600-4N4-AA
Offset	WTP200-4N-AA	WTP250-4N-AA	WTP300-4N4-AA	WTP350-4N4-AA	WTP400-4N4-AA	WTP500-4N4-AA	WTP600-4N4-AA
90°	WTPA200-4N-90-AA	WTPA250-4N-90-AA	WTPA300-4N4-90-AA	WTPA350-4N4-90-AA	WTPA400-4N4-90-AA	WTPA500-4N4-90-AA	WTPA600-4N4-90-AA
Expansion Terminal							
Center Form SPS	WXL200-4N-AA	WXL250-4N-AA	WXL300-4N4-AA	WXL350-4N4-AA	WXL400-4N4-AA	WXL500-4N4-AA	WXL600-4N4-AA
EHPS	WXL200E-4N-AA	WXL250E-4N-AA	WXL300E-4N4-AA	WXL350E-4N4-AA	WXL400E-4N4-AA	WXL500E-4N4-AA	WXL600E-4N4-AA
Offset SPS	WXLO200-4N-AA	WXLO250-4N-AA	WXLO300-4N4-AA	WXLO350-4N4-AA	WXLO400-4N4-AA	WXLO500-4N4-AA	WXLO600-4N4-AA
EHPS	WXLO200E-4N-AA	WXLO250E-4N-AA	WXLO300E-4N4-AA	WXLO350E-4N4-AA	WXLO400E-4N4-AA	WXLO500E-4N4-AA	WXLO600E-4N4-AA
Tee-Tap							
Parallel	WTC250-4N-AA	WTC250-4N-AA	WTC600-4N4-AA	WTC600-4N4-AA	WTC600-4N4-AA	WTC600-4N4-AA	WTC600-4N4-AA
Transverse	WTF250-4N-AA	WTF250-4N-AA	WTF600-4N4-AA	WTF600-4N4-AA	WTF600-4N4-AA	WTF600-4N4-AA	WTF600-4N4-AA
End Plug	WCX200-AA	WCX250-AA	WCX300-AA	WCX350-AA	WCX400-AA	WCX500-AA	WCX600-AA
Ground Stud	WGP250-AA	WGP250-AA	WGP600-AA	WGP600-AA	WGP600-AA	WGP600-AA	WGP600-AA

Notes:

1. Supports listed in table are for 5" BCM; 3" and 7" BCM's are available-see catalog pages referenced.

General Information Aluminum Bolted Bus Accessories

Bus Conductor Accessories are designed with large contact area and appropriate clamping forces to give them the efficient long life and trouble-free-operation typical. Aluminum Bus accessories, including the bolts and nuts, are made from high strength aluminum alloys. The large aluminum bolts maintain high contact pressure during heating and cooling cycles since the coefficients of expansion of the conductor, fittings and bolts are essentially the same. Bolts have an Alumilite* 205 finish and are coated with lubricant to give additional resistance to corrosion. The reduced friction provided by this lubricant coating gives a higher bolting pressure for a given torque.

AFL Conductor Accessories No. 2 Electrical Joint Compound is recommended for making aluminum-to-aluminum and aluminum-to-copper bolted joints. This compound is an effective seal against the entrance of moisture and corrosive or oxidizing agents. It has the additional advantage of chemically aiding in the removal of the natural oxides of aluminum. The flow point of AFL No. 2 Electrical

Joint Compound is about 150°F (66°C), although tests show that a film remains in the joint up to 200°F (92°C) to seal the joint and maintain stable operation.

Experience has shown that bolted joints on electrical bus conductors made with unbushed electrical fittings with the proper joint preparation and with adequate sealing of the connection, are entirely satisfactory for aluminum-to-aluminum and aluminum-to-copper connections.

Method of Making Bolted Electrical Connections

- (1) Remove grease and dirt from contact surfaces.
- (2) Coat thoroughly with No. 2 Electrical Joint Compound.
- (3) Abrade surfaces through coating with wire brush or emery cloth.
- (4) Assemble joint without removal of compound, and any excess may be left on the edges to seal the contact surfaces.

*Trademark of Aluminum Company of America

RECOMMENDED TIGHTENING TORQUE FOR ALUMINUM BOLTS WITH ALUMILITE 205 FINISH AND LUBRICANT COATING

Bolt Diameter (inches)	Torque		Bolt Diameter (inches)	Torque	
	Ft-Lbs	N. m		Ft-Lbs	N. m
3/8	15	20	5/8	40	54
7/16	20	27	3/4	60	81
1/2	25	34			

RECOMMENDED TIGHTENING TORQUE FOR GALVANIZED STEEL BOLTS WITH LUBRICANT COATING

Bolt Diameter (inches)	Torque		Bolt Diameter (inches)	Torque	
	Ft-Lbs	N. m		Ft-Lbs	N. m
5/16	15	20	5/8	60	81
3/8	25	34	3/4	75	102
1/2	40	54			

RECOMMENDED TIGHTENING TORQUE FOR SILICON BRONZE BOLTS

Bolt Diameter (inches)	Torque		Bolt Diameter (inches)	Torque	
	Ft-Lbs	N. m		Ft-Lbs	N. m
5/16-18	11	14	5/8-11	70	94
3/8-16	20	27	3/4-10	100	135
1/2-13	40	54			

RECOMMENDED TIGHTENING TORQUE FOR STAINLESS STEEL (18-8)

Bolt Diameter (inches)	Torque		Bolt Diameter (inches)	Torque	
	Ft-Lbs	N. m		Ft-Lbs	N. m
5/16-18	15	20	5/8-11	55	54
3/8-16	20	27	3/4-10	87	73
1/2-13	40	34			

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Aluminum Welded Bus Accessories

AFL Welded fittings (unless otherwise specified) will conduct the rated current of the largest conductor to which they can be applied. The dimensions of bus accessory surfaces to be welded are designed so that the proper weld bead for full conductivity is automatically applied. Conductor socket depths are generous, allowing wide tolerance in cutting conductors to length. For the larger conductors, a choice of terminal pad sizes are available.

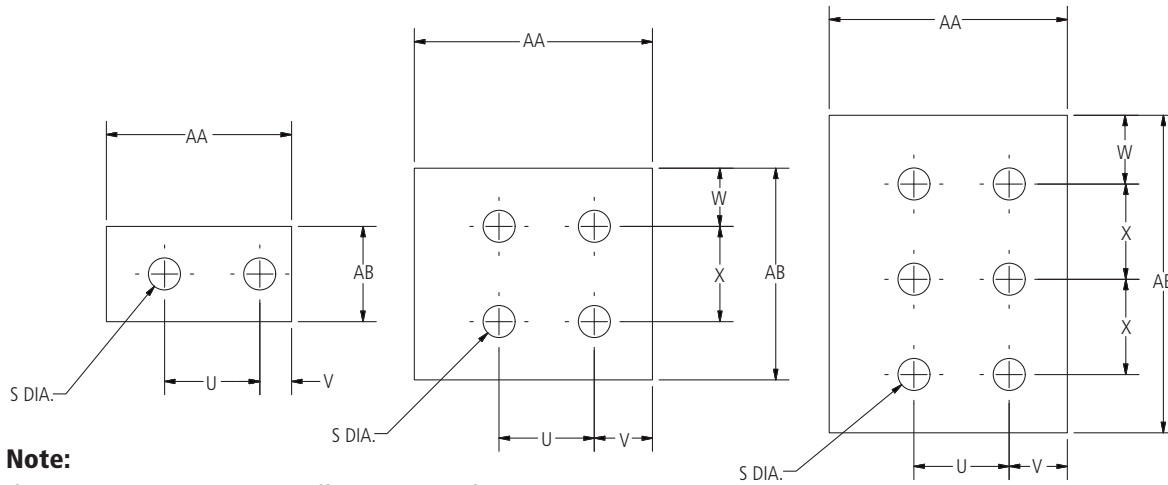
The streamlined design and the absence of protruding bolts (which act as corona points) make AFL Welded Bus Accessories an excellent choice for the construction of Extra-High-Voltage substations. AFL Welded Aluminum Bus accessories will save construction dollars three ways.

FIRST, AFL Welded Bus Accessories pass on to the user the

manufacturing economies gained by the elimination of superfluous material. SECOND use of welded bus accessories reduces installation costs through a user-cost-conscious design that provides a minimum welding surface—thus reducing welding time. THIRD, well-engineered and economical fittings accommodate a wide conductor range, permitting users to reduce significantly the number of stock sizes normally needed to handle a wide range of conductor sizes.

