Sheet1

Table 2

Computation of SAC Overhead Conductor Ampacities (Steady State)

Per ANSI/IEEE Standard 738-1986

	mi/hr	ft/s
Wind speed	1.36	2.00
Coefficient of emissivity		0.5
Coefficient of solar absorption		0.5

	Temperature C	Temperature F
Ambient air temp	40	104
Conductor surface temp	200	392

Latitude	45 degrees N
Azimuth of line	90 degrees
Elev above msl	1000 ft

Air viscosity @ T ave	0.05463	lb/h ft
Air density	0.05403	lb/ft^3
Air thermal conductivity	0.0101	W/ft C
Altitude of sun	68.1	degrees
Azimuth of sun	180	degrees
Heat rec'd by a surface	94.64	W/ft^2
Elevation correction factor	1.0340	

Conductor			Resistance, Ohm/mi			Ohm/kft	Conductor heat transfer, W/ft					Ampacity	MVA rating @ nominal voltage							
			50	100	200	200	Forced convection heat loss			Radiated	Solar		kV:	69	115	138	161	230	345	500	kcm
kcm	strand	diam/in	deg C	deg C	deg C	deg C	qc1	qc2	max	heat loss	heat gain		mod/ph:	1	1	1	1	1	2	3	
4/0	6/1	0.563	0.5920	0.6979	0.9097	0.17229	46.46	39.77	46.46	15.72	2.30	590		70	117	141	164				4/0
266	6/7	0.633	0.5520	0.6507	0.8481	0.16063	49.28	42.67	49.28	17.67	2.58	633		76	126	151	177				266
336	18/1	0.684	0.3059	0.3606	0.4700	0.08902	51.24	44.70	51.24	19.09	2.79	671		104	174	208	243				336
336	26/7	0.721	0.3072	0.3623	0.4725	0.08949	52.62	46.14	52.62	20.13	2.94	693		106	178	211	246				336
477	26/7	0.858	0.2169	0.2557	0.3333	0.06313	57.44	51.21	57.44	23.95	3.50	1111		133	221	266	310				477
477	24/7	0.846	0.2168	0.2556	0.3332	0.06311	57.04	50.78	57.04	23.62	3.45	1106		132	220	264	308				477
556	26/7	0.927	0.1860	0.2192	0.2856	0.05409	59.73	53.65	59.73	25.88	3.78	1230		147	245	294	343				556
636	24/7	0.977	0.1631	0.1922	0.2504	0.04742	61.34	55.37	61.34	27.27	3.98	1338		160	266	319	373	532			636
795	26/7	1.108	0.1306	0.1538	0.2002	0.03792	65.38	59.71	65.38	30.93	4.52	1556		186	310	372	434	620	1860	4042	795
795	45/7	1.115	0.1313	0.1544	0.2006	0.03799	65.59	59.93	65.59	31.13	4.55	1558		186	310	372	434	620	1861	4047	795
795	30/19	1.140	0.1307	0.1540	0.2006	0.03799	66.33	60.74	66.33	31.82	4.65	1569		187	312	375	437	625	1875	4076	795
954	45/7	1.165	0.1099	0.1291	0.1675	0.03172	67.06	61.53	67.06	32.52	4.75	1729		207	344	413	482	689	2066	4492	954
954	54/7	1.196	0.1094	0.1287	0.1673	0.03169	67.96	62.51	67.96	33.39	4.88	1745		209	348	417	487	695	2085	4533	954
1192	54/19	1.338	0.0863	0.1013	0.1313	0.02487	71.95	66.86	71.95	37.35	5.46	2044		244	407	488	570	814	2442	5309	1192
1272	54/19	1.382	0.0851	0.0996	0.1286	0.02436	73.14	68.17	73.14	38.58	5.63	2087		249	416	499	582	831	2494	5422	1272
1590	54/19	1.545	0.0657	0.0767	0.0987	0.01869	77.41	72.69	77.41	43.13	6.30	1472		295	492	591	689	985	2954	6423	1590
2312	76/19	1.802	0.0505	0.0584	0.0742	0.01405	83.72	79.94	83.72	50.30	7.35	3002		359	598	718	837	1196	3588	7600	2312

Notes:
Sun computations based on noon local sun time
Solar absorption based on "Clear atmosphere"
Azimuth of line: N-S = 0, E-W = 90

Xcel Energy
Delivery System Planning & Engineering

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