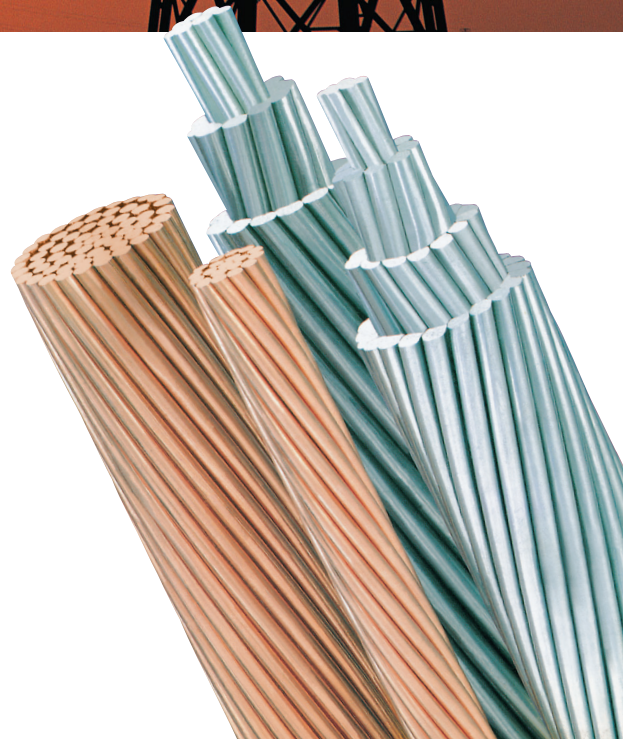


# 송·배전선 나동선 및 알루미늄선

## Copper and Aluminium Wire

DAEWON CABLE

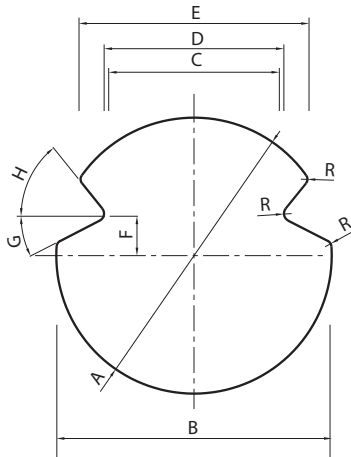
- 전차선
- 조가선
- 전기용 경동연선(HS)  
(일반용-For General Purpose)  
(가공송전용-For Overhead Transmission Purpose)
- 전기용 연동연선(AS)
- 전기용 경알루미늄선(HAL)
- 전기용 경알루미늄연선(HASC)
- 압축형 강심 알루미늄연선(SB-ACSR)
- 강심 알루미늄연선(ACSR)
- 알루미늄피복 강심 알루미늄연선(ACSR/AW)



## 전차선

## 원형전차선 (Cu)

### Trolley Wire



전철구간 중 지하구간(지하철)을 제외한  
지상구간에 전원공급용 가공선으로 사용

To be used for overhead power  
supply line of electric railways  
except the underground area.

#### ■ 구 조

1. 재 질 : 경동선
2. 적용규격 : 한국철도표준규격

#### ■ Construction

1. Material : Hard drawn copper
2. Standard : Korean Railway Standards

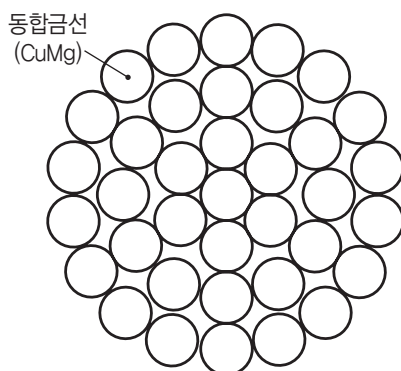
Nominal Sectional Area mm <sup>2</sup>	Calculated Sectional Area mm <sup>2</sup>	A mm	B mm	C mm	D mm	E mm	F mm	G °	H °	R mm	Approx. Weight kg/km	Min. Breaking Force kg	Min. Elongation %
170	170	15.49	15.49	7.32	7.74	11.43	2.4	27	51	0.38	1511.3	5900	3.4
110	111.1	12.34	12.34	6.85	7.27	9.75	1.7	27	51	0.38	987.7	3900	3.0

※ 허용치 A : ±1% B, D, E : ±2%

## 조가선

## 조가선(CuMg)

### Messenger Wire



전철구간 중 전차선을 같은 높이로 수평  
하게 유지시키기 위해 사용

To be used for overhead power  
supply line of electric railways  
except the underground area.