Representing the results of years of development and experience, this catalog provides electrical and mechanical details on AFL full line of standard welded electrical bus accessories. Inquiries regarding special design problems are invited and should be directed to your local sales representative.

General Information—NEMA Standard Pad Sizes



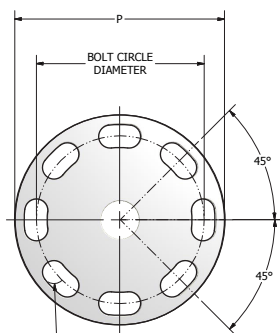
Note:
If catalog number has "EHV" suffix, pad will be furnished with rounded corners.

Pad Size	Dimensions						
	S	U	V	W	X	AA	AB
	in	in	in	in	in	in	in
B or 2N	0.6	1.8	0.6	—	—	3.0	1.8
D or 4N	0.6	1.8	0.6	0.6	1.8	3.0	3.0
E or 4N4	0.6	1.8	1.1	1.1	1.8	4.0	4.0
F or 5N4	0.6	1.8	1.1	0.8	1.8	4.0	5.0
G or 6N4	0.6	1.8	1.1	1.3	1.8	4.0	6.0

For non-standard pads, specify the S, U, V, W, or X dimensions. If the pad is to be copper faced or specially machined, give detailed information and whether the bottom side, top side or both sides are involved. When centerline of bolt spacing does not coincide

with the centerline of the pad, this then becomes non-standard drilling. In this case, the holes are offset on the pad by distance W and/or distance V.

Bus Support Bases



BASE DESIGN PERMITS ROTATIONAL ADJUSTMENT OF 10°
FOUR ALUMINUM HEX HEAD CAP SCREWS WITH LOCK WASERS
SUPPLIED AS MOUNTING HARDWARE UNLESS OTHERWISE SPECIFIED
SEE TABLE FOR HARDWARE SIZE

Bolt Circle Mounting	Dimensions		Mounting Hardware Supplied
	Base Thickness	P	
in	in	in	
3	0.5	4.3	1/2-13 x .87 Galvanized Steel Hex Hd. Bolts & 1/2 Lockwashers
5	0.5	6.3	5/8-11 x 1.25 Galvanized Steel Hex Hd. Bolts & 5/8 Lockwashers
7	0.5	8.5	3/4 x 1.50 Galvanized Steel Hex Hd. Bolts & 3/4 Lockwashers

Conductor Information for ACSR Conductors

Code Name	Size	Stranding	Diameter (Inches)				Weight per 1000 ft	Rated Strength	Resistance		Allowable Ampacity ¹	SAG10® Chart Number
			Individual Wires		Steel Core	Complete Cable			OHMS per 1000 ft			
			Al	St					DC @ 20°C	AC @ 75°C		
Turkey	6	6/1	0.066	0.066	0.066	0.198	36	1,190	0.641	0.806	105	1-1023
Swan	4	6/1	0.083	0.083	0.083	0.250	57	1,860	0.403	0.515	140	1-1023
Swanate	4	7/1	0.077	0.103	0.103	0.257	67	2,360	0.399	0.519	140	1-670
Sparrow	2	6/1	0.105	0.105	0.105	0.316	91	2,850	0.254	0.332	184	1-1023
Sparate	2	7/1	0.097	0.130	0.130	0.325	107	3,460	0.251	0.338	184	1-670
Robin	1	6/1	0.118	0.118	0.118	0.354	115	3,550	0.201	0.268	212	1-938
Rave	1/0	6/1	0.133	0.133	0.133	0.398	145	4,380	0.159	0.217	242	1-938
Quail	2/0	6/1	0.149	0.149	0.149	0.447	183	5,310	0.126	0.176	276	1-938
Pigeon	3/0	6/1	0.167	0.167	0.167	0.502	231	6,620	0.100	0.144	315	1-938
Penguin	4/0	6/1	0.188	0.188	0.188	0.563	291	8,350	0.080	0.119	357	1-938
Waxwing	266.8	18/1	0.122	0.122	0.122	0.609	289	6,880	0.064	0.079	449	1-844
Partridge	266.8	26/7	0.101	0.079	0.236	0.642	367	11,300	0.064	0.078	475	1-782
Ostrich	300	26/7	0.107	0.084	0.251	0.680	412	12,700	0.057	.069	492	1-782
Merlin	336.4	18/1	0.137	0.137	0.137	0.684	365	8,680	0.051	0.063	519	1-844
Linnet	336.4	26/7	0.115	0.089	0.265	0.720	462	14,100	0.051	0.062	529	1-782
Oriole	336.4	30/7	0.106	0.106	0.318	0.741	526	17,300	0.050	0.061	535	1-773
Chickadee	397.5	18/1	0.149	0.149	0.149	0.743	431	9,940	0.043	0.053	576	1-844
Brant	397.5	24/7	0.129	0.086	0.257	0.772	511	14,600	0.043	0.053	584	1-889
Ibis	397.5	26/7	0.124	0.096	0.289	0.783	546	16,300	0.043	0.052	587	1-782
Lark	397.5	30/7	0.115	0.115	0.345	0.806	622	20,300	0.043	0.052	594	1-773
Pelican	477	18/1	0.163	0.163	0.163	0.814	517	11,800	0.036	0.044	646	1-844
Flicker	477	24/7	0.141	0.094	0.282	0.846	614	17,200	0.036	0.044	655	1-889
Hawk	477	26/7	0.135	0.105	0.316	0.858	656	19,500	0.036	0.044	659	1-782
Hen	477	30/7	0.126	0.126	0.378	0.883	746	23,800	0.035	0.043	666	1-773
Osprey	556.5	18/1	0.176	0.176	0.176	0.879	603	13,700	0.031	0.038	711	1-844
Parakeet	556.5	24/7	0.152	0.102	0.305	0.914	716	19,800	0.031	0.038	721	1-889
Dove	556.5	26/7	0.146	0.114	0.341	0.927	765	22,600	0.031	0.038	726	1-782
Eagle	556.5	30/7	0.136	0.136	0.409	0.953	871	27,800	0.030	0.037	734	1-773
Peacock	605	24/7	0.159	0.106	0.318	0.953	779	21,600	0.028	0.035	760	1-889
Squab	605	26/7	0.153	0.119	0.356	0.966	832	24,300	0.028	0.035	765	1-782
Wood Duck	605	30/7	0.142	0.142	0.426	0.994	946	28,900	0.028	0.034	774	—
Teal	605	30/19	0.142	0.085	0.426	0.994	939	30,000	0.028	0.034	773	1-757
Kingbird	636	18/1	0.188	0.188	0.188	0.940	690	15,700	0.027	0.033	773	1-844
Swift	636	36/1	0.133	0.133	0.133	0.930	643	13,690	0.027	0.033	769	1-898
Rook	636	24/7	0.163	0.109	0.326	0.977	818	22,000	0.027	0.033	784	1-889
Grosbeak	636	26/7	0.156	0.122	0.365	0.991	874	25,200	0.027	0.033	789	1-782

Conductor Information for ACSR Conductors (continued)

