TEST REPORT

NEMA standard publication No. CC 3/ANSI C-119.4-2011
Heat Cycle of Automatic Tension Joint Splices
Mechanical of Automatic Tension Joint Splices

Report Number.	:	TMC180219001-R
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SAMPLE SUPPLIED	:	Four Samples of Auto-Joint Splice for #3 ACSR Conductor HAS42. Four Samples of Auto-Joint Splice for 1/0 ACSR Conductor HAS1020 Four Samples of Auto-Joint Splice for 4/0ACSR Conductor HAS3040 Four Samples of Auto-Joint Splice for #477 MCM ACSR Conductor HAS477 Four Samples of Compression Sleeve for #636 MCM ACSR Conductor HAS636
TEST CONDUCTED BY	:	TMC Testing Services (Shenzhen) Co., Ltd.
STANDERD	:	NEMA standard publication No. CC 3/ANSI C-119.4-2011

Test prepared by: Seven Liu Seven Liu Sign & Seal	Head of Lab: [illegible] Rao Sign & Seal

Heat Cycle of Automatic Tension Joint Splices

1.0 Introduction

Guangzhou Hotlink Hardware Co., Ltd. requested to carry out 500 heat cycle tests on a set of supplied samples of Auto Joint Splices for #3 ACSR HAS42, 1/0 ACSR HAS1020, 4/0 ACSR HAS3040, #477 MCM ACSR HAS477, and Compression Sleeve for #636 MCM ACSR HAS636, provide the test report. In response to the request, the supplied samples were tested in the facilities of the TMC Testing Services(Shenzhen) Co., Ltd. conducted the requested heat cycle tests as per NEMA standard publication No. CC 3/ANSI C-119.4-2011 and the report has been prepared based on the finding of the tests.

2.0 Test Samples and Loops

There were five types of auto joint splices having FOUR samples of each type as listed in Table-1.

Table 1: Sample Specification

SL No.	Catalog Number	Item Description	No. of Samples	Loops
1	HAS42	Auto Joint Splice for #3 ACSR Conductor	4	Loop 1
2	HAS1020	Auto Joint Splice for 1/0 ACSR Conductor	4	Loop 2
3	HAS3040	Auto Joint Splice for 4/0 ACSR Conductor	4	Loop 3
4	HAS477	Auto Joint Splice for #477 MCM ACSR Conductor	4	Loop 4
5	HAS636	Compression Sleeve for #636 MCM ACSR Conductor	4	Loop 5

For each category of samples, a loop is made as per NEMA standard publication No. CC-3/ ANSI C-119.4-2011 standard. Each loop comprises 4 splices and 6 equalizers. The loop 1-3 consists of a series circuit with 12 inch length of the respective ACSR conductor between any equalization point and auto joint splice. In each loop a control conductor was used which was of the same material but with 24 inch in length. Also, in each loop exposed conductor length was 24 inch and used the same material.

The loop 4-5 consists of a series circuit with 24 inch length of the respective ACSR conductor between any equalization point and auto joint splice. In each loop a control conductor was used which was of the same material but with 48 inch in length. Also, in each loop exposed conductor length was 48 inch and used the same material

3.0 Test Setup and Methods

An automated setup for the test along with current injectors. Switching ON/OFF of the ac supply at one-hour interval for the cases of Loop 1, 2 and 3 were performed automatically and Switching ON/OFF of the ac supply at one and half hour interval for the cases of Loop 4 and 5 were performed automatically. Temperature is measured manually using a digital sensor. All resistance measurement was performed manually with aprecession μΩ-Meter. For Loop 1, Loop 2, Loop 3, Loop 4 & Loop 5 measurements were taken initially and at the following cycle: 25, 50, 75, 100, 125, 165, 205, 250, 325, 405 and 500 +/- 5 cycles. All resistance measurements were converted to the reference at 20 ℃ temperature.

The circuits were energized with a current of approximately 175, 240, 385, 700 & 825 Amps for loops one, two, three, four & five respectively. The temperature of the control conductor was maintained near 100 ℃ above ambient temperature. The temperature of the control conductor and the auto joint splices were taken during the cycles preceding the resistance measurements.

4.0 Test Results

The ambient temperature and temperatures of the auto joint splices and control conductors were monitored manually. The auto joint splices resistance at the end of OFF time are measured manually with a precision μΩ-Meter. The test results are provided in tabular as well as graphical forms.

