Designation: A 1007 – 02

Standard Specification for Carbon Steel Wire for Wire Rope[1]

This standard is issued under the fixed designation A 1007; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification covers uncoated and four classes of round, metallic coated, cold-drawn, carbon steel wire for wire rope in five strength levels. This specification specifies:

1.1.1 Dimensional tolerances,

1.1.2 Mechanical characteristics,

1.1.3 Chemical composition requirements,

1.1.4 Coating requirements (if applicable), and

1.1.5 Packaging requirements.

1.2 The values stated for metric equivalents are provided for informational purposes only.

2. Referenced Documents

2.1 This specification incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at their appropriate place in the text and the publications are listed. For dated references, subsequent amendments to or revisions of any of these publications apply to this specification only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to would apply.

2.2 *ASTM Standards:*

A 90/A 90M Test Method for Weight (Mass) of Coating on Iron or Steel Articles with Zinc or Zinc-Alloy Coatings[2]

A 510 Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel-Coated[3]

A 938 Test Method for Torsion Testing of Wire[3]

B 6 Specification for Zinc (Slab Zinc)[4]

B 750 Specification for Zinc-5 % Aluminum Mischmetal Alloy (UNS Z38510) in Ingot Form for Hot-Dip Coatings[4]

E 8 Test Methods of Tension Testing of Metallic Materials[5]

IEEE/ASTM-SI-10 Standard for Use of the International System of Units (SI): The Modern Metric System[6]

2.3 *ISO/EN Standards:*

EN 10264-1.2 Steel Wire and Wire Products—Steel Wire for Wire Rope[7]

2.4 *Industry Standard:*

API 9A Specification for Wire Rope[8]

2.5 *Industry References:*

AIME/ISS Carbon Steel, Wire and Rods[9]

AIAG 02.00 Primary Metals Identification Tag Application[9]

2.6 *Non-Referenced Industry Applicable Standards:*

ISO Std. 2232 Drawn Wire for General Purpose Non-Alloy Steel Wire Ropes[7]

3. Terminology

3.1 *Definitions:*

3.1.1 *actual diameter*—the arithmetic mean of the minimum and maximum diameter measurements in one location on the wire.

3.1.2 *breaking force level (Levels 1,2,3,4 or 5)*—a wire strength based on the minimum load carrying capability of a designated wire.

3.1.3 *drawn-galvanized*—a zinc coating that is applied to the wire prior to the final cold drawing operation by either an electro-deposition or hot-galvanizing process.

3.1.4 *drawn-Zn5 Al-MM*—a zinc-aluminum alloy (misch-metal) coating that is applied to the wire prior to the final cold drawing operation by a molten coating process.

3.1.5 *final-coated Zn5 Al-MM*—a zinc-aluminum alloy (misch-metal) coating that is applied to the wire after the final cold drawing operation by a molten coating process.

3.1.6 *final-galvanized*—a zinc coating that is applied to the wire after the final cold drawing operation by either an electro-deposition or hot-galvanizing process.

3.1.7 *nominal diameter*—the diameter of the wire expressed in inches (millimetres) and specified by the user to designate

[1] This specification is under the jurisdiction of ASTM Committee A01 on Steel, Stainless Steel and Related Alloys and is the direct responsibility of Subcommittee A01.03 on Steel Rod and Wire.

Current edition approved March 10, 2002. Published March 2002 . Originally published as A 1007 – 00. Last previous edition A 1007 – 00.

[2] *Annual Book of ASTM Standards*, Vol 01.06.

[3] *Annual Book of ASTM Standards*, Vol 01.03.

[4] *Annual Book of ASTM Standards*, Vol 02.04.

[5] *Annual Book of ASTM Standards*, Vol 03.01.

[6] Available from ASTM International headquarters.

[7] Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

[8] Available from American Petroleum Institute, 1801 K Street, N.W., Washington, DC 20226.

[9] Available from Automotive Industry Action Group (AIAG), 26200 Lahser Road, Suite 200, Southfield, MI 48034–7100.

the wire size. It is the basis for the determination of the values of all characteristics of the wire for acceptance purposes.

3.1.8 *ovality*—the arithmetic difference between the maximum diameter and the minimum diameter in one location on the wire; it shall not be greater than half the tolerance specified in the respective tables referred to in the following parts of this specification.

3.1.9 *uncoated wire*—the surface of a wire furnished with a residual lube film as a result of cold-drawing said wire.

4. Ordering Information

4.1 It is the responsibility of the purchaser to specify all requirements that are necessary for material ordered under this specification. Such requirements shall include, but are not limited to the following:

4.1.1 Quantity (mass),

4.1.2 Name of material (drawn steel wire for wire rope),

4.1.3 Wire type (uncoated, drawn- or final-galvanized/Zn5 Al-mm coated),

4.1.4 Wire diameter,

4.1.5 Wire strength grade (Level 1 through 5),

4.1.6 Packaging (Section 15),

4.1.7 Cast or heat analysis; if requested,

4.1.8 Certification or test report; if requested, and

4.1.9 ASTM designation and date of issue.

5. Materials and Manufacture

5.1 The base metal rod used in the manufacture of rope wire shall be rolled from good commercial quality steel. The steel may be either ingot cast or strand cast.

5.2 A sufficient discard shall be made to ensure freedom from detrimental piping and undue segregation.

5.3 The wire shall be cold-drawn to produce the desired properties.

5.4 The wire shall be furnished in one of five types, as specified:

5.4.1 Uncoated,

5.4.2 Drawn-galvanized,

5.4.3 Final-galvanized,

5.4.4 Drawn Zn5/Al-MM, and

5.4.5 Final coated Zn5/Al-MM.

5.5 Uncoated, drawn-galvanized and drawn-Zn5 Al-MM wire can be furnished in Levels 1 through 5. Final-galvanized and final-coated Zn5 Al-MM wire is usually furnished in Levels 1 through 4.

5.6 The method utilized in the production of either drawn- or final-galvanized wire types may be by an electro-deposition or hot-dip galvanizing process at the option of the producer.

5.6.1 The slab zinc used in galvanized zinc coatings shall be as specified in Specification B 6.

5.7 The method utilized in the production of Zn5 Al-MM wire types may be either a continuous hot-dip alloy coating or two step coating where the first coating is zinc followed by a final bath having an aluminum content up to 7.2 % to prevent depletion of the aluminum content of the bath.

5.7.1 The bath metal used in continuous hot-dip Zn-5 Al-MM alloy coating shall meet the chemical composition limits specified in Specification B 750.

6. Chemical Composition

6.1 Upon agreement with the purchaser, the wire manufacturer shall apply a steel of suitable chemical composition that will satisfy the properties of the material ordered.

6.2 A quantitative analysis of each cast or heat shall be made by the steel producer or his representative to determine the percentage of the elements specified. The analysis shall be made from a test sample preferably taken during the pouring of the cast or heat. The chemical composition thus determined shall be reported, if required, to the purchaser or his representative.

6.3 An analysis may be made by the purchaser from the finished wire. The chemical composition thus determined as to the elements required shall conform to the product analysis requirements specified in Table 3 of Specification A 510 or as agreed upon between the purchaser and the manufacturer.