Code Name	Size	Stranding	Diameter (Inches)				Weight per 1000 ft	Rated Strength	Resistance		Allowable Ampacity ¹	SAG10 [®] Chart Number
			Individual Wires		Steel Core	Complete Cable			OHMS per 1000 ft			
			Al	St					DC @ 20°C	AC @ 75°C		
	kcmil	Al/St					lbs	lbs		Amps		
Scoter	636	30/7	0.146	0.146	0.437	1.019	995	30,400	0.026	0.033	798	—
Egret	636	30/19	0.146	0.087	0.437	1.019	987	31,500	0.027	0.033	798	1-757
Flamingo	666.6	24/7	0.167	0.111	0.333	1.000	858	23,700	0.026	0.032	807	1-889
Gannet	666.6	26/7	0.160	0.125	0.374	1.014	916	26,400	0.026	0.031	812	1-782
Stilt	715.5	24/7	0.173	0.115	0.345	1.036	920	25,500	0.024	0.029	844	1-889
Starling	715.5	26/7	0.166	0.129	0.387	1.051	984	28,400	0.024	0.029	849	1-537
Redwing	715.5	30/19	0.154	0.093	0.463	1.081	1,110	34,600	0.024	0.029	859	1-757
Coot	795	36/1	0.149	0.149	0.149	1.040	804	16,710	0.022	0.027	884	1-898
Drake	795	26/7	0.175	0.136	0.408	1.107	1,093	31,500	0.021	0.026	907	1-537
Tern	795	45/7	0.133	0.089	0.266	1.063	895	22,100	0.022	0.027	887	1-955
Condor	795	54/7	0.121	0.121	0.364	1.092	1,023	28,200	0.022	0.027	889	1-838
Mallard	795	30/19	0.163	0.098	0.488	1.140	1,233	38,400	0.021	0.026	918	1-757
Ruddy	900	45/7	0.141	0.094	0.283	1.131	1,013	24,400	0.019	0.024	958	1-955
Canary	900	54/7	0.129	0.129	0.387	1.162	1,158	31,900	0.019	0.024	961	1-838
Rail	954	45/7	0.146	0.097	0.291	1.165	1,074	25,900	0.018	0.023	993	1-955
Cardinal	954	54/7	0.133	0.133	0.399	1.196	1,227	33,800	0.018	0.023	996	1-838
Ortolan	1033.5	45/7	0.152	0.101	0.303	1.212	1,163	27,700	0.017	0.021	1043	1-957
Curlew	1033.5	54/7	0.138	0.138	0.415	1.245	1,330	36,600	0.017	0.021	1047	1-838
Bluejay	1113	45/7	0.157	0.105	0.315	1.258	1,253	29,800	0.016	0.019	1092	1-957
Finch	1113	54/19	0.144	0.086	0.431	1.292	1,429	39,100	0.015	0.020	1093	1-1009
Bunting	1192.5	45/7	0.163	0.109	0.326	1.302	1,342	32,000	0.014	0.018	1139	1-957
Grackle	1192.5	54/19	0.149	0.089	0.446	1.337	1,531	41,900	0.014	0.018	1140	1-1009
Bittern	1272	45/7	0.168	0.112	0.336	1.345	1,432	34,100	0.014	0.017	1184	1-957
Pheasant	1272	54/19	0.154	0.092	0.461	1.381	1,633	34,600	0.014	0.017	1187	1-1009
Dipper	1351.5	45/7	0.173	0.116	0.347	1.386	1,521	36,200	0.013	0.016	1229	1-957
Martin	1351.5	54/19	0.158	0.095	0.475	1.424	1,735	46,300	0.013	0.016	1232	1-1009
Bobolink	1431	45/7	0.178	0.119	0.357	1.427	1,611	38,300	0.012	0.015	1272	1-957
Lapwing	1590	45/7	0.188	0.125	0.376	1.504	1,790	42,200	0.011	0.014	1354	1-1019
Falcon	1590	54/19	0.172	0.103	0.515	1.544	2,041	54,500	0.011	0.014	1359	1-1009
Chukar	1780	84/19	0.146	0.087	0.437	1.602	2,071	51,000	0.010	0.013	1453	1-1020
Bluebird	2156	84/19	0.160	0.096	0.481	1.762	2,509	60,300	0.008	0.011	1623	1-020
Kiwi	2167	72/7	0.174	0.116	0.347	1.735	2,300	49,800	0.008	0.011	1607	1-1053

Note: Conductor temperature at 75°, ambient temperature 25°C, emissivity 0.5, wind 2 ft/sec, in sun.

Conductor Information for AAC Conductors

Code Name	Size	Stranding	Diameter (inches)	Weight per 1000 ft	Rated Strength	Resistance OHMS per 1000 ft		Allowable Ampacity ¹	SAG10® Chart Number
	kcmil		Al			Complete Cable	DC @ 20°C		
Peachbell	6	7	0.184	25	563	0.658	0.805	103	1-918
Rose	4	7	0.232	39	881	0.414	0.506	138	1-918
Iris	2	7	0.292	62	1,350	0.260	0.318	185	1-918
Pansy	1	7	0.328	78	1,640	0.207	0.252	214	1-918
Poppy	1/0	7	0.368	99	1,990	0.164	0.200	247	1-918
Aster	2/0	7	0.414	125	2,510	0.130	0.159	286	1-918
Phlox	3/0	7	0.464	157	3,040	0.103	0.126	331	1-918
Oxlip	4/0	7	0.522	198	3,830	0.082	0.100	383	1-918
Sneezewort	250.0	7	0.567	234	4,520	0.069	0.085	425	1-918
Valerian	250.0	19	0.574	234	4,660	0.069	0.085	426	1-945
Daisy	266.8	7	0.586	250	4,830	0.065	0.079	443	1-918
Laurel	266.8	19	0.592	250	4,970	0.065	0.079	444	1-945
Peony	300.0	19	0.628	281	5,480	0.058	0.071	478	1-945
Tulip	336.4	19	0.665	315	6,150	0.051	0.063	513	1-945
Daffodil	350.0	19	0.679	328	6,390	0.049	0.061	526	1-945
Canna	397.5	19	0.723	373	7,110	0.044	0.053	570	1-945
Goldentuft	450.0	19	0.769	422	7,890	0.038	0.043	616	1-945
Cosmos	477.0	19	0.792	447	8,360	0.036	0.045	639	1-945
Syringa	477.0	37	0.795	447	8,690	0.036	0.045	639	1-1049
Zinnia	500.0	19	0.811	469	8,760	0.035	0.043	658	1-945
Hyacinth	500.0	37	0.814	469	9,110	0.035	0.043	658	1-1049
Dahlia	556.5	19	0.856	522	9,750	0.031	0.038	703	1-945
Mistletoe	556.5	37	0.858	522	9,940	0.031	0.038	704	1-1049
Meadowsweet	600.0	37	0.891	562	10,700	0.023	0.036	738	1-1049
Orchid	636.0	37	0.918	596	11,400	0.027	0.036	765	1-1049
Heuchera	650.0	37	0.928	609	11,600	0.027	0.033	775	1-1049
Verbena	700.0	37	0.963	656	12,500	0.025	0.031	812	1-1049
Flag	700.0	61	0.964	656	12,900	0.025	0.031	812	1-1010
Violet	715.5	37	0.973	671	12,800	0.024	0.030	823	1-1049
Nasturtium	715.5	61	0.975	671	13,100	0.024	0.030	823	1-1010
Petunia	750.0	37	0.997	703	13,100	0.023	0.029	847	1-1049
Cattail	750.0	61	0.998	703	13,500	0.023	0.029	847	1-1010
Arbutus	795.0	37	1.026	745	13,900	0.022	0.027	878	1-1049
Lilac	795.0	61	1.027	745	14,300	0.022	0.027	879	1-1010
Cockscomb	900.0	37	1.092	844	15,400	0.019	0.024	948	1-1049



Conductor Information for AAC Conductors (continued)

Code Name	Size	Stranding Al	Diameter (inches)	Weight per 1000 ft lbs	Rated Strength lbs	Resistance OHMS per 1000 ft		Allowable Ampacity ¹ Amps	SAG10® Chart Number
	kcmil		Complete Cable			DC @ 20°C	AC @ 75°C		
Snapdragon	900.0	61	1.093	844	15,900	0.019	0.024	948	1-1010
Magnolia	954.0	37	1.124	894	16,400	0.018	0.023	982	1-1049
Goldenrod	954.0	61	1.125	894	16,900	0.018	0.023	983	1-1010
Hawkweed	1000.0	37	1.151	937	17,200	0.017	0.022	1,010	1-1049
Camellia	1000.0	61	1.152	937	17,700	0.071	0.022	1,011	1-1010
Bluebell	1033.5	37	1.170	969	17,700	0.017	0.021	1,031	1-1049
Larkspur	1033.5	61	1.171	969	18,300	0.017	0.021	1,032	1-1010
Marigold	113.0	61	1.216	1,043	19,700	0.016	0.020	1,079	1-1010
Hawthorn	1192.5	61	1.258	1,118	21,100	0.015	0.018	1,124	1-1010
Narcissus	1272.0	61	1.300	1,192	22,000	0.014	0.017	1,169	1-1010
Columbine	1351.5	61	1.340	1,267	23,400	0.013	0.016	1,212	1-1010
Carnation	1431.0	61	1.378	1,341	24,300	0.012	0.016	1,253	1-1010
Gladiolus	1510.5	61	1.416	1,416	25,600	0.014	0.015	1,294	1-1010
Coreopsis	1590.0	61	1.453	1,490	27,000	0.011	0.014	1,333	1-1010
Jessamine	1750.0	61	1.524	1,640	29,700	0.010	0.013	1,408	1-1010
Cowslip	2000.0	91	1.631	1,875	34,200	0.009	0.012	1,518	1-1157
Sagebrush	2250.0	91	1.730	2,130	37,500	0.008	0.011	1,612	1-1157
Lupine	2500.0	91	1.823	2,366	41,900	0.007	0.010	1,706	1-1157
Bitterroot	2750.0	91	1.912	2,603	46,100	0.006	0.009	1,793	1-1157
Trillium	3000.0	127	1.998	2,839	50,300	0.006	0.008	1,874	1-1032
Blubonnet	3500.0	127	2.158	3,345	58,700	0.005	0.008	2,024	1-1032

Note: Conductor temperature at 75°, ambient temperature 25°C, emissivity 0.5, wind 2 ft/sec, in sun.