#### ■ 구 조

1. 재 질 : 동합금선(CuMg)
2. 적용규격 : 한국철도표준규격  
한국철도시설공단  
물품구매 사양서

#### ■ Construction

1. Material : Copper Magnesium Alloy
2. Standard : Korean Railway Standards  
Purchasing  
Specification of Korea  
Rail Network Authority

Nominal Sectional Area mm <sup>2</sup>	Number & Diameter of Wire No./mm	Approx. Overall Diameter mm	Max. Conductor Resistance at 20°C Ω/km	Approx. Weight kg/km	Min. Breaking Force kN	Min. Conductivity %	Magnesium Content wt%
65	37/1.5	10.5	0.462	602	45.5	60	0.4~0.5
116	37/2.0	14.0	0.216	1050	72.1	72	0.2~0.3

## 전기용 경동연선

ES 120-019-085, 대원표준

### Hard-Drawn Copper Stranded Wire for Electrical Purpose(HS)

#### ■ 일반용(For General Purpose)

Nominal Sectional Area mm <sup>2</sup>	No. & Dia of Wire No./mm	Calculated Section Area mm <sup>2</sup>	Overall Diameter mm	Weight kg/km	Max. Conductor Resistance at 20℃ Ω/km	Min Tensile force kgf	Length m/reel	Weight kg/reel
1,000	127/3.2	1,021	41.6	9,315	0.0179	40,100	300	3,380
850	127/2.9	838.8	37.7	7,651	0.0217	33,100	300	2,880
725	91/3.2	731.8	35.2	6,655	0.0248	28,700	300	2,560
600	91/2.9	601.1	31.9	5,466	0.0303	23,800	300	2,010
500	61/3.2	490.6	28.8	4,448	0.0370	19,300	300	1,630
400	61/2.9	402.9	26.1	3,654	0.0450	15,900	300	1,310
325	61/2.6	323.8	23.4	2,937	0.0560	12,900	300	1,070
250	61/2.3	253.5	20.7	2,298	0.0715	10,200	500	1,280
200	37/2.6	196.4	18.2	1,776	0.0920	7,830	500	1,020
150	37/2.3	153.7	16.1	1,390	0.118	6,160	600	945
125	19/2.9	125.5	14.5	1,129	0.143	4,960	600	765
100	19/2.6	100.9	13.0	907.6	0.178	4,020	600	625
80	19/2.3	78.95	11.5	710.3	0.228	3,160	1,000	795
60	19/2.0	59.70	10.0	537.0	0.301	2,410	1,000	605
50	19/1.8	48.36	9.0	435.1	0.376	1,970	1,000	480
38	7/2.6	37.16	7.8	334.4	0.484	1,480	300	-
30	7/2.3	29.09	6.9	261.7	0.618	1,170	300	-
22	7/2.0	21.99	6.0	197.9	0.818	888	300	-
14	7/1.6	14.08	4.8	126.7	1.29	574	500	-
8.0	7/1.2	7.917	3.6	71.19	2.30	326	500	-
5.5	7/1.0	5.498	3.0	49.46	3.31	227	500	-
3.5	7/0.8	3.519	2.4	31.66	5.17	146	500	-
2.0	7/0.6	1.979	1.8	17.80	9.18	83	500	-
1.4	7/0.5	1.375	1.5	12.37	13.2	58	500	-
0.9	7/0.4	0.8799	1.2	7.913	20.7	37	500	-

#### ■ 가공송전용(For Overhead Transmission Purpose)

Nominal Sectional Area mm <sup>2</sup>	No. & Dia of Wire No./mm	Calculated Section Area mm <sup>2</sup>	Overall Diameter mm	Weight kg/km	Max. Conductor Resistance at 20℃ Ω/km	Min Tensile force kgf	Length m/reel	Weight kg/reel
240	19/4.0	238.8	20.0	2,148	0.0753	9,180	600	1,450
200	19/3.7	204.3	18.5	1,838	0.0880	7,900	700	1,430
180	19/3.5	182.8	17.5	1,645	0.0984	7,130	800	1,490
150	19/3.2	152.8	16.0	1,375	0.118	6,000	1,000	1,550
125	19/2.9	125.5	14.5	1,129	0.143	4,960	1,000	1,250
100	7/4.3	101.6	12.9	914.5	0.177	3,880	600	625
75	7/3.7	75.25	11.1	677.0	0.239	2,910	700	545
55	7/3.2	56.29	9.6	506.4	0.320	2,210	1,000	575
45	7/2.9	46.24	8.7	416.0	0.389	1,830	1,000	465
38	7/2.6	37.16	7.8	334.4	0.484	1,480	1,000	380
30	7/2.3	29.09	6.9	261.7	0.618	1,170	1,200	355
22	7/2.0	21.99	6.0	197.9	0.818	888	1,200	275