7. Wire Diameter

7.1 The wire shall be measured using a micrometer with an minimum accuracy of 0.0001 in. (0.002 mm) for all diameters.

7.2 All diameter values measured in one location along the wire shall be within the tolerance limits given in Table 1 for uncoated and drawn-galvanized or drawn-Zn5 Al-MM rope wire or Table 2 for final-galvanized or final-coated Zn5 Al-MM rope wire.

8. Tensile Properties

8.1 *Tensile Test Procedure*:

8.1.1 *Standard Testing Method*—The tensile test shall be carried out in accordance with Test Methods E 8. The distance between the grips of the testing machine shall not be less than 8 in. (203 mm). The speed of the movable head of the testing machine, under no load, shall not exceed 1 in./min (0.4 mm/s). Any specimen breaking within 1 in. (25.4 mm) of the jaws may be disregarded and a retest performed.

8.1.2 *Alternate Testing Method*—The tensile test shall be carried out in accordance with Test Methods E 8. The loading

TABLE 1 Wire Diameter Tolerances Uncoated and Drawn-Galvanized or Zn5 Al-MM Rope Wire

Diameter Range, in.	Diameter Range, mm	Tolerance, in.		Tolerance, mm	
		Minus	Plus	Minus	Plus
0.010 to 0.025 incl.	0.25 to 0.64 incl.	0.0003	0.0007	0.01	0.02
Over 0.025 to 0.060 incl.	Over 0.64 to 1.50 incl.	0.0005	0.001	0.01	0.03
Over 0.060 to 0.093 incl.	Over 1.50 to 2.36 incl.	0.001	0.001	0.03	0.03
Over 0.093 to 0.142 incl.	Over 2.36 to 3.61 incl.	0.001	0.0015	0.03	0.04
Over 0.142 to 0.200 incl.	Over 3.61 to 5.08 incl.	0.0015	0.002	0.04	0.05
Over 0.200 to .250 incl.	Over 5.08 to 6.35 incl.	0.002	0.002	0.05	0.05

TABLE 2 Wire Diameter Tolerances Final-Galvanized or Final-Coated Zn5 Al-MM Rope Wire

Diameter Range, in.	Diameter Range, mm	Tolerance, in.		Tolerance, mm	
		Minus	Plus	Minus	Plus
0.025 to 0.061 incl.	0.64 to 1.55 incl.	0.001	0.001	0.03	0.03
Over 0.061 to 0.079 incl.	Over 1.55 to 2.01 incl.	0.002	0.002	0.05	0.05
Over 0.079 to 0.092 incl.	Over 2.01 to 2.34 incl.	0.003	0.003	0.08	0.08
Over 0.092 to 0.103 incl.	Over 2.34 to 2.62 incl.	0.003	0.003	0.08	0.08
Over 0.103 to 0.119 incl.	Over 2.62 to 3.02 incl.	0.003	0.003	0.08	0.08
Over 0.119 to 0.142 incl.	Over 3.02 to 3.61 incl.	0.003	0.003	0.08	0.08
Over 0.142 to 0.187 incl.	Over 3.61 to 4.75 incl.	0.004	0.004	0.10	0.10
Over 0.187	Over 4.75	0.004	0.004	0.10	0.10

rate may be greater than that specified, depending on the number of tests to be carried out for the batch inspection. However, it shall not exceed the rate corresponding to a 25 % elongation between anchorages in 1 min. The minimum distance between the clamping jaws of the test machine is 4 in. (100 mm). In the event of a dispute, the tensile test shall be carried out strictly in accordance with Test Methods E 8, in particular with regard to the loading rate.

8.1.3 The minimum breaking forces are specified in Table 3 of this specification, for wire grade Levels 1 through 5. The range in breaking force for a given grade level is based on the calculated minimum tensile strength requirement (psi). While no maximum values are shown for breaking force, rope wire is generally produced to a tensile strength range of 30 000 psi. The resultant minimum breaking force of either uncoated, drawn-galvanized, and drawn-Zn5 Al-MM wires of various levels shall meet or exceed the values shown in Table 3. The resultant minimum breaking force for final-galvanized or final-coated Zn5 Al-MM wire is obtained by reducing the value stated for its level in Table 3 for uncoated wire by 10 %.

TABLE 3 Minimum Breaking Forces

Wire Diameter		Minimum Torsional Values (Number of Twists in 8 in.)					Minimum Breaking Force[A]									
in.	mm	Level 1	Level 2	Level 3	Level 4	Level 5	Level 1		Level 2		Level 3		Level 4		Level 5	
							lbf	N	lbf	N	lbf	N	lbf	N	lbf	N
0.010	0.254	274	254	234	218	190	16	70	17	80	20	90	22	100	24	110
0.011	0.279	249	231	213	196	173	18	90	21	100	24	110	27	120	29	130
0.012	0.305	228	212	195	182	158	22	100	25	120	29	130	32	150	31	160
0.013	0.330	211	196	180	168	146	26	120	29	140	34	150	37	170	41	180
0.014	0.356	196	181	167	156	136	31	140	34	160	39	180	43	200	45	210
0.015	0.381	182	169	156	145	126	36	180	39	180	45	200	49	220	53	240
0.016	0.408	171	156	146	136	118	40	180	41	200	51	230	56	250	80	270
0.017	0.432	161	149	137	126	111	48	200	50	230	57	260	63	290	63	310
0.018	0.467	152	141	130	121	105	50	230	53	250	64	290	71	320	73	340
0.019	0.483	144	133	123	114	100	56	250	62	260	72	320	79	360	85	380
0.020	0.508	136	126	116	108	94	60	280	69	310	79	360	87	390	94	420
0.021	0.533	130	120	111	103	90	68	310	73	340	87	390	100	450	100	450
0.022	0.559	124	115	106	96	86	75	340	83	360	96	430	110	490	110	490
0.023	0.584	118	110	101	94	82	80	370	91	410	100	450	120	540	120	540
0.024	0.610	113	105	97	90	78	85	400	100	450	110	490	130	580	130	580
0.025	0.635	109	101	93	86	75	90	430	110	490	120	540	140	630	150	670
0.026	0.680	105	97	89	83	72	100	450	130	540	130	560	150	670	160	720
0.027	0.686	101	93	86	80	70	110	490	130	580	140	630	160	720	170	730
0.028	0.711	97	90	83	77	67	120	540	130	580	150	670	170	760	180	810
0.029	0.737	94	87	80	74	65	130	580	140	630	170	760	180	810	200	890
0.030	0.782	90	84	77	72	62	140	630	150	670	180	810	190	850	210	940
0.031	0.787	86	81	75	69	60	150	670	160	720	190	850	210	940	220	960
0.032	0.813	85	78	72	67	56	160	720	180	810	200	890	220	980	240	1070
0.033	0.836	82	76	70	65	57	170	780	190	850	210	940	240	1070	250	1130
0.034	0.864	80	74	68	63	55	180	810	200	890	230	1030	250	1120	270	1210
0.035	0.869	77	72	66	61	53	190	860	210	940	240	1070	260	1160	280	1250
0.036	0.914	75	70	64	60	52	200	890	220	960	250	1120	280	1250	300	1340
0.037	0.940	73	68	62	58	50	210	940	230	1030	270	1210	300	1340	320	1430
0.038	0.966	71	66	61	56	49	220	960	250	1120	280	1250	310	1360	330	1470
0.039	0.991	69	64	59	55	48	230	1030	260	1160	300	1340	330	1470	350	1560
0.040	1.02	67	62	57	53	46	240	1070	270	1210	310	1360	340	1520	370	1650
0.041	1.04	66	61	56	52	45	250	1160	290	1290	330	1470	360	1610	390	1740
0.042	1.07	64	59	55	51	44	270	1210	300	1340	340	1520	380	1700	410	1830
0.043	1.09	63	58	53	50	43	280	1250	310	1380	360	1610	400	1780	430	1920
0.044	1.12	61	57	52	48	42	300	1340	330	1470	380	1700	420	1870	450	2010
0.045	1.14	60	56	51	47	41	310	1360	340	1520	390	1740	430	1920	470	2100
0.046	1.17	58	54	50	46	40	320	1430	360	1610	410	1830	450	2010	490	2130
0.047	1.19	57	53	49	45	39	340	1530	370	1650	430	1920	470	2100	510	2270
0.048	1.22	56	52	48	44	36	350	1560	390	1740	450	2010	490	2180	540	2350