Conductor Information for AAAC Conductors

Code Name	Size	Stranding	Diameter	Weight per 1000 ft	Rated Strength	Resistance OHMS per 1000 ft		Allowable Ampacity ¹	SAG10® Chart Number
	kcmil					Al	in	lbs	
Akron	30.58	7	0.198	29	1,110	0.659	0.785	107	1-1068
Alton	48.69	7	0.250	45	1,760	0.414	0.493	143	1-1068
Ames	77.47	7	0.316	72	2,800	0.260	0.310	191	1-1068
Azusa	123.3	7	0.398	115	4,460	0.163	0.195	256	1-1068
Anaheim	155.4	7	0.447	145	5,390	0.130	0.154	296	1-1068
Amherst	195.7	7	0.502	183	6,790	0.103	0.123	342	1-1068
Alliance	246.9	7	0.563	230	8,560	0.082	0.097	395	1-1068
Butte	312.8	19	0.642	292	11,000	0.064	0.077	460	1-1056
Canton	394.5	19	0.720	368	13,300	0.051	0.061	532	1-1056
Cairo	465.4	19	0.783	434	15,600	0.043	0.052	590	1-1056
Darien	559.5	19	0.858	522	18,800	0.036	0.043	663	1-1056
Elgin	652.4	19	0.927	608	21,900	0.031	0.037	729	1-1056
Flint	740.8	37	0.990	691	24,400	0.027	0.033	790	1-1155
Greeley	927.2	37	1.108	865	30,500	0.022	0.026	908	1-1155

Note: Conductor temperature at 75°, ambient temperature 25°C, emissivity 0.5, wind 2 ft/sec, in sun.



Conductor Information for ACAR Conductors

Size	Stranding	Diameter (inches)	Weight per 1000 ft	Rated Strength	Resistance OHMS per 1000 ft		Allowable Ampacity ¹	SAG10® Chart Number
					DC @ 20°C	AC @ 75°C		
kcmil	AAC/AAAC	Complete Cable OD	lbs	lbs			Amps	
355.0	12/7	0.683	332	8,500	0.051	0.062	519	1-1196
465.9	12/7	0.783	436	11,000	0.039	0.048	616	1-1196
503.6	12/7	0.814	471	11,900	0.036	0.044	646	1-1196
653.1	12/7	0.927	611	15,400	0.028	0.034	760	1-1196
739.8	30/7	0.990	693	15,300	0.024	0.030	831	1-1203
739.8	18/19	0.990	692	18,800	0.025	0.031	814	1-1206
853.7	30/7	1.063	799	17,500	0.021	0.026	907	1-1203
853.7	18/19	1.063	798	21,500	0.022	0.027	890	1-1206
927.2	30/7	1.108	868	19,000	0.019	0.024	955	1-1203
927.2	18/19	1.108	867	23,400	0.020	0.025	936	1-1206
1024.5	30/7	1.165	959	20,900	0.017	0.022	1,015	1-1203
1024.5	18/19	1.165	958	25,800	0.018	0.023	995	1-1206
1081.0	30/7	1.196	1,012	22,100	0.016	0.021	1,048	1-1203
1081.0	18/19	1.196	1,011	27,200	0.017	0.021	1,028	1-1206
1109.0	30/7	1.212	1,038	22,700	0.016	0.020	1,065	1-1203
1109.0	18/19	1.212	1,037	27,900	0.017	0.021	1,044	1-1206
1172.0	30/7	1.246	1,097	24,000	0.015	0.019	1,101	1-1203
1172.0	18/19	1.246	1,096	29,500	0.016	0.020	1,080	1-1206
1197.0	30/7	1.259	1,121	24,500	0.015	0.019	1,115	1-1203
1197.0	18/19	1.259	1,119	30,200	0.016	0.019	1,094	1-1206
1280.0	30/7	1.302	1,199	26,200	0.014	0.018	1,160	1-1203
1280.0	18/19	1.302	1,197	32,200	0.015	0.018	1,139	1-1206
1361.0	42/19	1.344	1,274	30,300	0.013	0.017	1,196	1-1125
1527.0	42/19	1.424	1,429	33,600	0.012	0.015	1,314	1-1125
1703.0	42/19	1.504	1,594	37,500	0.011	0.014	1,363	1-1125
1933.0	42/19	1.602	1,809	42,500	0.009	0.012	1,465	1-1125
2267.0	42/19	1.735	2,142	49,900	0.008	0.011	1,594	1-1125
2339.0	42/19	1.762	2,210	51,500	0.008	0.011	1,622	1-1125
2493.0	72/19	1.821	2,357	50,400	0.007	0.010	1,687	1-1235
2493.0	54/37	1.821	2,355	57,600	0.007	0.010	1,670	1-1105

Note: Conductor temperature at 75°, ambient temperature 25°C, emissivity 0.5, wind 2 ft/sec, in sun.

General Information—Thermal Expansion Aluminum Tubular Bus Conductor

Length		Temperature Change °C ¹									
		10°		20°		30°		40°		50°	
		Change in Length									
ft	m	in	mm	in	mm	in	mm	in	mm	in	mm
10	3.05	0.028	0.7	0.055	1.4	0.083	2.1	0.11	2.8	0.138	3.5
20	6.1	0.055	1.4	0.110	2.8	0.166	4.2	0.221	5.6	0.276	7.0
30	9.14	0.083	2.1	0.166	4.2	0.284	6.3	0.331	8.4	0.414	10.5
40	12.19	0.110	2.8	0.221	5.6	0.331	8.4	0.442	11.2	0.552	14.0
50	15.24	0.138	3.5	0.276	7.0	0.414	10.5	0.552	14.0	0.69	17.5
60	18.29	0.166	4.2	0.331	8.4	0.497	12.6	0.662	16.8	0.828	21.0
70	21.34	0.192	4.9	0.386	9.8	0.580	14.7	0.773	19.6	0.966	24.5
80	24.38	0.221	5.6	0.442	11.2	0.662	16.8	0.883	22.4	1.104	28.0
90	27.43	0.248	6.3	0.497	12.6	0.745	18.9	0.994	25.2	1.242	31.5
100	30.48	0.276	7.0	0.522	14.0	0.828	21.0	1.104	28.0	1.38	35.0

Length		Temperature Change °C ¹									
		60°		70°		80°		90°		100°	
		Change in Length									
ft	m	in	mm	in	mm	in	mm	in	mm	in	mm
10	3.05	0.166	4.2	0.193	4.9	0.221	5.6	0.248	6.3	0.276	7.0
20	6.1	0.331	8.4	0.386	9.8	0.442	11.2	0.497	12.6	0.552	14.0
30	9.14	0.497	12.6	0.580	14.7	0.662	16.8	0.745	18.9	0.828	21.0
40	12.19	0.662	16.8	0.773	19.6	0.883	22.4	0.994	25.2	1.104	28.0
50	15.24	0.828	21.0	0.966	24.5	1.104	28.0	1.242	31.5	1.38	35.1
60	18.29	0.994	25.2	1.159	29.4	1.325	33.7	1.49	37.8	1.656	42.1
70	21.34	1.159	29.4	1.352	34.3	1.546	39.3	1.739	44.2	1.932	49.1
80	24.38	1.325	33.7	1.546	39.3	1.766	44.9	1.987	50.5	2.208	56.1
90	27.43	1.49	37.8	1.739	44.2	1.987	50.5	2.236	56.8	2.484	63.1
100	30.48	1.656	42.1	1.932	49.1	2.208	56.1	2.484	63.1	2.76	70.1