## 전기용 연동 연선

### Annealed Copper Stranded Wire for Electrical Purpose(AS)

Nominal Sectional Area mm <sup>2</sup>	Minimum number of Wires in the conductor	Calculated Area mm <sup>2</sup>	Appox. Overall Diameter mm	Max. Conductor Resistance at 20°C Ω/km	Approx. Weight kg/km	Standard Length m
1000	91	1021.39	41.6	0.0176	9439.86	300
800	91	810.18	37.05	0.0221	7481.7	300
630	91	633.42	32.76	0.0283	5854.3	300
500	61	481.19	28.53	0.0366	4333.71	300
400	61	374.61	25.17	0.047	3374.6	300
300	61	293.56	22.28	0.0601	2643.44	300
240	61	234.09	19.9	0.0754	2108.98	300
185	37	177.92	17.33	0.0991	1600.82	500
150	37	142.12	15.48	0.124	1278.56	600
120	37	115.48	13.96	0.153	1039.37	600
95	19	91.44	12.38	0.193	821.92	600
70	19	66.03	10.52	0.268	593.02	1000
50	19	45.68	8.75	0.387	410.55	1000
35	7	33.69	7.43	0.524	302.14	300
25	7	24.28	6.31	0.727	217.73	300
16	7	15.34	5.01	1.15	137.61	500
10	7	10.02	4.05	1.83	89.92	500
6	7	5.95	3.12	3.08	53.38	500
4	7	3.97	2.55	4.61	35.64	500
2.5	7	2.47	2.01	7.41	22.14	500
1.5	7	1.54	1.59	12.1	13.85	500
1	7	0.89	1.2	18.1	7.9	500
0.75	7	0.752	1.11	24.5	6.84	500
0.5	7	0.56	0.96	36	5.09	500

※ 소선경, 연선경, 개산중량 등은 참고치로 실제 제품과 차이가 날 수 있습니다.



## 전기용 경 알루미늄선

### Hard-Drawn Aluminium Wire for Electrical Purpose(HAL)

Diameter mm	Tolerance ± mm	Calculated Sectional Area mm <sup>2</sup>	Approx. Weight kg/km	Min. Tensile Strength Mpa	Max. Resisivity at 20℃ nΩm	Density at 20℃ kg/dmm <sup>3</sup>	Coefficient of linear expansion ℃
5.0	±1%	19.635	53.03	160	28.264	2.703	23 × 10 <sup>-6</sup>
4.8		18.096	48.87	160			
4.6		16.619	44.87	160			
4.5		15.904	42.93	160			
4.3		14.522	39.20	160			
4.2		13.854	37.40	160			
4.0		12.566	33.94	160			
3.8		11.341	30.62	160			
3.7		10.752	29.03	160			
3.5		9.621	25.98	160			
3.2		8.042	21.71	165			
3.1		7.548	20.38	165			
2.9	±0.03mm	6.605	17.38	170			
2.8		6.158	16.63	170			
2.6		5.309	14.33	170			
2.3		4.155	11.22	175			
2.0		3.142	8.483	185			
1.8		2.545	6.872	185			
1.6		2.011	5.430	190			