TABLE 3 *Continued*

Wire Diameter		Minimum Torsional Values (Number of Twists in 8 in.)					Minimum Breaking Force[A]									
in.	mm	Level 1	Level 2	Level 3	Level 4	Level 5	Level 1		Level 2		Level 3		Level 4		Level 5	
							lbf	N	lbf	N	lbf	N	lbf	N	lbf	N
0.049	1.24	55	51	47	43	36	370	1560	410	1830	470	2100	510	2270	550	2450
0.050	1.27	54	50	46	42	37	380	1700	420	1870	490	2180	530	2380	570	2500
0.051	1.30	53	49	45	42	36	400	1760	440	1960	500	2230	560	2500	610	2670
0.052	1.32	52	48	44	41	36	410	1830	480	2050	520	2320	580	2580	620	2730
0.053	1.35	51	47	43	40	36	430	1920	470	2100	540	2410	600	2670	640	2850
0.054	1.37	50	46	42	39	34	440	1960	490	2180	580	2500	620	2780	660	2990
0.055	1.40	49	45	41	38	33	460	2050	510	2270	590	2630	640	2850	690	3070
0.056	1.42	48	44	41	36	33	470	2100	530	2360	610	2720	670	2990	710	3200
0.057	1.45	47	43	40	37	32	490	2180	550	2450	630	2810	690	3070	710	3300
0.058	1.47	46	43	39	36	32	510	2270	570	2540	650	2900	720	3210	710	3430
0.059	1.50	45	42	36	36	31	530	2360	580	2580	670	2990	740	3300	710	3520
0.060	1.52	44	41	38	35	30	540	2410	600	2670	690	3070	760	3390	810	3550
0.061	1.56	44	40	37	35	30	560	2500	620	2760	720	3210	790	3520	850	3790
0.062	1.57	43	40	37	34	29	580	2580	640	2850	740	3300	810	3610	830	3923
0.063	1.60	42	39	36	33	29	600	2670	660	2940	760	3390	840	3740	930	4310
0.064	1.63	42	38	36	33	28	620	2760	690	3070	790	3520	870	3870	930	4140
0.065	1.65	41	38	35	32	28	640	2850	710	3160	810	3610	890	3980	960	4283
0.066	1.68	40	37	34	32	28	680	2940	730	3250	840	3740	920	4100	990	4410
0.067	1.70	40	37	34	31	27	670	2990	750	3340	860	3830	950	4230	1000	4540
0.068	1.73	39	36	33	31	27	690	3070	770	3430	890	3960	980	4360	1060	4630
0.069	1.75	38	36	33	30	26	710	3160	790	3520	910	4050	1000	4450	1160	4810
0.070	1.78	38	35	32	30	26	730	3250	820	3650	940	4190	1030	4590	1110	4940
0.071	1.80	37	35	32	29	26	780	3390	840	3740	970	4320	1080	4720	1140	5080
0.072	1.83	37	34	31	29	25	780	3470	880	3830	990	4410	1090	4850	1170	5200
0.073	1.85	36	34	31	29	25	800	3580	590	3960	1020	4540	1120	4990	1210	5360
0.074	1.86	36	33	30	28	24	820	3650	910	4050	1050	4680	1150	5120	1240	5600
0.075	1.91	35	33	30	28	24	840	3740	930	4140	1070	4760	1180	5250	1270	5680
0.076	1.93	35	32	30	27	24	860	3830	960	4280	1100	4900	1210	5390	1300	5790
0.077	1.96	34	32	29	27	23	890	3960	960	4380	1130	5030	1240	5520	1340	5900
0.078	1.98	34	31	29	27	23	910	4080	1010	4500	1160	5160	1280	5700	1370	6100
0.079	2.01	33	31	28	26	23	930	4140	1030	4590	1190	5300	1310	5830	1410	6300
0.080	2.03	33	30	28	26	22	950	4230	1080	4720	1230	5430	1340	5970	1440	6400
0.081	2.03	33	30	28	26	22	960	4260	1090	4850	1250	5570	1370	6100	1480	6500
0.082	2.03	32	30	27	25	22	1000	4460	1110	4610	1280	5700	1410	6280	1510	0000
0.083	2.11	32	29	27	25	22	1020	4500	1140	5080	1310	5830	1440	6410	1550	0000
0.084	2.13	31	29	27	25	21	1050	4680	1160	5160	1340	5970	1470	6540	1580	7030
0.085	2.16	31	29	26	24	21	1070	4760	1190	5300	1370	6100	1510	6720	1620	7210
0.086	2.18	31	28	26	24	21	1100	4800	1220	5430	1400	6230	1540	6660	1660	7390
0.087	2.21	30	28	26	24	21	1120	4990	1250	5570	1430	6370	1580	7030	1700	7570
0.088	2.24	30	28	25	23	20	1150	5120	1270	5650	1470	6540	1610	7170	1730	7700
0.089	2.26	30	27	25	23	20	1170	5210	1300	5790	1500	6660	1650	7340	1770	7880
0.090	2.29	29	27	25	23	20	1200	5340	1330	5920	1530	6610	1680	7480	1810	8080
0.091	2.31	29	27	24	23	20	1220	5430	1360	6050	1560	6940	1720	7660	1850	8230
0.092	2.34	28	26	24	22	19	1250	5670	1390	6190	1600	7120	1760	7830	1890	8410
0.093	2.36	28	26	24	22	19	1280	5700	1420	6320	1630	7260	1790	7970	1930	8590
0.094	2.39	28	26	24	22	19	1300	5790	1450	6450	1670	7430	1830	8150	1970	8770
0.095	2.41	28	25	23	22	19	1330	5920	1480	6590	1700	7570	1870	8320	2010	8900
0.096	2.44	27	25	23	21	18	1360	6050	1510	6720	1740	7740	1910	8500	2050	9130
0.097	2.46	27	25	23	21	18	1390	6190	1540	6880	1770	7880	1950	8680	2090	9300
0.098	2.49	27	25	23	21	18	1410	6280	1570	6990	1810	8060	1990	8860	2140	9529
0.099	2.51	26	24	22	21	18	1440	6410	1600	7120	1840	8190	2030	9030	2180	9700
0.100	2.54	26	24	22	20	18	1470	6540	1630	7260	1880	8370	2070	9210	2220	9880
0.101	2.57	26	24	22	20	18	1500	6580	1680	7390	1910	8500	2110	9390	2260	10 000
0.102	2.59	26	24	22	20	17	1530	6810	1700	7570	1950	8680	2150	9570	2310	10 210
0.103	2.62	25	23	21	20	17	1560	6940	1730	7700	1990	8860	2190	9750	2360	10 410
0.104	2.64	25	23	21	20	17	1580	7030	1760	7830	2030	9030	2230	9920	2390	10 610
0.105	2.67	25	23	21	19	17	1610	7170	1790	7970	2080	9170	2270	10 100	2440	10 810
0.106	2.69	25	23	21	19	17	1640	7300	1830	8150	2100	9350	2310	10 280	2480	11 010
0.107	2.72	24	22	21	19	16	1670	7430	1860	8280	2140	9520	2350	10 460	2530	11 280
0.108	2.74	24	22	20	19	16	1700	7570	1890	8410	2180	9700	2400	10 680	2580	11 430
0.109	2.77	24	22	20	19	16	1730	7700	1930	8590	2220	9880	2440	10 860	2620	11 630
0.110	2.79	24	22	20	18	16	1770	7880	1960	8720	2260	10 060	2480	11 040	2670	11 830
0.111	2.82	23	22	20	18	16	1800	8010	2000	8900	2300	10 240	2530	11 260	2710	12 050
0.112	2.84	23	21	20	18	16	1830	8150	2030	9030	2340	10 410	2570	11 440	2760	12 230
0.113	2.87	23	21	19	18	15	1880	8280	2070	9210	2380	10 590	2610	11 610	2810	12 500
0.114	2.90	23	21	19	18	15	1890	8410	2100	9350	2420	10 770	2660	11 840	2860	12 730
0.115	2.92	22	21	19	18	15	1920	8550	2140	9620	2480	10 950	2700	12 020	2910	12 950
0.116	2.95	22	21	19	17	15	1960	8720	2170	9660	2500	11 130	2750	12 240	2950	13 130
0.117	2.97	22	20	19	17	15	1990	8860	2210	9840	2540	11 300	2790	12 420	3000	13 350
0.118	3.00	22	20	18	17	15	2020	8960	2240	9970	2580	11 480	2840	12 640	3050	13 670
0.119	3.02	22	20	18	17	15	2050	9120	2290	10 150	2620	11 660	2890	12 880	3100	13 790