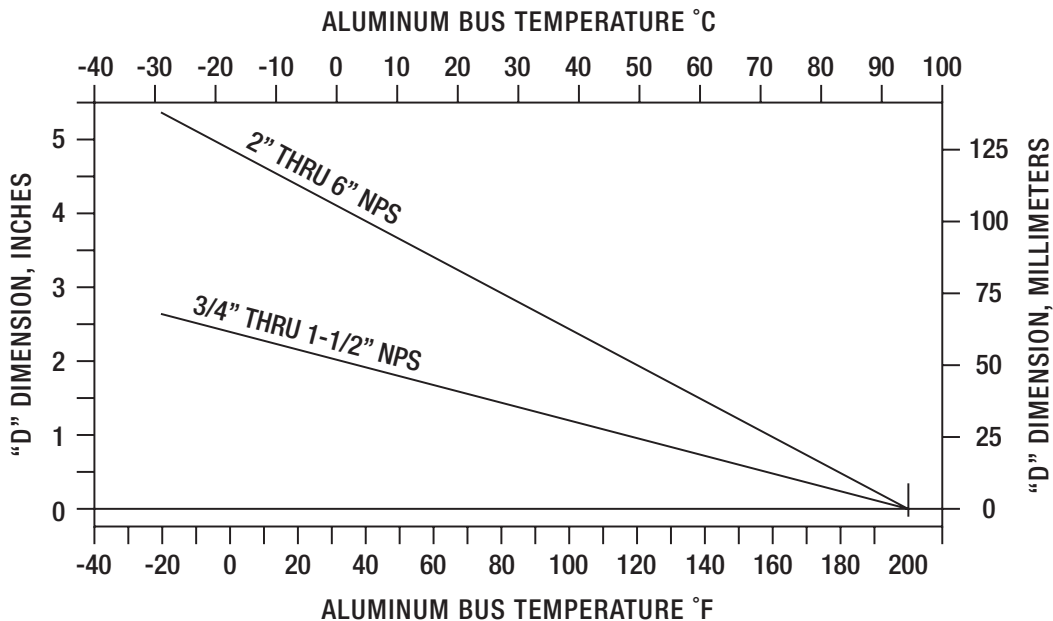
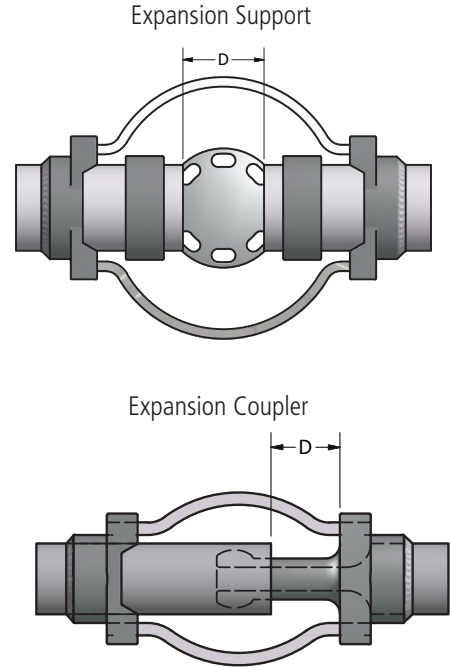
1. Coefficient of thermal expansion for tubular bus conductor is 0.000023 per unit length per °C.

General Information—Expansion, Coupler and Support Typical Bolted & Welded Types (Welded Type shown)

The expansion space (Dimension "D" on illustration) provided for expansion supports and couplers is based on an installation temperature of 68°F (20°C) and an operating temperature range between 200°F (93°C) maximum and -20°F (-29°C) minimum.

The temperature range is based on a maximum run length between fixed supports of 80 ft. (24.4m) for 3/4" thru 1-1/2" NPS and 150 ft. (45.7m) for 2" thru 6" NPS. Assembly dimensions are based on expansion support or expansion coupler being centered between fixed supports.

Spaces provided for expansion, based on an installation temperature of 68°F (20°C) are 1.75" (44.5mm) for 3/4" thru 1-1/2" NPS and 3.25" (82.6mm) for 2" thru 6" NPS. Installation dimensions must be altered to compensate for installation temperatures other than 68°F (20°C) which affects space provided for expansion ("D" on illustration) by using graph shown below.

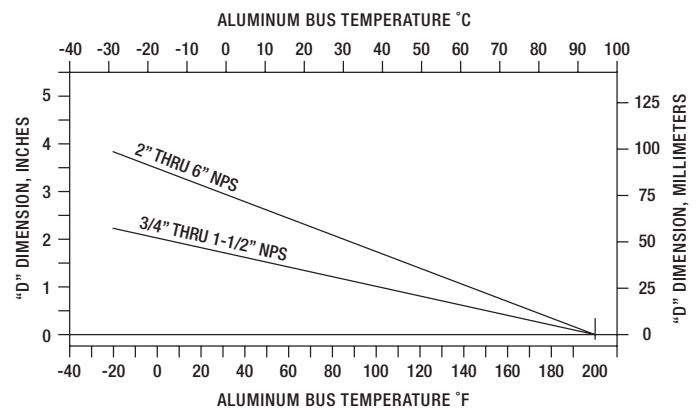
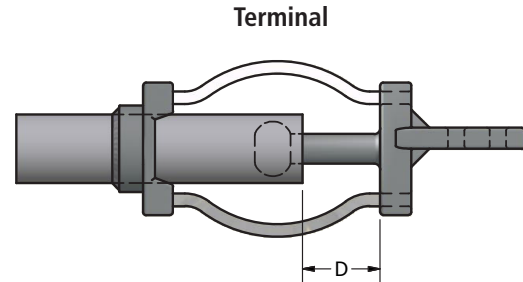


General Information—Expansion Terminal Typical Bolted and Welded Types (Welded Type shown)

The expansion space (Dimension "D" on illustration) provided for expansion terminals is based on an installation temperature of 68°F (20°C) and an operating temperature range between 200°F (93°C) maximum and -20°F (-29°C) minimum.

The temperature range is based on a maximum run length between fixed support and terminal of 60 ft. (18.3 m) for 3/4" through 1-1/2" NPS and 100 ft. (30.5 m) for 2" through 6" NPS.

Spaces provided for expansion based on an installation temperature of 68°F (20°C) are 1.30" (33 mm) for 3/4" through 1-1/2" NPS and 2.25" (57 mm) for 2" through 6" NPS. Installation dimensions must be altered to compensate for installation temperatures other than 68°F (20°C) which affects space provided for expansion ("D" on illustration) by using graph shown at right.

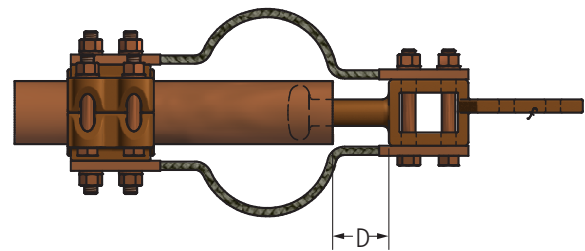


General Information—Bronze Expansion Terminal

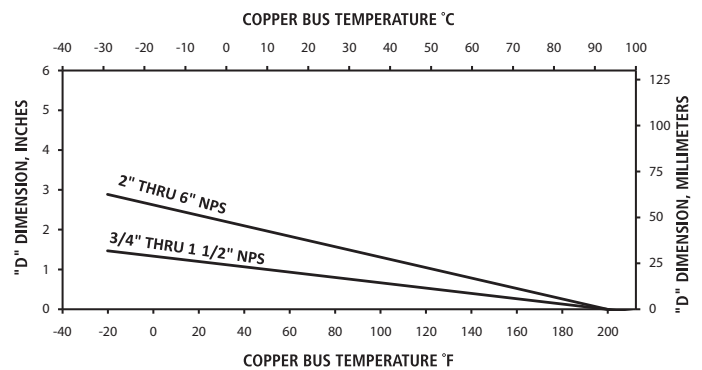
The expansion space (Dimension "D" on illustration) provided for expansion terminals is based on an installation temperature of 68°F (20°C) and an operating temperature range between 200°F (93°C) maximum and -20°F (-29°C) minimum.

The temperature range is based on a maximum run length between fixed support and terminal of 60 ft. (18.3 m) for 3/4" through 1-1/2" NPS and 100 ft. (30.5 m) for 2" through 6" NPS.

Spaces provided for expansion of bronze terminals based on an installation temperature of 68°F (20°C) are 0.88" (22 mm) for 3/4" through 1-1/2" NPS and 1.5" (38 mm) for 2" through 6" NPS. Installation dimensions must be altered to compensate for installation temperatures other than 68°F (20°C) which affects space provided for expansion ("D" on illustration) by using graph shown at right.