4.1 Loop 1：Test Loop with auto joint splice HAS42 for #3 ACSR

The temperature and resistance values obtained during the tests are shown in Table 2 and Table 3, respectively.

Table 2: Test data of auto joint splices Temperature for Loop 1 with current cycle (1 Hour ON and 1 Hour OFF) and test current of 175A

Cycle Number	Ambient (^{0}C)	Control Conductor (^{0}C)	Auto joint splices Temperatures (^{0}C)				Temperature Difference (^{0}C)			
			C1	C2	C3	C4	C1	C2	C3	C4
25	23.44	124.0	92.4	70.25	79.2	80.24	31.6	53.75	44.8	43.76
50	21.50	122.0	90.52	67.53	76.8	74.81	31.48	54.47	45.2	47.19
75	20.47	120.0	83.8	63.3	78.9	80.94	36.2	56.7	41.1	39.06
100	21.23	122.0	77.5	56.44	65.6	69.73	44.5	65.56	56.4	52.27
125	22.10	122.0	88.7	57.3	75.8	66.02	33.3	64.7	46.2	55.98
165	19.91	120.0	78.2	59.87	67.41	69.36	41.8	60.13	52.59	50.64
205	18.83	119.0	72.8	54.66	62.62	68.11	46.2	64.34	56.38	50.89
250	17.66	118.0	71.6	52.4	66.6	72.1	46.4	65.6	51.4	45.9
325	17.54	118.0	74.8	59.52	64.86	69.42	43.2	58.48	53.14	48.58
405	15.64	116.0	75.47	60.3	74.6	65.53	40.53	55.7	41.4	50.47
500	15.20	116.0	82.7	53.6	71.5	72.61	33.3	62.4	44.5	43.39
		Average Temperature Difference					38.95	60.16	48.46	48.01

Comments: The auto joint splices temperatures are found less than the temperature of the control conductor. The auto joint splices **HAS42** for #3 ACSR conductor performance are satisfactory.