TABLE 3 *Continued*

Wire Diameter		Minimum Torsional Values (Number of Twists in 8 in.)					Minimum Breaking Force[A]									
in.	mm	Level 1	Level 2	Level 3	Level 4	Level 5	Level 1		Level 2		Level 3		Level 4		Level 5	
							lbf	N	lbf	N	lbf	N	lbf	N	lbf	N
0.120	3.05	21	20	18	17	14	2090	9300	2320	10 320	2670	11 880	2930	13 040	3150	14 030
0.121	3.07	21	20	18	17	14	2120	9440	2360	10 500	2710	12 080	2960	13 260	3200	14 210
0.122	3.10	21	19	18	17	14	2150	9570	2390	10 640	2750	12 240	3030	13 480	3250	14 160
0.123	3.12	21	19	18	16	14	2190	9750	2430	10 610	2800	12 460	3070	13 660	3310	14 730
0.124	3.15	21	19	18	16	14	2220	9660	2470	10 990	2840	12 640	3120	13 880	3360	14 950
0.125	3.18	21	19	17	16	14	2260	10 080	2510	11 170	2880	12 820	3170	14 110	3410	15 170
0.126	3.20	20	19	17	16	14	2290	10 190	2550	11 360	2930	13 040	3220	14 330	3460	15 200
0.127	3.23	20	19	17	16	14	2330	10 370	2580	11 480	2970	13 220	3270	14 550	3510	15 320
0.128	3.25	20	18	17	16	13	2360	10 500	2620	11 600	3020	13 440	3320	14 770	3570	15 390
0.129	3.25	20	18	17	16	13	2400	10 660	2680	11 840	3080	13 620	3370	15 000	3620	16 110
0.130	3.30	20	18	17	15	13	2430	10 610	2700	12 020	3110	13 640	3420	15 220	3670	16 330
0.131	3.33	20	18	17	15	13	2470	10 990	2740	12 190	3150	14 020	3470	15 440	3730	16 800
0.132	3.35	19	18	16	15	13	2500	11 130	2780	12 370	3200	14 240	3620	15 660	3780	16 830
0.133	3.38	19	18	16	15	13	2540	11 300	2820	12 550	3250	14 480	3670	15 890	3840	17 090
0.134	3.40	19	18	16	15	13	2580	11 460	2860	12 730	3290	14 640	3620	16 110	3890	17 310
0.135	3.43	19	17	16	15	13	2610	11 610	2900	12 900	3340	14 860	3670	16 330	3950	17 580
0.136	3.45	19	17	16	15	13	2650	11 790	2940	13 080	3390	15 080	3720	16 550	4000	17 800
0.137	3.48	19	17	16	15	13	2690	11 970	2990	13 310	3430	15 260	3780	16 820	4080	18 060
0.138	3.51	18	17	16	14	12	2720	12 100	3030	13 480	3480	15 480	3630	17 040	4120	18 330
0.139	3.53	18	17	15	14	12	2760	12 260	3070	13 660	3530	15 710	3880	17 260	4170	18 560
0.140	3.56	18	17	15	14	12	2800	12 460	3110	13 840	3580	15 630	3940	17 530	4230	18 820
0.141	3.58	18	17	15	14	12	2840	12 640	3150	14 020	3630	16 150	3990	17 750	4290	19 090
0.142	3.61	18	17	15	14	12	2880	12 820	3200	14 240	3680	16 370	4040	17 980	4350	19 360
0.143	3.63	18	16	15	14	12	2910	12 950	3240	14 420	3720	16 550	4100	18 240	4400	19 680
0.144	3.65	18	16	15	14	12	2960	13 130	3260	14 600	3770	16 770	4150	18 470	4460	19 840
0.145	3.66	18	16	15	14	12	2990	13 310	3330	14 820	3820	17 000	4210	18 730	4620	20 110
0.146	3.71	17	16	15	14	12	3030	13 480	3370	15 000	3870	17 220	4280	18 950	4680	20 380
0.147	3.73	17	16	15	13	12	3070	13 880	3410	15 170	3920	17 440	4320	19 220	4640	20 640
0.148	3.76	17	16	14	13	11	3110	13 840	3480	15 400	3960	17 710	4370	19 440	4700	20 910
0.149	3.78	17	16	14	13	11	3150	14 020	3500	15 570	4030	17 930	4430	19 710	4760	21 180
0.150	3.81	17	16	14	13	11	3190	14 190	3550	15 800	4080	18 150	4490	19 980	4820	21 450
0.151	3.84	17	15	14	13	11	3230	14 370	3590	15 970	4130	18 380	4540	20 200	4880	21 710
0.152	3.86	17	15	14	13	11	3270	14 550	3640	16 200	4180	18 800	4600	30 470	4940	21 980
0.153	3.89	17	15	14	13	11	3310	14 730	3680	16 370	4230	18 820	4660	20 730	5010	22 290
