



HSM Wire International, Inc

Ph: 330-244-8501 Fax: 330-244-8561

www.hsmwire.com

Insulated Flat Wire 11 AWG - 32 AWG Half Sizes 1.2 Ratio - 1.4 Ratio

AWG Sizes		Ratios - Millimeter Dimensions									
AWG	Dia. mm	1:2		1:2.5		1:3		1:3.5		1:4	
		T	W	T	W	T	W	T	W	T	W
11	2.39	1.50	3.00	1.35	3.38	1.23	3.70	1.14	4.00	1.07	4.27
12	2.14	1.34	2.68	1.20	3.01	1.10	3.30	1.02	3.56	0.95	3.81
12.5	2.02	1.27	2.53								
13	1.92	1.20	2.40	1.07	2.68	0.98	2.95	0.91	3.18	0.85	3.40
13.5	1.81	1.13	2.27	1.01	2.54						
14	1.71	1.07	2.15	0.96	2.40	0.88	2.63	0.81	2.82	0.75	3.01
14.5	1.62	1.02	2.03	0.91	2.27	0.83	2.49				
15	1.53	0.96	1.92	0.86	2.15	0.78	2.35	0.73	2.56	0.69	2.74
15.5	1.45	0.91	1.82	0.81	2.03	0.74	2.23				
16	1.37	0.86	1.71	0.77	1.91	0.70	2.10	0.65	2.27	0.61	2.42
16.5	1.30	0.81	1.62	0.73	1.82	0.66	1.99	0.61	2.15	0.57	2.30
17	1.22	0.77	1.53	0.69	1.72	0.63	1.88	0.58	2.03	0.54	2.17
17.5	1.16	0.73	1.45	0.65	1.62	0.59	1.78	0.55	1.92	0.51	2.05
18	1.09	0.69	1.37	0.61	1.53	0.56	1.68	0.52	1.81	0.49	1.94
18.5	1.03	0.65	1.30	0.58	1.45	0.53	1.59	0.49	1.71	0.46	1.83
19	0.98	0.61	1.23	0.55	1.37	0.50	1.50	0.46	1.62	0.43	1.73
19.5	0.93	0.58	1.17	0.52	1.30	0.48	1.43	0.44	1.54	0.41	1.65
20	0.88	0.55	1.10	0.49	1.23	0.45	1.35	0.42	1.46	0.39	1.56
20.5	0.83	0.52	1.04	0.47	1.16	0.42	1.27	0.39	1.38	0.37	1.47
21	0.79	0.49	0.99	0.44	1.10	0.40	1.21	0.37	1.31	0.35	1.40
21.5	0.74	0.47	0.93	0.42	1.04	0.38	1.14	0.35	1.23	0.33	1.32
22	0.70	0.44	0.88	0.39	0.98	0.36	1.08	0.33	1.16	0.31	1.24
22.5	0.68	0.42	0.85	0.38	0.95	0.35	1.04	0.32	1.12	0.30	1.20
23	0.63	0.40	0.79	0.35	0.89	0.32	0.97	0.30	1.05	0.28	1.12
23.5	0.60	0.37	0.75	0.33	0.84	0.31	0.92	0.28	0.99	0.26	1.06
24	0.57	0.35	0.71	0.32	0.79	0.29	0.87	0.27	0.94	0.25	1.00
24.5	0.54	0.34	0.67	0.30	0.75	0.27	0.82	0.25	0.89	0.24	0.95