## 전기용 경 알루미늄연선

### Hard-Drawn Aluminium Stranded Wire for Electrical Purpose(HASC)

Nominal Sectional Area mm <sup>2</sup>	Number & Dia. of Wire No./mm	Calculated Sectional Area mm <sup>2</sup>	Overall Diameter mm	Max. Conductor Resistance at 20℃ Ω/km	Approx. Weight kg/km	Min. Tensile force N	Standard Length m
1260	91/4.2	1260.75	46.2	0.0230	3499	179950	600
980	91/3.7	978.44	40.7	0.0297	2716	142200	600
850	61/4.2	845.12	37.8	0.0342	2334	120620	1300
660	61/3.7	655.88	33.3	0.0441	1812	95320	1300
510	37/4.2	512.61	29.4	0.0563	1413	73160	1300
400	37/3.7	397.83	25.9	0.0726	1097	57760	1300
300	37/3.2	297.57	22.4	0.0969	820.1	43440	1500
240	19/4.0	238.76	20.0	0.120	654.5	34230	1300
200	19/3.7	204.29	18.5	0.140	559.8	29710	1300
150	19/3.2	152.81	16.0	0.188	418.7	22260	1500
95	7/4.2	96.98	12.6	0.295	264.9	13830	1000
55	7/3.2	56.30	9.6	0.507	153.8	8220	1000
38	7/2.6	37.17	7.8	0.769	101.5	5650	1800
30	7/2.3	29.08	6.9	0.984	79.40	4600	1800

Nominal Sectional Area mm <sup>2</sup>	Number & Dia. of Wire No./mm	Calculated Sectional Area mm <sup>2</sup>	Overall Diameter mm	Max. Conductor Resistance at 20℃ Ω/km	Approx. Weight kg/km	Min. Tensile force KN	Standard Length m
1500	91/4.58	1499.21	50.4	0.0193	4143.1	240.00	600
1400	91/4.43	1402.62	48.7	0.0207	3866.9	224.00	600
1250	91/4.18	1248.77	46.0	0.0231	3452.60	200.00	600
1120	91/3.96	1120.78	43.5	0.0258	3093.5	179.20	600
1000	61/4.57	1000.58	41.1	0.0289	2759.2	160.00	600
900	61/4.33	898.25	39.0	0.0321	2483.3	144.00	600
800	61/4.09	801.43	36.8	0.0361	2207.4	128.00	1300
710	61/3.85	710.14	34.6	0.0407	1959.1	113.60	1300
630	61/3.63	631.30	32.6	0.0458	1738.3	100.80	1300
560	37/4.39	560.04	30.7	0.0515	1542.9	89.60	1300
500	37/4.15	500.48	29.0	0.0577	1377.6	80.00	1300
450	37/3.94	451.11	27.5	0.0641	1239.8	72.00	1300
400	37/3.71	399.98	26.0	0.0721	1102.0	64.00	1300
315	37/3.29	314.55	23.0	0.0916	867.9	51.97	1300
250	19/4.09	249.63	20.5	0.1151	687.1	40.00	1300
200	19/3.66	199.90	18.3	0.1439	549.7	32.00	1300
160	19/3.27	159.57	16.4	0.1798	439.8	26.40	1300
125	19/2.89	124.63	14.5	0.2302	343.6	21.25	1500
100	19/2.59	100.10	12.9	0.2877	274.8	17.00	1500
63	7/3.39	63.18	10.2	0.4545	172.3	10.39	1000
40	7/2.70	40.08	8.09	0.7158	109.4	6.80	1000
25	7/2.13	24.94	6.40	1.1453	68.4	4.50	1800
16	7/1.71	16.08	5.12	1.7896	43.8	3.04	1800
10	7/1.35	10.02	4.05	2.8633	27.4	1.95	1800