0.154	2.91	16	15	14	13	11	3350	14 910	3730	18 800	4290	19 090	4710	20 980	5070	22 580
0.155	3.94	16	15	14	13	11	3400	15 130	3770	16 770	4340	19 310	4770	21 220	5130	22 830
0.156	3.96	16	15	14	13	11	3440	15 310	3820	17 000	4390	19 630	48 30	21 490	5190	23 090
0.157	3.99	16	15	14	13	11	3480	15 480	3880	17 180	4440	19 760	4890	21 750	5260	23 400
0.158	4.01	16	15	13	12	11	3520	15 880	3910	17 400	4600	20 030	4950	22 020	5320	23 670
0.159	4.04	16	15	13	12	11	3560	15 840	3980	17 620	4550	20 240	5010	22 290	5380	23 940
0.160	4.06	16	14	13	12	10	3600	16 020	4010	17 840	4610	20 510	5070	22 560	5450	24 250
0.161	4.09	16	14	13	12	10	3650	16 240	4050	18 020	4660	20 730	5130	22 820	5510	24 510
0.162	4.11	16	14	13	12	10	3690	16 420	4100	18 240	4720	21 000	5190	23 090	5580	24 830
0.163	4.14	15	14	13	12	10	3730	16 600	4150	18 470	4770	21 220	5250	23 360	5840	25 090
0.164	4.17	15	14	13	12	10	3780	16 820	4200	18 690	4830	21 490	5310	23 630	5710	25 400
0.165	4.19	15	14	13	12	10	3820	17 000	4240	18 870	4880	21 710	5370	23 890	5770	25 870
0.166	4.22	15	14	13	12	10	3880	17 180	4290	19 090	4940	21 980	5430	24 160	5840	25 680
01.67	4.24	15	14	13	12	10	3910	17 400	4340	19 310	4990	22 200	5490	24 430	5900	26 250
0.168	4.27	15	14	13	12	10	3950	17 580	4390	19 530	5050	22 470	5560	24 690	5970	26 560
0.169	4.29	15	14	12	12	10	4000	17 800	4440	19 760	5110	22 740	5620	25 000	6040	26 870
0.170	4.32	15	14	12	11	10	4040	17 980	4490	19 980	5180	22 960	5660	25 270	6100	27 140
0.171	4.34	15	13	12	11	10	4080	18 150	4540	20 200	5220	23 220	5740	25 540	6170	27 450
0.172	4.37	15	13	12	11	10	4130	18 380	4590	20 420	5280	23 490	5800	25 800	6240	27 760
0.173	4.39	14	13	12	11	10	4170	18 550	4640	20 640	5330	23 710	5870	26 120	6310	28 070
0.174	4.42	14	13	12	11	10	4220	18 780	4690	20 870	5390	23 980	5930	26 380	6380	28 380
0.175	4.45	14	13	12	11	9	4270	19 000	4740	21 090	5450	24 250	6000	26 690	6450	28 700
0.176	4.47	14	13	12	11	9	4310	19 180	4790	21 310	5510	24 510	6060	26 960	6510	28 960
0.177	4.50	14	13	12	11	9	4360	19 400	4840	21 530	5570	24 780	6120	27 230	6580	29 270
0.178	4.52	14	13	12	11	9	4400	19 580	4890	21 780	5630	25 050	6190	27 540	6650	29 590
0.179	4.55	14	13	12	11	9	4450	19 800	4940	21 980	5690	25 320	6250	27 810	6720	29 900
0.180	4.57	14	13	12	11	9	4500	20 020	5000	22 250	5750	25 580	6320	28 120	6790	30 210
0.181	4.60	14	13	12	11	9	4540	20 200	5050	22 470	5810	25 850	6390	28 430	6860	30 620
0.182	4.62	14	13	11	11	9	4590	20 420	5100	22 690	5870	26 120	6450	28 700	6940	30 880
0.183	4.65	14	12	11	11	9	4640	20 640	5150	22 910	5930	26 380	6520	29 010	7010	31 190
0.184	4.67	13	12	11	10	9	4680	20 820	5210	23 180	5990	26 650	6580	29 270	7060	31 500
0.185	4.70	13	12	11	10	9	4730	21 050	5260	23 400	6050	26 920	6650	29 590	7150	31 810
0.186	4.72	13	12	11	10	9	4780	21 270	5310	23 630	6110	27 180	6720	29 900	7220	32 120
0.187	4.75	13	12	11	10	9	4830	21 460	5360	23 850	6170	27 450	6790	30 210	7290	32 430
0.188	4.78	13	12	11	10	9	4880	21 710	5420	24 110	6230	27 720	6850	30 480	7370	32 790
0.189	4.80	13	12	11	10	9	4920	21 890	5470	24 340	6290	27 980	6920	30 790	7440	33 100
0.190	4.83	13	12	11	10	9	4970	22 110	5630	24 600	6350	28 250	6990	31 100	7510	33 410