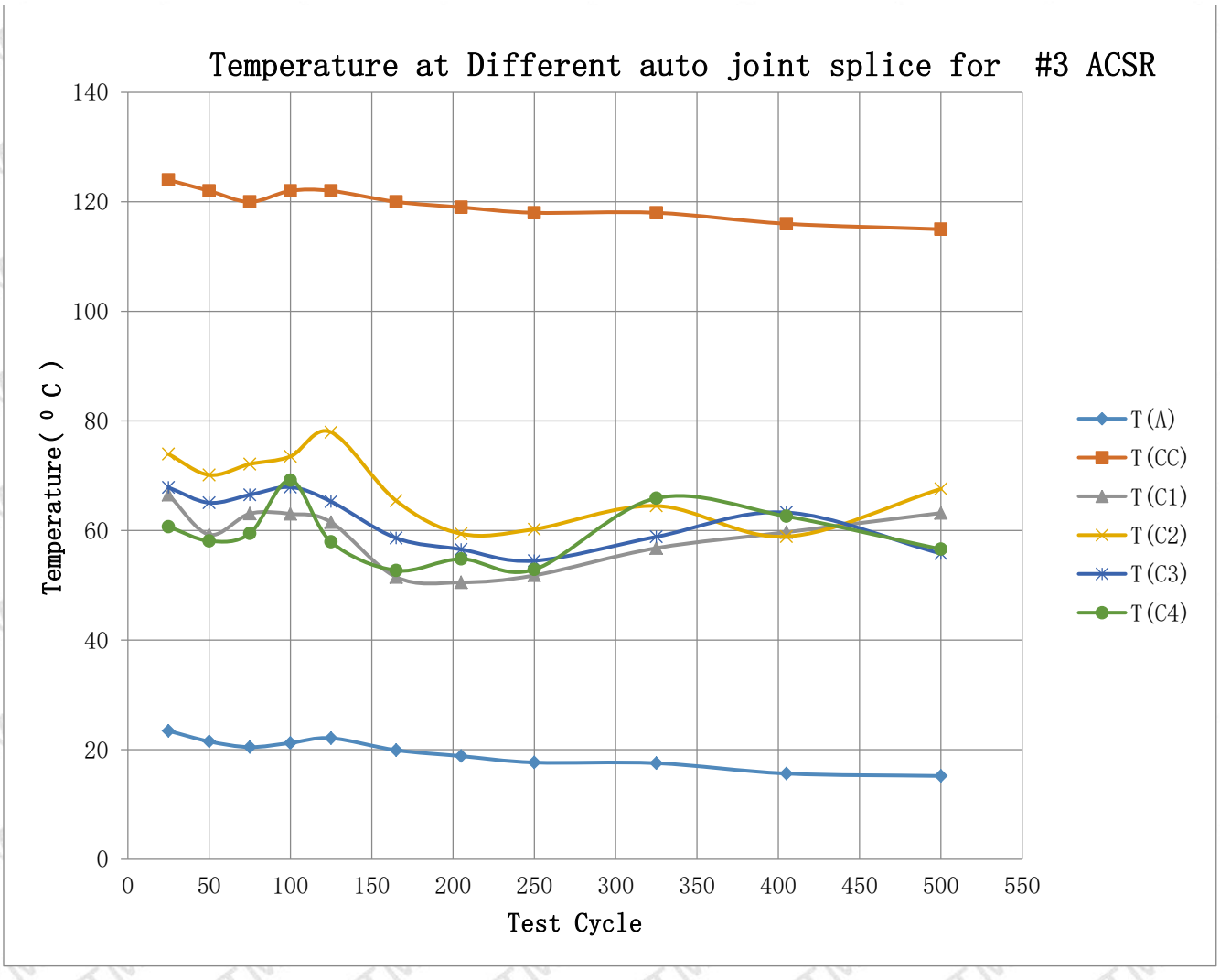


Table 2 Chart

Table 3: Test data of auto joint splices Resistance for Loop 1 with current cycle (1 Hour ON and 1 Hour OFF) and test current of 175A

Cycle Number	Ambient (^{0}C)	Conductor (^{0}C)	Auto joint splices Resistance (Measured) Micro Ohms (μΩ)				Auto joint splices Resistance (Corrected to 20^{0}C)) Micro Ohms (μΩ)			
			C1	C2	C3	C4	C1	C2	C3	C4
0	23.20	23.30	283	282	287.5	286	281.20	280.21	285.67	284.18
25	23.44	124.0	299	295.5	300	300	300.44	296.93	301.45	301.45
50	21.50	122.0	292.75	298.25	283	295.5	294.16	299.69	281.84	294.92
75	20.47	120.0	283	289.75	295	291.25	285.51	292.32	297.62	293.84
100	21.23	122.0	295.25	300.75	290.5	290	295.25	300.75	290.50	290.00
125	22.10	122.0	296.25	295.25	303.5	293.5	294.48	293.49	301.69	291.75
165	19.91	120.0	297.75	298.75	293.75	301	294.45	295.44	390.50	297.67
205	18.83	119.0	292.75	303.25	301	295.75	290.66	301.08	302.81	293.64
250	17.66	118.0	291	293	301.75	290.75	290.65	292.65	301.39	290.40
325	17.54	118.0	301	290.75	303.5	289.5	299.06	288.90	301.57	287.66
405	15.64	116.0	294	291.75	296	292	289.48	287.27	291.45	287.51
500	15.20	116.0	295.75	292.75	285.75	285.75	289.16	286.22	279.38	279.38
Average Resistance							292.04	292.91	293.82	291.03
Minimum Acceptable Resistance							277.44	278.27	279.13	276.48
MaxAllowable Resistance							306.65	307.56	308.51	305.58

Comments: The resistances of auto joint splices remain within maximum and minimum allowable limits throughout the test cycle (refer Table 3). The resistance variations of auto joint splices **HAS42** for #3 ACSR conductor during the heat cycle test are satisfactory.