## 강심알루미늄연선

### Aluminium Conductor Steel Reinforced (ACSR) / (ACSR(Cardinal))

Nominal Sectional Area mm <sup>2</sup>	No. & Dia of Wire		Calculated Sectional Area		Overall Diameter		Calculated Weight			Min. Tensile force kg	Max. Conductor Resistance at 20℃ Ω/km	Hard- drawn Copper Equiv.Area mm <sup>2</sup>	Length m
	Aluminum No./mm	Steel No./mm	Aluminum mm <sup>2</sup>	Steel mm <sup>2</sup>	Aluminum mm	Steel mm	Aluminum kg/km	Steel kg/km	Total kg/km				
860	54/4.5	19/2.7	858.6	108.8	40.5	13.5	2,381	854.5	3,236	25,710	0.0339	540	600
750	54/4.2	19/2.5	747.9	93.27	37.8	12.5	2,074	732.6	2,807	22,220	0.0388	470	600
680	54/4.0	19/2.4	678.8	85.96	36.0	12.0	1,882	675.2	2,557	20,310	0.0428	427	800
610	54/3.8	7/3.8	612.4	79.38	34.2	11.4	1,698	622.2	2,320	18,150	0.0474	385	1,000
590	30/5.0	19/3.0	589.2	134.3	35.0	15.0	1,634	1,055	2,689	24,300	0.0493	371	1,000
580	54/3.7	7/3.7	580.5	75.25	33.3	11.1	1,610	589.9	2,200	17,470	0.0500	365	1,000
520	54/3.5	7/3.5	519.5	67.35	31.5	10.5	1,441	527.9	1,969	15,600	0.0559	327	1,000
510	26/5.0	7/3.9	510.6	83.65	31.7	11.7	1,415	655.7	2,071	17,210	0.0568	321	1,000
480	30/4.5	10/2.7	477.0	108.9	31.5	13.5	1,323	854.5	2,178	20,160	0.0609	300	1,000
480(Ca.)	54/3.38	7/3.38	484.53	62.81	30.42	10.14	1,345	495.0	1,850	15,300	0.0599	300	1,000or2000
430	26/4.6	7/3.6	432.1	71.26	29.2	10.8	1,197	558.6	1,756	14,610	0.0671	272	1,000
420	30/4.2	19/2.5	415.5	93.27	29.4	12.5	1,152	732.6	1,885	17,380	0.0698	261	1,000
410	26/4.5	7/3.5	413.4	67.35	28.5	10.5	1,145	527.9	1,673	13,890	0.0702	260	1,000
380	30/4.0	19/2.4	377.1	85.96	28.0	12.0	1,046	675.2	1,721	15,930	0.0070	237	1,000
360	26/4.2	7/3.2	360.1	56.29	26.4	9.6	997	441.3	1,439	11,860	0.0805	226	1,000
330	26/4.0	7/3.1	326.8	52.84	25.3	9.3	905.4	414.2	1,320	10,930	0.0888	206	1,000
320	30/3.7	7/3.7	322.5	75.25	25.9	11.1	894.4	589.9	1,484	13,630	0.090	203	1,000
290	30/3.5	7/3.5	288.6	67.35	24.5	10.5	800.4	527.9	1,328	12,170	0.101	181	1,000
280	26/3.7	7/2.9	279.5	46.24	23.5	8.7	774.4	362.4	1,237	9,780	0.104	176	1,400
250	26/3.5	7/2.7	250.1	40.08	22.1	8.1	693.0	313.8	1,007	8,590	0.116	157	1,400
240	30/3.2	7/3.2	241.3	56.29	22.4	9.6	668.9	441.3	1,110	10,210	0.120	152	1,400
210	26/3.2	7/2.5	209.1	34.36	20.3	7.5	578.1	269.4	848.5	7,290	0.139	131	1,400
200	30/2.9	7/2.9	198.2	46.24	20.3	8.7	549.3	362.4	911.7	8,620	0.147	125	1,400
170	26/2.9	7/2.25	171.7	27.83	18.35	6.75	475.6	218.2	693.8	5,980	0.169	108	1,250
160	30/2.6	7/2.6	159.3	37.16	18.2	7.8	441.5	291.3	732.8	6,990	0.182	100	1,900
140	26/2.6	7/2.0	138.0	21.99	16.4	6.0	382.3	172.4	554.7	4,810	0.210	87	1,450
120	30/2.3	7/2.3	124.7	29.09	16.1	6.9	345.7	228.0	573.7	5,550	0.233	78	1,300
120	12/3.5	7/3.5	115.5	67.35	17.5	10.5	318.0	527.9	845.9	9,950	0.250	73	1,300
110	26/2.3	7/1.8	108.0	17.82	14.6	5.4	299.3	139.6	438.9	3,990	0.268	68	1,300
97	12/3.2	7/3.2	96.50	56.26	16.0	9.6	265.7	441.3	707.0	8,050	0.298	61	1,400
95	6/4.5	1/4.5	95.40	15.90	13.5	4.5	261.2	124.0	385.2	3,180	0.301	60	1,300
80	6/4.2	1/4.2	83.10	13.85	12.6	4.2	227.5	108.0	335.5	2,770	0.345	52	1,000
79	12/2.9	7/2.9	79.26	46.24	14.5	8.7	218.2	362.4	580.6	6,820	0.364	50	1,000
75	6/4.0	1/4.0	75.42	12.57	12.0	4.0	206.5	98.05	304.6	2,510	0.380	47	1,000
65	6/3.7	1/3.7	64.50	10.75	11.1	3.7	176.6	83.85	260.5	2,220	0.444	41	1,000
64	12/2.6	7/2.6	63.71	37.16	13.0	7.8	175.4	291.3	466.7	5,510	0.452	40	1,000
58	6/3.5	1/3.5	57.73	9.621	10.5	3.5	158.1	75.04	233.1	1,980	0.497	36	1,000
48	6/3.2	1/3.2	48.25	8.042	9.6	3.2	132.1	62.73	194.8	1,660	0.593	30	1,000
40	6/2.9	1/2.9	39.63	6.605	8.7	2.9	108.50	51.52	160.0	1,400	0.723	25	1,000
32	6/2.6	1/2.6	31.85	5.309	7.8	2.6	87.18	41.41	128.6	1,140	0.899	20	950
25	6/2.3	1/2.3	24.93	4.155	6.9	2.3	68.26	32.41	100.7	907	1.15	16	1,000
19	6/2.0	1/2.0	18.85	3.152	6.0	2.0	51.61	24.51	76.12	698	1.52	12	1,000