TABLE 3 *Continued*

Wire Diameter		Minimum Torsional Values (Number of Twists in 8 in.)					Minimum Breaking Force[A]									
in.	mm	Level 1	Level 2	Level 3	Level 4	Level 5	Level 1		Level 2		Level 3		Level 4		Level 5	
							lbf	N	lbf	N	lbf	N	lbf	N	lbf	N
0.191	4.85	13	12	11	10	9	5030	22 340	5580	24 830	6420	28 580	7080	31 410	7590	33 770
0.192	4.88	13	12	11	10	8	5070	22 580	5630	25 050	6480	28 830	7130	31 720	7660	34 080
0.193	4.90	13	12	11	10	8	5120	22 780	5690	25 320	6540	29 100	7200	32 030	7740	34 430
0.194	4.93	13	12	11	10	8	5170	23 000	5740	25 540	6610	29 410	7270	32 340	7810	34 750
0.195	4.95	13	12	11	10	8	5220	23 220	5800	25 800	6670	29 670	7340	32 650	7890	35 100
0.196	4.96	13	12	11	10	8	5270	23 450	5850	26 030	6730	29 940	7410	32 970	7960	35 410
0.197	5.00	13	11	10	10	8	5320	23 670	5910	26 290	6800	30 250	7480	33 280	8040	36 770
0.198	5.03	12	11	10	10	8	5370	23 890	5970	26 580	6880	30 520	7550	33 590	8110	36 080
0.199	5.05	12	11	10	10	8	5420	24 110	6020	26 780	6920	30 790	7620	33 900	8190	36 440
0.200	5.06	12	11	10	9	8	5470	24 340	6080	27 050	6990	31 100	7690	34 210	8260	36 750
0.201	5.11	12	11	10	9	8	5520	24 580	6130	27 270	7050	31 380	7780	34 520	8340	37 100
0.202	5.13	12	11	10	9	8	5570	24 780	6190	27 540	7120	31 680	7830	34 630	8420	37 460
0.203	5.16	12	11	10	9	8	5620	25 000	6250	27 810	7180	31 940	7900	35 150	8490	37 770
0.204	5.18	12	11	10	9	8	5670	25 230	6300	28 030	7250	32 250	7970	35 480	8570	38 130
0.205	5.21	12	11	10	9	8	5720	25 460	6360	26 300	7320	32 570	8050	35 810	8850	38 480
0.206	5.23	12	11	10	9	8	5780	25 720	6420	28 560	7380	32 830	8120	36 120	8730	38 840
0.207	5.26	12	11	10	9	8	5830	25 940	6480	26 830	7450	33 140	8190	36 440	8810	39 190
0.208	5.28	12	11	10	9	8	5880	26 180	6530	29 050	7510	33 410	8270	36 790	8890	39 650
0.209	5.31	12	11	10	9	8	5930	26 380	6590	29 320	7580	33 720	8340	37 100	8960	39 860
0.210	5.33	12	11	10	9	8	5990	26 650	6850	29 590	7650	34 030	8410	37 410	9040	40 220
0.211	5.36	12	11	10	9	8	6040	26 870	6710	29 850	7710	34 300	8490	37 770	9120	40 570
0.212	5.38	12	11	10	9	8	6090	27 090	6770	30 120	7780	34 610	8560	38 080	9200	40 930
0.213	5.41	11	11	10	9	8	6140	27 320	6830	30 390	7650	34 920	8630	38 390	9280	41 380
0.214	5.44	11	10	10	9	7	6200	27 580	6890	30 650	7920	35 230	8710	38 750	9360	41 640
0.215	5.46	11	10	9	9	7	6250	27 810	6940	30 880	7990	35 550	8780	39 080	9440	42 000
0.216	5.49	11	10	9	9	7	6300	28 030	7000	31 140	8050	35 810	8880	39 420	9520	42 350
0.217	5.51	11	10	9	9	7	6380	28 300	7080	31 410	8120	36 120	8940	39 770	9610	42 750
0.218	5.54	11	10	9	9	7	6410	28 520	7120	31 680	8190	36 440	9010	40 080	9690	43 110
0.219	5.56	11	10	9	9	7	6460	28 740	7180	31 940	8260	36 750	9090	40 440	9770	43 460
0.220	5.59	11	10	9	8	7	6520	29 010	7240	32 210	8330	37 080	9160	40 750	9850	43 830
0.221	5.61	11	10	9	8	7	6570	29 230	7300	32 480	8400	37 370	9240	41 110	9930	44 180
0.222	5.64	11	10	9	8	7	6630	29 500	7360	32 740	8470	37 680	9320	41 460	10 020	44 580
0.223	5.65	11	10	9	8	7	6680	29 720	7430	33 080	8540	37 990	9390	41 770	10 100	44 930
0.224	5.89	11	10	9	8	7	6740	29 990	7490	33 320	8610	36 300	9470	42 130	10 150	45 290
0.225	5.72	11	10	9	8	7	6790	30 210	7550	33 590	8680	36 620	9550	42 490	10 260	45 640
0.226	5.74	11	10	9	8	7	6850	30 480	7610	33 880	8750	38 930	9630	42 840	10 350	46 040
0.227	5.77	11	10	9	8	7	6900	30 700	7670	34 120	8820	39 240	9700	43 150	10 430	46 400
0.228	5.79	11	10	9	8	7	6960	30 980	7730	34 390	8890	39 550	9780	43 510	10 520	46 600
0.229	5.82	11	10	9	8	7	7020	31 230	7790	34 680	8980	39 880	9880	43 860	10 600	46 000
0.230	5.84	10	10	9	8	7	7070	31 450	7880	34 970	9040	40 220	3940	44 230	10 680	47 000
0.231	5.97	10	10	9	8	7	7130	31 720	7930	36 230	9110	40 530	10 030	44 580	10 770	47 000
0.232	5.50	10	10	9	8	7	7180	31 940	7980	35 500	9180	40 840	10 100	44 930	10 850	48 270
0.233	5.92	10	9	9	8	7	7240	32 210	8040	35 770	9250	41 150	10 180	46 290	10 940	48 670
0.234	5.94	10	9	9	8	7	7300	32 480	8110	36 080	9320	41 460	10 260	45 640	11 030	49 070
0.235	5.97	10	9	9	8	7	7360	32 700	8170	36 350	9400	41 820	10 340	48 000	11 110	49 420
0.236	5.99	10	9	8	8	7	7410	32 970	8230	36 610	9470	42 130	10 420	46 360	11 200	49 830
0.237	6.02	10	9	8	8	7	7470	33 230	8300	36 930	9540	42 440	10 500	46 710	11 280	50 180
0.238	6.05	10	9	8	8	7	7530	33 500	8360	37 190	9620	42 800	10 580	47 070	11 370	50 580
0.239	6.07	10	9	8	8	7	7580	33 720	8430	37 500	9690	43 110	10 680	47 420	11 460	50 980
0.240	6.10	10	9	8	8	6	7640	33 990	8490	37 770	9760	43 420	10 740	47 780	11 580	51 360
0.241	6.12	10	9	8	8	6	7700	34 260	8550	38 040	9840	43 780	10 820	48 130	11 630	51 740
0.242	6.15	10	9	8	8	6	7780	34 620	8620	38 350	9910	44 090	10 900	48 490	11 720	52 150
0.243	6.17	10	9	8	8	6	7820	34 790	8680	38 620	9990	44 440	10 980	48850	11 810	52 540
0.244	6.20	10	9	8	8	6	7870	35 010	8750	38 930	10 080	44 750	11 070	49 250	11 900	52 940
0.245	6.22	10	9	8	7	6	7930	35 280	8610	39 190	10 140	45 110	11 150	49 600	11 990	53 340
0.246	6.25	10	9	8	7	6	7990	35 550	8880	39 510	10 210	45 420	11 230	49 960	12 070	53 700
0.247	6.27	10	9	8	7	6	8050	35 810	8940	39 770	10 290	46 780	11 310	50 310	12 160	54 100
0.248	6.30	10	9	8	7	6	8110	38 080	9010	40 080	10 380	48 090	11 400	50 710	12 250	54 500
0.249	6.32	10	9	8	7	6	8170	36 350	9080	40 390	10 440	48 440	11 480	51 070	12 340	54 600
0.250	6.36	10	9	8	7	6	8230	36 610	9140	40 660	10 510	48 780	11 580	51 430	12 430	56 300

[A] 1 lbf = 4.448222 N.