AWG Sizes		Ratios - Inches Dimensions									
AWG	Dia. in.	1:2		1:2.5		1:3		1:3.5		1:4	
		T	W	T	W	T	W	T	W	T	W
11	0.0949	0.059	0.118	0.053	0.133	0.049	0.146	0.045	0.157	0.042	0.168
12	0.0846	0.053	0.105	0.047	0.119	0.043	0.130	0.040	0.140	0.038	0.150
12.5	0.080	0.050	0.100								
13	0.0756	0.047	0.094	0.042	0.106	0.039	0.116	0.036	0.125	0.033	0.134
13.5	0.071	0.045	0.089	0.040	0.100						
14	0.0669	0.042	0.085	0.038	0.095	0.035	0.104	0.032	0.111	0.030	0.119
14.5	0.064	0.040	0.080	0.036	0.089	0.033	0.098				
15	0.0609	0.038	0.076	0.034	0.084	0.031	0.093	0.029	0.101	0.027	0.108
15.5	0.057	0.036	0.072	0.032	0.080	0.029	0.088				
16	0.054	0.034	0.067	0.030	0.075	0.028	0.083	0.025	0.089	0.024	0.095
16.5	0.051	0.032	0.064	0.029	0.071	0.026	0.078	0.024	0.085	0.023	0.090
17	0.048	0.030	0.060	0.027	0.068	0.025	0.074	0.023	0.080	0.021	0.085
17.5	0.046	0.029	0.057	0.026	0.064	0.023	0.070	0.022	0.076	0.020	0.081
18	0.043	0.027	0.054	0.024	0.060	0.022	0.066	0.020	0.071	0.019	0.076
18.5	0.041	0.026	0.051	0.023	0.057	0.021	0.062	0.019	0.067	0.018	0.072
19	0.039	0.024	0.048	0.022	0.054	0.020	0.059	0.018	0.064	0.017	0.068
19.5	0.037	0.023	0.046	0.021	0.051	0.019	0.056	0.017	0.061	0.016	0.065
20	0.035	0.022	0.043	0.019	0.048	0.018	0.053	0.016	0.057	0.015	0.061
20.5	0.033	0.020	0.041	0.018	0.046	0.017	0.050	0.015	0.054	0.014	0.058
21	0.031	0.019	0.039	0.017	0.043	0.016	0.048	0.015	0.051	0.014	0.055
21.5	0.029	0.018	0.037	0.016	0.041	0.015	0.045	0.014	0.049	0.013	0.052
22	0.028	0.017	0.035	0.015	0.039	0.014	0.042	0.013	0.046	0.012	0.049
22.5	0.027	0.017	0.033	0.015	0.037	0.014	0.041	0.013	0.044	0.012	0.047
23	0.025	0.016	0.031	0.014	0.035	0.013	0.038	0.012	0.041	0.011	0.044
23.5	0.024	0.015	0.029	0.013	0.033	0.012	0.036	0.011	0.039	0.010	0.042
24	0.023	0.014	0.028	0.012	0.031	0.011	0.034	0.011	0.037	0.010	0.040
24.5	0.021	0.013	0.026	0.012	0.030	0.011	0.032	0.010	0.035	0.009	0.037

Insulation Type: Polyester / Polyamideimide. Heavy Build. UL recognized, Class 200°C as round wire.
 Polyester / Polyamideimide. Heavy Build. UL recognized, Class 240°C as round wire.
 Polyester / Polyamideimide / Bondcoat. Heavy Build. UL recognized, Class 180°C as round wire.

Product can be shipped: 10 lbs. / 4.5 kgs.
 20 lbs. / 9.1 kgs.
 80 lbs. / 36.3 kgs.

Spool Size: 6" OD x 3.5" (10 lbs.)