## 압축형 강심 알루미늄 연선

### Smooth Body ACSR (SB-ACSR)

Nominal Sectional Area mm <sup>2</sup>	Construction		Overall Diameter mm	Min. Tensile Strength kg	Calculated Weight			Max. Conductor Resistance at 20 °C Ω/km	Hard- drawn Copper Equiv. Area mm <sup>2</sup>	Length m
	Aluminum	Steel			Aluminum kg/km	Steel kg/km	Total kg/km			
	No./shape	No./mm								
12	6/SB	1/1.6	4.4	460	33.05	15.69	48.74	2.40	3.2(mm)	900
19	6/SB	1/2.0	5.5	698	52.33	24.51	76.84	1.52	4.0(mm)	900
25	6/SB	1/2.3	6.3	907	68.85	32.41	101.3	1.15	14	900
32	6/SB	1/2.6	7.2	1,140	88.13	41.41	129.5	0.901	5.0(mm)	900
58	6/SB	1/3.5	9.7	1,980	159.7	75.04	234.7	0.497	38	600
95	6/SB	1/3.5	12.0	2,510	261.6	75.04	336.6	0.303	60	300
120	6/SB	1/4.2	13.6	3,300	330.5	108.0	438.5	0.240	80	300

## 알루미늄피복 강심 알루미늄연선

### Aluminium Conductor Aluminum-Clad Steel Reinforced (ACSR/AW) / (ACSR/AW(Cardinal))

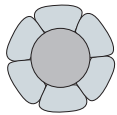
Nominal Sectional Area mm <sup>2</sup>	No. & Dia. of Wire		Calculated Sectional Area		Tensile force kgf	Overall Diameter		Approx. Weight kg/km	Approx. Conductor Resistance Ω/km	Length m
	AL No./mm	AW No./mm	AL No./mm	AW No./mm		AL mm	AW mm			
520	54/3.5	7/3.5	519.5	67.35	15,600	31.5	10.5	1,848	0.0536	<sup>*</sup> (1,000 2,000)
480	45/3.7	7/2.47	483.84	33.54	11,800	29.61	7.41	1,544	0.0586	"
480(Ca.)	54/3.38	7/3.38	484.53	62.81	15,300	30.42	10.14	1,850	0.0599	"
410	26/4.5	7/3.5	413.4	67.35	13,890	28.5	10.5	1,578	0.0665	"
330	26/4.0	7/3.1	326.8	52.84	10,930	25.3	9.3	1,239	0.0842	"
240	30/3.2	7/3.2	241.3	56.29	10,210	22.4	9.6	1,024	0.111	"
160	30/2.6	7/2.6	159.3	37.16	6,990	18.2	7.8	676.4	0.169	"
130	12/3.5	7/3.5	115.45	67.35	9,590	17.5	10.5	737	0.210	"
97	12/3.2	7/3.2	96.5	56.29	10,600	16.0	9.6	608	0.295	"
95	6/4.5	1/4.5	95.40	15.90	3,180	13.5	4.5	362	0.285	"
65	12/2.6	7/2.6	63.71	37.17	5,415	13.0	7.8	401	0.380	"
58	6/3.5	1/3.5	57.73	9.621	1,980	10.5	3.5	299.7	0.471	1,000
32	6/2.6	1/2.6	31.85	5.309	1,140	7.8	2.6	120.6	0.852	1,000

주: \*; 1조의 길이 1,000M는 보수 및 소규모 공사용이고 2,000M는 대규모 공사용임.  
(Ca.); (ACSR(Cardinal)) or (ACSR/AW(Cardinal))를 나타냄.