Bronze Terminal





General Information—Standard Pipe Size Nominal Dimensions & Weight

Aluminum

Nominal Pipe Size Inches	Diameter		Wall Thickness in	Wall Area in ²	Weight lb/ft
	Outside in	Inside in			
ASA SCHEDULE 40 PIPE (Standard Pipe Size)					
1	1.315	1.049	0.133	0.494	0.581
1 - 1/4	1.660	1.380	0.140	0.668	0.786
1 - 1/2	1.900	1.610	0.145	0.800	0.940
2	2.375	2.067	0.154	1.074	1.264
2 - 1/2	2.875	2.469	0.203	1.704	2.004
3	3.500	3.068	0.216	2.228	2.621
3 - 1/2	4.000	3.548	0.226	2.680	3.151
4	4.500	4.026	0.237	3.174	3.733
5	5.563	5.047	0.258	4.300	5.057
6	6.625	6.065	0.280	5.581	6.564
8	8.625	7.981	0.322	8.399	9.878
ASA SCHEDULE 80 PIPE (Extra-Heavy Pipe Size)					
1	1.315	0.957	0.179	0.639	0.751
1 - 1/4	1.660	1.278	0.191	0.881	1.037
1 - 1/2	1.900	1.500	0.200	1.068	1.256
2	2.375	1.939	0.218	1.477	1.737
2 - 1/2	2.875	2.323	0.276	2.254	2.650
3	3.500	2.900	0.300	3.016	3.547
3 - 1/2	4.000	3.364	0.318	3.678	4.326
4	4.500	3.826	0.337	4.407	5.183
5	5.563	4.813	0.375	6.112	7.188
6	6.625	5.761	0.432	8.405	9.884
8	8.625	7.625	0.500	12.763	15.008

Copper

Nominal Pipe Size Inches	Diameter		Wall Thickness in	Wall Area in ²	Weight lb/ft
	Outside in	Inside in			
ASA SCHEDULE 40 PIPE (Standard Pipe Size)					
1	1.315	1.062	0.127	0.472	1.830
1 - 1/4	1.660	1.368	0.146	0.694	2.680
1 - 1/2	1.900	1.600	0.150	0.825	3.190
2	2.375	2.062	0.157	1.091	4.210
2 - 1/2	2.875	2.500	0.188	1.583	6.120
3	3.500	3.062	0.219	2.257	8.720
3 - 1/2	4.000	3.500	0.250	2.945	11.380
4	4.500	4.000	0.250	3.338	12.900
4 - 1/2	5.000	4.500	0.250	3.731	14.420
5	5.563	5.063	0.250	4.173	16.120
6	6.625	6.125	0.250	5.007	19.350
ASA SCHEDULE 80 PIPE (Extra-Heavy Pipe Size)					
1	1.315	0.951	0.182	0.648	2.510
1 - 1/4	1.660	1.272	0.194	0.839	3.460
1 - 1/2	1.900	1.494	0.203	1.080	4.190
2	2.375	1.933	0.221	1.490	5.790
2 - 1/2	2.875	2.315	0.280	2.290	8.840
3	3.500	2.892	0.304	3.050	11.820
3 - 1/2	4.000	3.358	0.321	3.710	14.370
4	4.500	3.818	0.341	4.450	17.250
5	5.563	4.813	0.375	6.110	23.670
6	6.625	5.751	0.437	8.490	32.930
8	8.625	7.625	0.500	12.760	49.420

General Information—Bus Conductors Deflection & Stress Formulas

	Simple Beam	Beam fixed at both ends	Continuous Beam	
			2 Spans	More than 2 Spans
Maximum Deflection ⑤	$D = \frac{5wl^4}{384EI}$	$D = \frac{wl^4}{384EI}$	$D = \frac{wl^4}{185EI}$	①
Maximum Moment	$M = \frac{wl^2}{8}$ ②	$M = \frac{wl}{12}$ ③	$M = \frac{wl^2}{8}$ ④	$M = 0.107wl^2$ ④
Fiber Stress	$f' = \frac{wl^2}{8S}$ ②	$f' = \frac{wl^2}{12S}$ ③	$f' = \frac{wl^2}{8S}$ ④	$f' = \frac{0.107wl^2}{S}$ ④
Maximum Load	$W = \frac{8fS}{l}$	$W = \frac{12fS}{l}$	$W = \frac{8fS}{l}$	$W = \frac{fS}{0.1071}$
Maximum Span	$l = \sqrt{\frac{8fS}{w}}$	$l = \sqrt{\frac{12fS}{w}}$	$l = \sqrt{\frac{8fS}{w}}$	$l = \sqrt{\frac{fS}{0.107w}}$

D = deflection in inches

w = load in lb/in. of length $\frac{\text{lbs. per ft}}{12}$

W = total uniform load in pounds (wl)

l = span in inches

E = modulus of elasticity, lb/sq in.

I = moment of inertia, inches ④

M = bending moment in pounds - inches

S = section modulus, inches ②

f' = fiber stress in lb/sq in.

f = maximum allowable fiber stress in lb/sq in. (The value of minimum yield strength is commonly used.)

- ① Maximum deflection occurs in the end spans and is only slightly more than that for a continuous beam of 2 spans.
- ② Maximum moment and fiber stress for simple beams occur at the center of the span.
- ③ Maximum moment and fiber stress for beams fixed at both ends occur at the points of support.
- ④ Maximum moment and fiber stress for continuous beams occur at the second support from each end.
- ⑤ See page S-1 11

General Information—Deflection Values ASA Schedule 40 Aluminum Pipe

CONDITIONS	Nominal Pipe Size (in)	SPAN (ft)													
		20		25		30		35		40		45		50	
		DEFLECTION ① ②													
		in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
Bare Conductor (No Wind or Ice)	1	2.39	61	—	—	—	—	—	—	—	—	—	—	—	—
	1 1/4	1.45	37	3.54	90	—	—	—	—	—	—	—	—	—	—
	1 1/2	1.09	28	2.66	68	—	—	—	—	—	—	—	—	—	—
	2	0.68	17	1.67	42	3.45	88	—	—	—	—	—	—	—	—
	2 1/2	0.47	12	1.15	29	2.38	61	4.42	112	—	—	—	—	—	—
	3	0.31	8	0.76	19	1.58	40	2.93	74	4.99	127	—	—	—	—
	3 1/2	0.24	6	0.58	15	1.20	30	2.22	56	3.78	96	6.06	154	—	—
	4	0.19	5	0.45	11	0.94	24	1.74	44	2.97	75	4.75	121	7.24	184
	5	0.12	3	0.29	7	0.61	15	1.12	29	1.92	49	3.07	78	4.68	119
6	0.08	2	0.20	5	0.42	11	0.79	20	1.34	34	2.15	55	3.27	83	
8	0.05	1	0.12	3	0.25	6	0.46	12	0.78	20	1.25	32	1.91	49	
1/2-in Ice (13 mm)	1	7.03	179	—	—	—	—	—	—	—	—	—	—	—	—
	1 1/4	3.93	100	9.59	244	—	—	—	—	—	—	—	—	—	—
	1 1/2	2.82	72	6.88	175	—	—	—	—	—	—	—	—	—	—
	2	1.65	42	4.02	102	8.34	212	—	—	—	—	—	—	—	—
	2 1/2	0.96	24	2.35	60	4.88	124	9.04	230	—	—	—	—	—	—
	3	0.61	15	1.49	38	3.08	78	5.71	145	9.73	247	—	—	—	—
	3 1/2	0.45	11	1.09	28	2.26	57	4.19	106	7.14	181	11.44	291	—	—
	4	0.34	9	0.83	21	1.72	44	3.19	81	5.44	138	8.71	221	13.28	337
	5	0.21	5	0.51	13	1.06	27	1.96	50	3.35	85	5.36	136	8.17	208
6	0.14	4	0.34	9	0.71	18	1.32	33	2.25	57	3.60	91	5.48	139	
8	0.08	2	0.19	5	0.39	10	0.72	18	1.23	31	1.98	50	3.01	76	
1/2-in (13 mm) Ice 4-psf (1,8 Kg/m ²) Wind plus NESC constant	1	8.95	227	—	—	—	—	—	—	—	—	—	—	—	—
	1 1/4	4.81	122	11.74	298	—	—	—	—	—	—	—	—	—	—
	1 1/2	3.38	86	8.26	210	—	—	—	—	—	—	—	—	—	—
	2	1.92	49	4.68	119	9.71	247	—	—	—	—	—	—	—	—
	2 1/2	1.08	27	2.64	67	5.47	139	10.14	257	—	—	—	—	—	—
	3	0.67	17	1.63	42	3.39	86	6.28	160	10.72	272	—	—	—	—
	3 1/2	0.49	12	1.19	30	2.46	63	4.56	116	7.78	198	12.46	316	—	—
	4	0.37	9	0.90	23	1.86	47	3.44	87	5.87	149	9.40	239	14.33	364
	5	0.22	6	0.54	14	1.13	29	2.09	53	3.56	90	5.71	145	8.70	221
6	0.15	4	0.36	9	0.75	19	1.39	35	2.37	60	3.79	96	5.78	147	
8	0.08	2	0.20	5	0.41	10	0.75	19	1.28	33	2.06	52	3.13	80	
1-in Ice (25 mm)	1	14.23	361	—	—	—	—	—	—	—	—	—	—	—	—
	1 1/4	7.55	192	18.44	468	—	—	—	—	—	—	—	—	—	—
	1 1/2	5.27	134	12.87	327	—	—	—	—	—	—	—	—	—	—
	2	2.95	75	7.20	183	14.92	379	—	—	—	—	—	—	—	—
	2 1/2	1.60	41	3.91	99	8.11	206	15.03	382	—	—	—	—	—	—
	3	0.98	25	2.39	61	4.95	126	9.18	233	15.66	398	—	—	—	—
	3 1/2	0.70	18	1.72	44	3.56	90	6.59	167	11.25	286	18.02	458	—	—
	4	0.53	13	1.28	33	2.66	68	4.93	125	8.40	213	13.46	342	20.52	521
	5	0.31	8	0.76	19	1.59	40	2.94	75	5.01	127	8.03	204	12.24	311
6	0.20	5	0.50	13	1.04	26	1.92	49	3.28	83	5.25	133	8.00	203	
8	0.11	3	0.26	7	0.55	14	1.02	26	1.73	44	2.78	70	4.23	107	