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AWG Sizes		Ratios - Millimeter Dimensions									
		1:2		1:2.5		1:3		1:3.5		1:4	
AWG	Dia.	T	W	T	W	T	W	T	W	T	W
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
25	0.51	0.32	0.63	0.28	0.71	0.26	0.78	0.24	0.84	0.22	0.90
25.5	0.48	0.30	0.60	0.27	0.67	0.25	0.74	0.23	0.80	0.21	0.85
26	0.45	0.28	0.57	0.25	0.63	0.23	0.69	0.21	0.75	0.20	0.80
26.5	0.43	0.27	0.54	0.24	0.61	0.22	0.66	0.20	0.72	0.19	0.77
27	0.41	0.26	0.51	0.23	0.57	0.21	0.63	0.19	0.68	0.18	0.72
27.5	0.39	0.24	0.49	0.22	0.54	0.20	0.60	0.18	0.64	0.17	0.69
28	0.37	0.23	0.46	0.20	0.51	0.19	0.56	0.17	0.61	0.16	0.65
28.5	0.35	0.22	0.44	0.20	0.49	0.18	0.53	0.16	0.58	0.15	0.62
29	0.33	0.21	0.41	0.19	0.46	0.17	0.51	0.16	0.55	0.15	0.59
29.5	0.31	0.20	0.39	0.18	0.44	0.16	0.48	0.15	0.52	0.14	0.55
30	0.29	0.18	0.37	0.17	0.41	0.15	0.45	0.14	0.49	0.13	0.52
30.5	0.28	0.177	0.353	0.158	0.395	0.144	0.432	0.133	0.467	0.125	0.499
31	0.27	0.166	0.333	0.149	0.372	0.136	0.407	0.126	0.440	0.118	0.470
31.5	0.25	0.159	0.318	0.142	0.356	0.130	0.390	0.120	0.421	0.113	0.450
32	0.24	0.150	0.301	0.135	0.336	0.123	0.368	0.114	0.398	0.106	0.425

AWG Sizes		Ratios - Inches Dimensions									
		1:2		1:2.5		1:3		1:3.5		1:4	
AWG	Dia.	T	W	T	W	T	W	T	W	T	W
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
25	0.020	0.012	0.025	0.011	0.028	0.010	0.031	0.009	0.033	0.009	0.035
25.5	0.019	0.012	0.024	0.011	0.026	0.010	0.029	0.009	0.031	0.008	0.033
26	0.018	0.011	0.022	0.010	0.025	0.009	0.027	0.009	0.030	0.008	0.032
26.5	0.017	0.011	0.021	0.010	0.024	0.009	0.026	0.008	0.028	0.008	0.030
27	0.016	0.010	0.020	0.009	0.023	0.008	0.025	0.008	0.027	0.007	0.029
27.5	0.015	0.010	0.019	0.009	0.021	0.008	0.023	0.007	0.025	0.007	0.027
28	0.014	0.009	0.018	0.008	0.020	0.007	0.022	0.007	0.024	0.006	0.026
28.5	0.014	0.009	0.017	0.008	0.019	0.007	0.021	0.006	0.023	0.006	0.024
29	0.013	0.008	0.016	0.007	0.018	0.007	0.020	0.006	0.022	0.006	0.023
29.5	0.012	0.008	0.015	0.007	0.017	0.006	0.019	0.006	0.020	0.005	0.022
30	0.012	0.007	0.015	0.007	0.016	0.006	0.018	0.005	0.019	0.005	0.021
30.5	0.011	0.007	0.014	0.006	0.016	0.006	0.017	0.005	0.018	0.005	0.020
31	0.01	0.007	0.013	0.006	0.015	0.005	0.016	0.005	0.017	0.005	0.019
31.5	0.01	0.006	0.013	0.006	0.014	0.005	0.015	0.005	0.017	0.004	0.018
32	0.009	0.006	0.012	0.005	0.013	0.005	0.015	0.004	0.016	0.004	0.017

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THE PROCESS

The pre-insulated wire or bare wire is flattened utilizing proprietary equipment in a single step deformation between mirror polished work surfaces. It is special for the process that the deformation is performed with negligible elongation. This means the cross sectional area is reduced only marginally. The result is that even at the maximum ratio of deformation 1:4, the insulation is stretched no more than 25% on the flats, and in one direction only (crosswise).

It has shown that the flattening preserves the integrity of practically all types of insulation including solderable polyurethanes and bondcoats as well as high temperature polyimide/imide coatings. Studies of sections of flattened wire show a continuous rather than an angular transition from the flats into semi elliptical edges practically without any stress concentrations. The product also does not exhibit the "dogbone" shape often encountered in post insulated rectangular wire due to surface tension drawing the varnish away from the wire edges.

WORK HARDENING

Depending on the flattening ratio the process normally involves a degree of work hardening, which leaves the wire somewhat harder than post insulated wire. The increased stiffness is perceived as an advantage in certain applications.