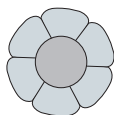


# ACSR 순서도

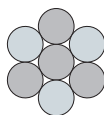
## ACSR CONSTRUCTION



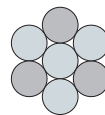
Smooth Body



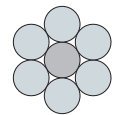
Smooth Body



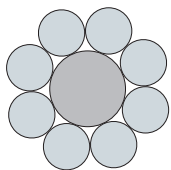
3 Al./4 St.



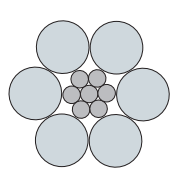
4 Al./3 St.



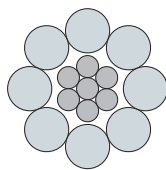
6 Al./1 St.



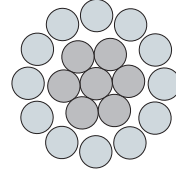
8 Al./1 St.



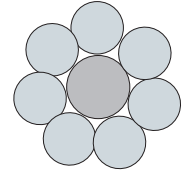
6 Al./7 St.



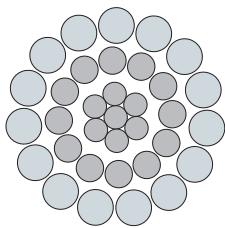
8 Al./7 St.



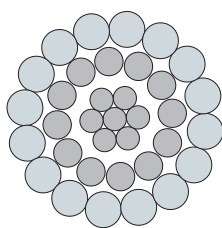
12 Al./7 St.



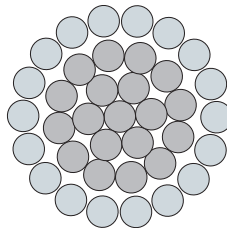
7 Al./1 St.



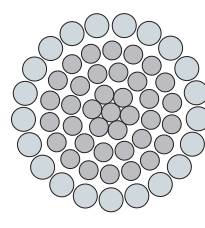
15 Al./19 St.



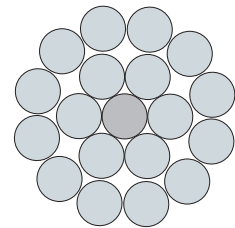
16 Al./19 St.



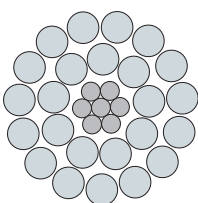
18 Al./19 St.



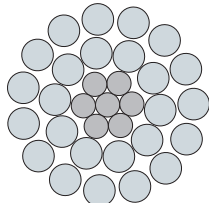
21 Al./37 St.



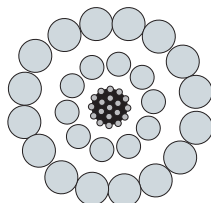
18 Al./1 St.



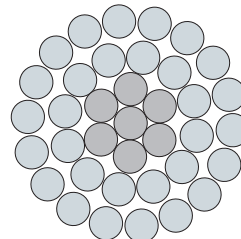
24 Al./7 St.



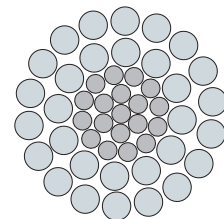
26 Al./7 St.



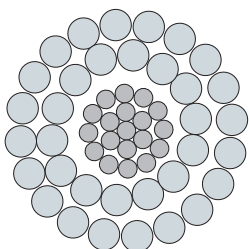
26 Al./19 St.



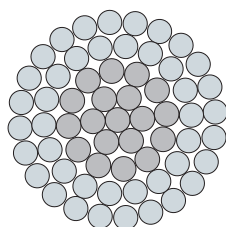
30 Al./7 St.



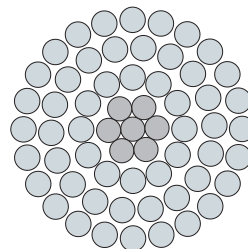
30 Al./19 St.



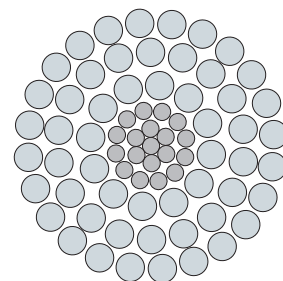
34 Al./19 St.



42 Al./19 St.



54 Al./7 St.



54 Al./19 St.