① These are maximum deflection values for a simple beam with uniformly distributed load. For beams fixed at both ends the deflection will be 1/5 of the values given.

② Deflection $d1$ for any other span $L1$ may be obtained from relation:

$$d1 = d \frac{(L1^4)}{(L^4)}$$

③ Referred to in product tables as "SPS"

General Information—Deflection Values

ASA Schedule 80 Aluminum Pipe

CONDITIONS	Nominal Pipe Size (in)	SPAN (ft)													
		20		25		30		35		40		45		50	
		DEFLECTION ① ②													
		in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
Bare Conductor (No Wind or Ice)	1	2.39	61	—	—	—	—	—	—	—	—	—	—	—	—
	1 1/4	1.45	37	3.54	90	—	—	—	—	—	—	—	—	—	—
	1 1/2	1.09	28	2.66	68	—	—	—	—	—	—	—	—	—	—
	2	0.68	17	1.67	42	3.45	88	—	—	—	—	—	—	—	—
	2 1/2	0.47	12	1.15	29	2.38	61	4.42	112	—	—	—	—	—	—
	3	0.31	8	0.76	19	1.58	40	2.93	74	4.99	127	—	—	—	—
	3 1/2	0.24	6	0.58	15	1.20	30	2.22	56	3.78	96	6.06	154	—	—
	4	0.19	5	0.45	11	0.94	24	1.74	44	2.97	75	4.75	121	7.24	184
	5	0.12	3	0.29	7	0.61	15	1.12	29	1.92	49	3.07	78	4.68	119
1/2-in Ice (13 mm)	1	7.03	179	—	—	—	—	—	—	—	—	—	—	—	—
	1 1/4	3.93	100	9.59	244	—	—	—	—	—	—	—	—	—	—
	1 1/2	2.82	72	6.88	175	—	—	—	—	—	—	—	—	—	—
	2	1.65	42	4.02	102	8.34	212	—	—	—	—	—	—	—	—
	2 1/2	0.96	24	2.35	60	4.88	124	9.04	230	—	—	—	—	—	—
	3	0.61	15	1.49	38	3.08	78	5.71	145	9.73	247	—	—	—	—
	3 1/2	0.45	11	1.09	28	2.26	57	4.19	106	7.14	181	11.44	291	—	—
	4	0.34	9	0.83	21	1.72	44	3.19	81	5.44	138	8.71	221	13.28	337
	5	0.21	5	0.51	13	1.06	27	1.96	50	3.35	85	5.36	136	8.17	208
1/2-in (13 mm) Ice 4-psf (1,8 Kg/m ²) Wind plus NESC constant	1	8.95	227	—	—	—	—	—	—	—	—	—	—	—	—
	1 1/4	4.81	122	11.74	298	—	—	—	—	—	—	—	—	—	—
	1 1/2	3.38	86	8.26	210	—	—	—	—	—	—	—	—	—	—
	2	1.92	49	4.68	119	9.71	247	—	—	—	—	—	—	—	—
	2 1/2	1.08	27	2.64	67	5.47	139	10.14	257	—	—	—	—	—	—
	3	0.67	17	1.63	42	3.39	86	6.28	160	10.72	272	—	—	—	—
	3 1/2	0.49	12	1.19	30	2.46	63	4.56	116	7.78	198	12.46	316	—	—
	4	0.37	9	0.90	23	1.86	47	3.44	87	5.87	149	9.40	239	14.33	364
	5	0.22	6	0.54	14	1.13	29	2.09	53	3.56	90	5.71	145	8.70	221
1-in Ice (25 mm)	1	14.23	361	—	—	—	—	—	—	—	—	—	—	—	—
	1 1/4	7.55	192	18.44	468	—	—	—	—	—	—	—	—	—	—
	1 1/2	5.27	134	12.87	327	—	—	—	—	—	—	—	—	—	—
	2	2.95	75	7.20	183	14.92	379	—	—	—	—	—	—	—	—
	2 1/2	1.60	41	3.91	99	8.11	206	15.03	382	—	—	—	—	—	—
	3	0.98	25	2.39	61	4.95	126	9.18	233	15.66	398	—	—	—	—
	3 1/2	0.70	18	1.72	44	3.56	90	6.59	167	11.25	286	18.02	458	—	—
	4	0.53	13	1.28	33	2.66	68	4.93	125	8.40	213	13.46	342	20.52	521
	5	0.31	8	0.76	19	1.59	40	2.94	75	5.01	127	8.03	204	12.24	311
	6	0.20	5	0.50	13	1.04	26	1.92	49	3.28	83	5.25	133	8.00	203
	8	0.11	3	0.26	7	0.55	14	1.02	26	1.73	44	2.78	70	4.23	107

① These are maximum deflection values for a simple beam with uniformly distributed load. For beams fixed at both ends the deflection will be 1/5 of the values given.

② Deflection $d1$ for any other span $L1$ may be obtained from relation:

$$d1 = d \frac{(L1^4)}{(L^4)}$$

③ Referred to in product tables as "EHPS"

General Information

General Welding Specification for Tubular Aluminum Bus Conductor

The following items cover key points that should be included in specifications for welding aluminum bus conductors. It is recommended that the references be reviewed in the preparation of proprietary welding specifications:

1. The welding process and all welding operations shall be qualified in accordance with the Aluminum Association, "Aluminum Construction Manual" Section 7.2.4 "Qualification of Welding Procedure and Welding"
2. All joints to be welded shall be free of moisture and hydrocarbon. Moisture can be removed thermally but the temperature applied shall not exceed 250°F (121°C). Degreasing shall be done with a non-toxic solvent so as to leave a minimum of residual on the parts. Sufficient time must be allowed for evaporation of the solvent prior to welding. Wire brushing with a stainless steel wire brush should be employed after solvent cleaning to remove thick heat-treat oxide films, water stains, etc., to permit optimum fusion and soundness of the weld.
3. All welds shall be made by the gas metal-arc (MIG) or the gas tungsten-arc (TIG) welding process. Reversed-polarity direct current shall be used for MIG welding, whereas alternating current shall be used for TIG welding. The shielding gas shall be welding grade argon, helium, or a mixture of the two. Filler alloy 4043 shall be used.
4. The working area should be substantially draft free and should be protected from atmospheric contamination.
5. All welds shall be made with clean metal and the completed weld shall have a smooth finish and shall indicate good fusion with parent metal. Preheating of parts prior to welding shall not exceed 250°F (121°C).
6. All connections shall be checked before, during and after the weld is made. Before the weld is begun, visually inspect the connection to determine proper edge preparation and alignment. During the weld, maintain a smooth and continuous flow of metal

into the joint and maintain a constant current setting on the welding station. When several passes are to be made, check the previous pass before laying down the next one to enable detection of poor fusion or cracks.