9. Torsional Properties

9.1 *Torsion Test*—The torsion test shall be conducted in accordance with Test Method A 938 with the following modifications. The standard distance between the jaws of the testing machine is 8 ± 1/16 in. (203 ± 1 mm). In order to save time during tests, the distance between the jaws of the testing machine may be shortened to as small as 100 wire diameters (less than 8 in. (203 mm)). One end of the wire is to be rotated with respect to the other end at a uniform speed, not to exceed sixty 360° (6.28 rad) revolutions per minute, until breakage occurs. The machine must be equipped with an automatic counter to record the number of revolutions (twists) causing

breakage. One jaw shall be fixed axially and the other jaw movable axially and arranged for applying tension weights to wire under test. Tests in which breakage occurs within ⅛ in. (3.18 mm) of the jaw may be disregarded.

9.2 *Torsional Response Values*—The minimum number of twists for bright (uncoated) or drawn galvanized wire of the grades and sizes listed in Table 3 shall be the number of 360° (6.28 rad) revolutions in an 8-in. (203 mm) length that the wire must withstand before breakage occurs. When the distance between the jaws of the testing machine is different than 8 in. (203-mm), as permitted by 9.1, the minimum number of twists shall be adjusted in direct proportion to the change in jaw spacing as determined by the following formula:

$$T_A = \frac{(T_L \times L_\Delta)}{L_L} \quad (1)$$

where:

T_A = minimum number of twists for the adjusted spacing,
T_L = minimum number of twists for 8 in. (203 mm) jaw spacing for size and grade.
L_Δ = distance between testing machine jaws for adjusted spacing, inches (mm).
L_L = 8 in. (203 mm).

Torsion testing of final-galvanized or final coated Zn5 Al-MM rope wire is not required but can be produced to the torsional requirements of Table 3 for uncoated rope wire, subject to the following reduced values.

Wire over 0.120 in.	30 % of Table 3 minimum
Wire 0.080—0.120 in.	40 % of Table 3 minimum
Wire 0.035—0.079 in.	50 % of Table 3 minimum

9.3 *Torsion Test Loading*—During the torsion test, a minimum pound force as shown in Table 4 shall be applied to the wire being tested.

TABLE 4 Applied Load (Pound Force) for Torsion Testing

Diameter of Wire		Minimum Applied Load[A]	
		Pounds force	
in.	mm	(lbf)	Newtons (N)
Over 0.010 to 0.016	Over 0.25 to 0.41	0.5	4
Over 0.016 to 0.020	Over 0.41 to 0.51	1	5
Over 0.020 to 0.030	Over 0.51 to 0.76	2	9
Over 0.030 to 0.040	Over 0.76 to 1.02	3	14
Over 0.040 to 0.050	Over 1.02 to 1.28	4	18
Over 0.050 to 0.060	Over 1.28 to 1.53	5	20
Over 0.060 to 0.070	Over 1.53 to 1.79	6	25
Over 0.070 to 0.080	Over 1.79 to 2.04	7	29
Over 0.080 to 0.090	Over 2.04 to 2.30	8	36
Over 0.090 to 0.100	Over 2.30 to 2.55	9	43
Over 0.100 to 0.110	Over 2.55 to 2.80	10	47
Over 0.110 to 0.120	Over 2.80 to 3.06	11	51
Over 0.120 to 0.130	Over 3.06 to 3.31	12	56
Over 0.130 to 0.140	Over 3.31 to 3.57	13	58
Over 0.140 to 0.150	Over 3.57 to 3.82	14	62
Over 0.150 to 0.160	Over 3.82 to 4.07	15	67
Over 0.160 to 0.170	Over 4.07 to 4.33	16	71
Over 0.170 to 0.180	Over 4.33 to 4.58	17	76
Over 0.180 to 0.190	Over 4.58 to 4.84	18	80
Over 0.190 to 0.200	Over 4.84 to 5.09	19	85
Over 0.200 to 0.210	Over 5.09 to 5.34	20	89
Over 0.210 to 0.220	Over 5.34 to 5.60	21	94
Over 0.220 to 0.230	Over 5.60 to 5.85	22	98
Over 0.230 to 0.240	Over 5.85 to 6.10	23	103
Over 0.240 to 0.250	Over 6.10 to 6.35	24	107

[A] Weights shall not exceed twice the minimums listed.

10. Wrap Testing

10.1 All metallic coated wire produced to this specification must meet a wrap test as a measure of steel ductility. The wrapping may be done by any hand or power device that will coil the wire in a closely wound helix about a mandrel equal to twice the nominal diameter of the material being tested for six complete turns without wire fracture.

10.2 All metallic coated wire produced to this specification must meet a wrap test as a measure of coating adherence. The wrapping may be done by any hand or power device that will coil the wire in a closed helix about a mandrel for six complete turns without the coating of the wire flaking or cracking. The mandrel diameter for drawn coatings (either galvanized or mischmetal) is as listed in Table 5. The mandrel for final-galvanized wire and final-coated ZN5/AL-MM is as listed in Table 6.

11. Metallic Coatings for Rope Wire

11.1 Drawn-galvanized and drawn-Zn5 Al-MM rope wire shall be made having a tightly adherent, uniform, and continuous coating. The minimum weight of zinc or zinc-alloy coating tested in accordance with Specification A 90/A 90M shall be as specified in Table 5. The mandrel diameter shall be as specified in Table 5.

11.2 Final-galvanized and final-coated Zn5 Al-MM rope wire shall be made having a tightly adherent, uniform and continuous coating. The minimum weight of zinc or zinc-alloy coating tested in accordance with Specification A 90/A 90M shall be as specified in Table 6. The mandrel diameter shall be as specified in Table 6.

12. Workmanship, Finish and Appearance

12.1 The surface of the wire shall be free from rust and excessive scale. The wire surface shall be smooth and free from detrimental discontinuities such as seams, pits, and die marks.

12.2 Each coil or spool of wire shall be one continuous length properly coiled and firmly tied.

13. Sampling

13.1 Material testing shall be carried out by the supplier in accordance with a method approved by the purchaser. The number of test specimens taken from the end of a given package vary with the quality control procedures and the facilities of each manufacturer, but is generally not less than 10 % of the coils produced.

TABLE 5 Weight of Coating-Mandrel Diameter Drawn-Galvanized or Drawn Zn5 Al-MM Rope Wire

Diameter of Wire		Adherence Test	Minimum Weight of Coating	
in.	mm	Mandrel Diameter[A]	oz/ft^2	kg/m^2
0.010 to 0.015	0.25 to 0.38	1D	0.05	0.015
0.018 to 0.028	0.46 to 0.71	2D	0.10	0.03
0.029 to 0.060	0.74 to 1.52	3D	0.20	0.06
0.061 to 0.090	1.55 to 2.29	4D	0.30	0.09
0.091 to 0.140	2.31 to 3.56	5D	0.40	0.12

[A] Where: D = nominal diameter of wire being tested.

TABLE 6 Weight of Coating-Mandrel Diameter Final-Galvanized or Final Coated Zn5 Al-MM Rope Wire

Diameter of Wire		Adherence Test	Minimum Weight of Coating	
in.	mm	Mandrel Diameter[A]	oz/ft^2	kg/m^2
0.025 to 0.047	0.64 to 1.19	2D	0.20	0.06
0.048 to 0.054	1.22 to 1.37	2D	0.40	0.12
0.055 to 0.063	1.40 to 1.60	2D	0.50	0.15
0.064 to 0.079	1.63 to 2.01	2D	0.60	0.18
0.080 to 0.092	2.03 to 2.34	3D	0.70	0.21
0.093 to 0.192	2.36 to 4.88	3D	0.80	0.24
0.193 and larger	4.90 and larger	3D	0.90	0.27

[A] Where: D = nominal diameter of wire being tested.

13.2 The purchaser may elect to have incoming acceptance testing performed. To ensure representative sampling, the samples shall be taken at random from the coil or spool ends.

14. Retesting

14.1 If non-complying results are obtained, the purchaser may reject the entire lot, reclassify the material or perform further testing to establish material acceptability. This additional testing shall be based solely on the non-complying characteristic.

15. Package Marking

15.1 The coil or spool mass, dimensions, and protective covering shall be agreed upon between the manufacturer and purchaser.

15.2 The wire size, purchaser order number, ASTM specification number, heat number and manufacturer identification shall be on a tag securely attached to each package.

15.3 Bar coding of each package is acceptable as a supplementary identification method on the wire identification tag. If bar coding is used, the coding shall be consistent with the AIAG Standard 02.00, Primary Metals Identification Tag Application.

16. Keywords

16.1 metallic coated; rope; wire

APPENDIXES

(Nonmandatory Information)

X1. IMPERIAL (ENGLISH) WIRE MATERIALS (IN ACCORDANCE WITH CRITERIA SET FORTH IN EN 10264-1.2)

X1.1 *Definitions of Terms Relating to Sampling and Acceptance*:

X1.1.1 *batch*—a defined quantity of wire of the same diameter, the same grade, and the same finish presented for inspection and manufactured in conditions assumed to be identical and uniform.

X1.1.2 *unit (wire package)*—A variable or fixed quantity supplied in a:

X1.1.2.1 coil of a single length or mass of wire, or

X1.1.2.2 *bobbin (reel)*—A single length or mass of wire wound on a reel, spool or bobbin, or

X1.1.2.3 *flat coil (spooless core)*—A single length or mass of wire wound on a cardboard center drum, or

X1.1.2.4 other wire packaging as agreed between supplier and purchaser.

X1.1.3 *base unit for sampling (m_1)*—a mass expressed in pounds (lb) conventionally with a value equal to 100*d*, where *d* is the diameter of the wire expressed in inches.

X1.1.4 *size of batch (N):* number given by the following formula:

$$N = \frac{m}{2.8 \times 10^{-2} \times m_1} \quad \text{(X1.1)}$$

where:

m = batch mass, tons, and

m_1 = base unit mass, lb.

Knowing that conventionally:

$$m_1 = 100\,d \quad \text{(X1.2)}$$

where:

d = nominal wire diameter, in.,

it follows that:

$$N = \frac{m}{2.8 \times 10^{-2} \times 100d} \quad \text{(X1.3)}$$

or:

$$N = \frac{0.357\,m}{d} \quad \text{(X1.4)}$$

X1.1.5 *sample for testing*—a sufficient length of wire for measurement of an individual characteristic.

X1.1.6 *sampling length*—a sufficient length of wire to produce the necessary samples for testing all characteristics.

X1.1.7 *sampling*—taking all necessary samples to supply information on the batch.

X1.1.8 *sample size, n*—number of samples for tests.

X1.1.9 *non-conformance*—result of a test not complying with the requirements for a characteristic.

X1.2 *Definitions of Terms Relating to Sampling and Acceptance*:

X1.2.1 *batch*—a defined quantity of wire of the same diameter, the same grade, and the same finish presented for inspection and manufactured in conditions assumed to be identical and uniform.

X1.2.2 *unit (wire package)*—a variable or fixed quantity supplied in a:

X1.2.2.1 coil of a single length or mass of wire, or

X1.2.2.2 *bobbin (reel)*—A single length or mass of wire wound on a reel, spool or bobbin, or

X1.2.2.3 *flat coil (spooless core)*—A single length or mass of wire wound on a cardboard center drum, or

X1.2.2.4 other wire packaging as agreed between supplier and purchaser.

X1.2.3 *base unit for sampling (m_1)*—a mass expressed in (kilograms) conventionally with a value equal to 100*d*, where *d* is the diameter of the wire expressed in (millimetres).

X1.2.4 *size of batch (N)*—number given by the formula:

$$N = \frac{m}{10^3 \times m_1} \quad \text{(X1.5)}$$

where:

m = batch mass, tonnes, and

m_1 = base unit mass, kg.

Knowing that conventionally:

$$m_1 = 100\ d \quad \text{(X1.6)}$$

where:

d = nominal wire diameter (mm),

it follows that:

$$N = \frac{m}{10^{-3} \times 100d} \quad \text{(X1.7)}$$

or:

$$N = \frac{10\ m}{d} \quad \text{(X1.8)}$$

X1.2.5 *sample for testing*—a sufficient length of wire for measurement of an individual characteristic.

X1.2.6 *sampling length*—a sufficient length of wire to produce the necessary samples for testing all characteristics.

X1.2.7 *sampling*—taking all necessary samples to supply information on the batch.

X1.2.8 *sample size, n*—number of samples for tests.

X1.2.9 *non-conformance*—result of a test not complying with the requirements for a characteristic.

X2. METRIC WIRE MATERIALS (IN ACCORDANCE WITH CRITERIA SET FORTH IN eN 10264-1.2)

X2.1 *Definition of Terms Relating to Sampling and Acceptance*:

X2.1.1 *batch*—a defined quantity of wire of the same diameter, the same grade, and the same finish presented for inspection and manufactured in conditions assumed to be identical and uniform.

X2.1.2 *unit (wire package)*—a variable or fixed quanity supplied in a:

X2.1.2.1 coil of a single length or mass of wire, or

X2.1.2.2 *bobbin (reel)*—a single length or mass of wire wound on a reel, spool or bobbin, or

X2.1.2.3 *flat coil (spooless core)*—a single length or mass of wire wound on a cardboard center drum, or

X2.1.2.4 other wire packaging as agreed between supplier and purchaser.

X2.1.3 *base unit for sampling (m_1)*—a mass expressed in (kilograms) conventionally with a value equal to 100 *d*, where *d* is the diameter of the wire expressed in (millimetres).

X2.1.4 *size of batch (N):* number given by the formula:

$$N = \frac{m}{10^{-3} \times m_1} \quad \text{(X2.1)}$$

where:

m = batch mass, tonnes, and

m_1 = base unit mass, kg.

Knowing that conventionally:

$$m_1 = 100\ d \quad \text{(X2.2)}$$

where:

d = nominal wire diameter, mm,

it follows that:

$$N = \frac{m}{10^{-3} \times 100d} \quad \text{(X2.3)}$$

or:

$$N = \frac{10m}{d} \quad \text{(X2.4)}$$

X2.1.5 *sample for testing*—a sufficient length of wire for measurement of an individual characteristic.

X2.1.6 *sampling length*—a sufficient length of wire to produce the necessary samples for testing all characteristics.

X2.1.7 *sampling*—taking all necessary samples to supply information on the batch.

X2.1.8 *sample size, n,*—number of samples for tests.

X2.1.9 *non-conformance*—result of a test not complying with the requirements for a characteristic.