- Defective area shall be removed with a dry chisel prior to application of subsequent weld passes. After the weld has been completed, it shall be again visually inspected for quality and to determine if the weld bead is the correct size. The cross-sectional area of the weld should not be less than that of the smallest member being joined.
7. To repair a defective weld, the defective portion must be entirely removed by chipping or machining. The area to be repaired must be smooth and free of dirt, or foreign matter. The repair weld then may be made in a similar manner as the original.
 8. Members being joined should be tack welded in place to prevent misalignment during the welding process.

REFERENCES:

1. Aluminum Construction Manual, The Aluminum Association, Inc., 818 Connecticut Ave. N.W., Washington, D.C., 20006.
2. Recommended practices for Gas Shielded-Arc Welding of Aluminum and Aluminum Alloy Pipe, American Welding Society, Inc. 2501 N.W. 7th Street, Miami, Florida, 33125.
3. Welding Alcoa Aluminum, Aluminum Company of America, Pittsburgh Pennsylvania.
4. Guide for Welding Aluminum in Substation, IEEE Transactions, Power Apparatus and Systems (1967). Vol. 86, pp. 775-786

General Information—Hardware Method for Determining Bolt Length

The following table is to be used for determining bolt length for bolting accessories together when hardware is ordered separately. Bolt length is determined as follows:

- 1) Determine "grip". This is the combined thickness of items bolted together. This does not include nuts, washers or pads.
- 2) Under "grip" column, find grip determined in Step 1. If grip falls between two thicknesses, use the larger to determine bolt length.
- 3) Read across to find bolt length required under "Bolt Length - No Cover".
- 4) If pad cover(s) are required, use columns "Bolt Length - One Cover" or "Bolt Length - Two Covers".

Note: The table is based on the following dimensions:

- 1/2 Nut .44" (11mm) Thick
- 1/2" Flat Washer .11" (3mm) Thick (Two washers required on each bolt)
- Pad Cover .25" (6mm) Thick

Grip		Bolt Length					
		No Cover		One Cover		Two Covers	
in	mm	in	mm	in	mm	in	mm
1.00	25	2.00	51	2.00*	51*	2.25*	57*
1.25	32	2.25	57	2.25*	57*	2.50*	64*
1.50	38	2.50	64	2.50*	64*	2.75*	70*
1.75	44	2.75	70	2.75*	70*	3.00*	76*
2.00	51	3.00	76	3.00	76	3.50	89
2.25	57	3.50	89	3.50*	89*	3.50*	89*
2.50	64	3.50	89	—	—	—	—
2.75	70	3.50*	89*	—	—	—	—

* Bolt and Nut are flush



General Information—Filler Compound (AFC) Required for Compression Accessories

Catalog Series	2500		2600 2700 3400		2800		2900		3500		5000	
	lb	g	lb	g	lb	g	lb	g	lb	g	lb	g
30	.15	68	.13	59	.29	131	.42	191	.13	59	.19	86
34	.18	82	.15	68	.36	163	.51	231	.16	73	.25	113
36	.20	90	.16	73	.38	172	.54	245	.22	100	.28	127
38	.23	104	.19	86	.43	195	.62	281	.28	127	.35	159
40	.32	145	.27	122	.61	277	.88	399	.36	163	.40	181
42	.33	150	.28	127	.65	295	.93	422	.40	181	.54	245
44	.41	186	.33	150	.76	345	1.1	499	.40	181	.67	304
48	.61	277	.58	263	1.1	499	1.7	771	—	—	—	—

Catalog Series	5100 5600 5800		5300		5400		5500		7100 7200		8100 8200	
	lb	g	lb	g	lb	g	lb	g	lb	g	lb	g
30	.09	41	.32	145	.60	272	.42	191	.15	68	.47	213
34	.12	54	.41	186	.93	422	.53	240	.20	91	.56	254
36	.15	68	.52	236	.96	435	.68	308	.26	118	.62	281
38	.17	77	.58	263	1.1	499	.75	340	.27	122	.80	363
40	.20	91	.70	318	1.1	499	.91	413	.37	168	.90	408
42	.24	109	.84	381	1.4	635	1.1	499	.45	204	1.1	499
44	.28	127	1.2	544	1.5	680	1.6	726	.55	249	1.2	544
48	—	—	—	—	—	—	—	—	—	—	—	—

Notes:

- The amount of AFC shown in the tabulation is for the purpose of estimating the amount of compound necessary for a construction project. The tabulated weights of filler compound shown in the above table for the catalog 5100, 5600 and 5800 terminal does not include sufficient quantity to fill the cavity area at the transition of the barrel and flat pad. If the terminal is installed with the barrel in the upright position, it is imperative that an additional quantity of AFC be used to fill the cavity area.

General Information—Part Number Suffixes

Substation Suffix Codes	
A	ALLEN HEAD SOCKET SCREWS
AG	SILVER PLATED
B	BASE MOUNTING HARDWARE
BS	BOTH SIDES FINISHED (OLD AFL NUMBERS)
CA	BI-METALLIC TRANSITION PLATE
CD	CADMIUM PLATED
CH	ANTI-CHATTER SPRING
CL	CLEVIS EYES WILL BE SUPPLIED WITH STRAIN CLAMP
CSBV	TERMINAL HARDWARE SHIELD WILL BE SUPPLIED WITH THE CONNECTOR
E	LIFTING EYE
EM	EVERDUR MOUNTING HARDWARE
F	TERMINAL PAD FINISH ON BOTH SIDES
G	JUMPER GUIDE
GS	GALVANIZED STEEL HARDWARE
H	HEX HEAD BOLTS
L	EXTRA LENGTH
LH	LESS HARDWARE
LMH	LESS MOUNTING HARDWARE
LN	LOCKWASHER AND NUT
LP	CONNECTOR GROOVES COATED WITH ALNOX AND ENCLOSED IN A POLYETHYLENE BAG
LPP	CONNECTOR GROOVES AND TERMINAL PAD ARE PRE-COATED WITH ALNOX & ENCLOSED IN A POLYETHYLENE BAG
MLB	Multi Link Braid
MT	MOISTURE SEAL
NK	NICKEL PLATED
NP	ITEM NORMALLY PLATED WILL BE SUPPLIED UNPLATED
P	PULLING EYE
NN	CONFINED PAD
R	CAPTIVE HEX HEAD BOLTS, ONE WRENCH INSTALLATION
S	SPECIAL CABLE RANGE & SPECIAL TERMINAL PAD
SN	TIN PLATED
SO	A SOCKET EYE WILL BE SUPPLIED WITH STRAIN CLAMP
SS	STAINLESS STEEL HARDWARE
SSM	STAINLESS STEEL MOUNTING HARDWARE
SW	SPLIT LOCKWASHER
T	THICKNESS OF BAR IS INDICATED BY THE NUMBER IMMEDIATELY FOLLOWING THE SUFFIX
TMH	TONGUE MOUNTING HARDWARE
TMHB	TONGUE MOUNTING HARDWARE, STAINLESS STEEL, & BELLEVILLE WASHER
TMHF	TONGUE MOUNTING HARDWARE WITH TWO FLAT SURFACES
TMHSS	TONGUE MOUNTING HARDWARE, STAINLESS STEEL
TO	UNTHREADED STUD
U	UNDRILLED TONGUE ON TERMINALS OR LUGS
WP	END PLUGS SUPPLIED WITH CONNECTOR
XX	NO OXIDE DIP
X	OXIDATION INHIBITOR

Compression Accessories Suffixes	
SS	STAINLESS STEEL HARDWARE
AL	ALUMINUM HARDWARE ON TERMINALS WHEN HARDWARE IS NOT NORMALLY SUPPLIED
P	PRE-FILLED WITH COMPOUND
HT	HIGH TEMPERATURE ACCESSORY
EHV	HIGH VOLTAGE APPLICATION \leq 345 KV
NT	NO TERMINAL
NS	NON-SPECULAR FINISH
BNW	BOLT NUT WASHER

Suspension Units	
SC	SOCKET CLEVIS
SE	SOCKET EYE
BNC	BOLT NUT COTTER
YCE	Y CLEVIS EYE
YCE90	Y CLEVIS EYE 90

Stockbridge Dampers	
BA	BREAK-A-WAY BOLT

Notes:

1. The suffix designations above will not appear as part of the catalog number unless specifically requested, in which case there will be an extra charge to cover the stamping or marking operations.
2. When more than one suffix is required to designate more than one special feature, they should be arranged in alphabetical order.