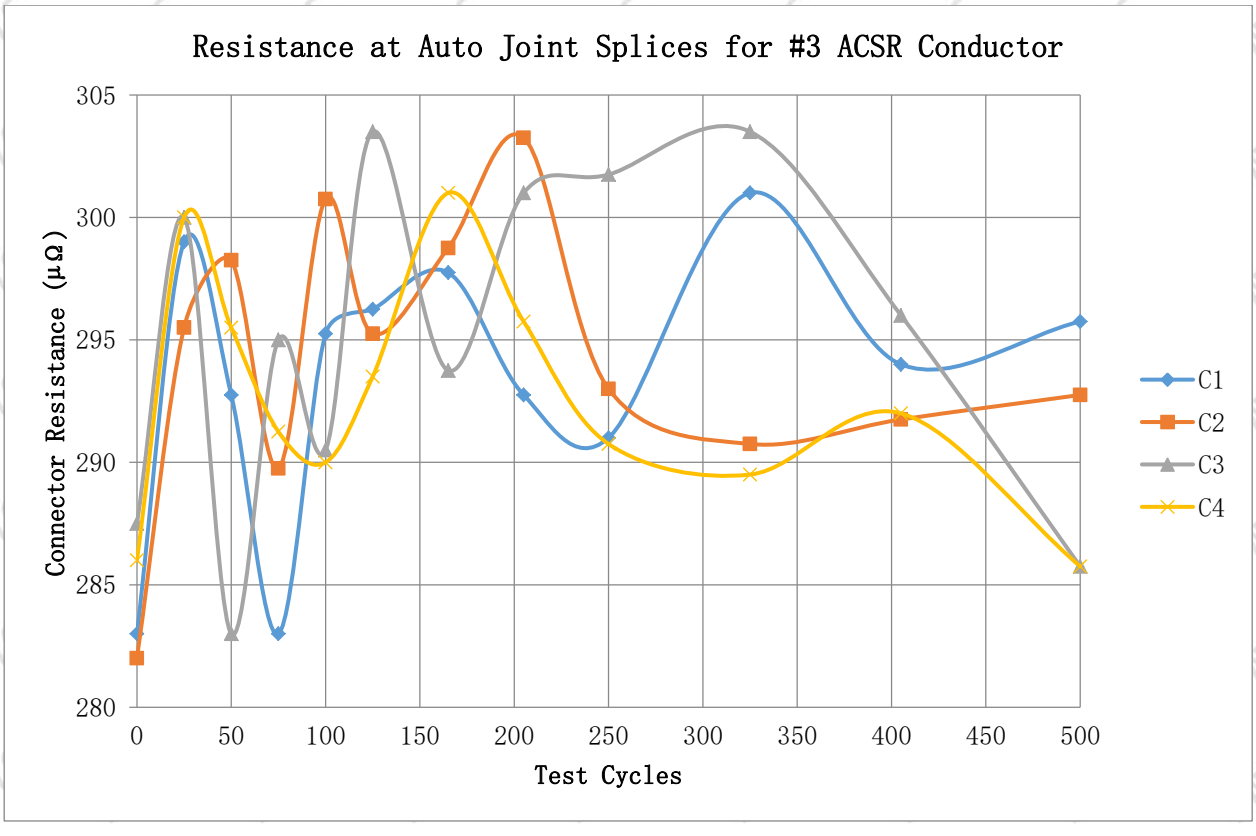


Table 3 Chart

4.2 Loop 2：Test Loop with auto joint splice HAS1020 for 1/0 ACSR

The temperature and resistance values obtained during the tests are shown in Table 4 and Table 5, respectively.

Table 4: Test data of auto joint splices Temperature for loop 2 with current cycle (1 Hour ON and 1 Hour OFF) and test current of 240A

Cycle Number	Ambient (^{0}C)	Control conductor (^{0}C)	Auto joint splices Temperatures (^{0}C)				Temperature Difference (^{0}C)			
			C1	C2	C3	C4	C1	C2	C3	C4
25	23.44	124.0	56.4	70.7	69.9	71.01	67.6	53.3	54.1	52.99
50	21.50	122.0	66.6	67.3	71.6	70.97	55.4	54.7	50.4	51.03
75	20.47	120.0	68.5	61.55	72.7	69.99	51.5	58.45	47.3	50.01
100	21.23	122.0	69.71	60.16	65.49	65.78	52.29	61.84	56.51	56.22
125	22.10	122.0	66.24	62.91	63.66	58.42	55.76	59.09	58.34	63.58
165	19.91	120.0	62.26	56.33	60.08	59.21	57.74	63.67	59.92	60.79
205	18.83	119.0	50.42	50.37	55.1	57.11	68.58	68.63	63.9	61.89
250	17.66	118.0	54.03	50.34	54.99	61.2	63.97	67.66	63.01	56.8
325	17.54	118.0	52.14	47.21	54.9	57.1	65.86	70.79	63.1	60.9
405	15.64	116.0	51.23	49.5	58.94	51.73	64.77	66.5	57.06	64.27
500	15.20	116.0	64.71	56.72	63.57	65.59	50.29	58.28	51.43	49.41
		Average Temperature Difference					59.43	62.08	56.82	57.08

Comments: The auto joint splices temperatures are found less than the temperature of the control conductor. The auto joint splices **HAS1020** for 1/0 ACSR conductor performance are satisfactory.

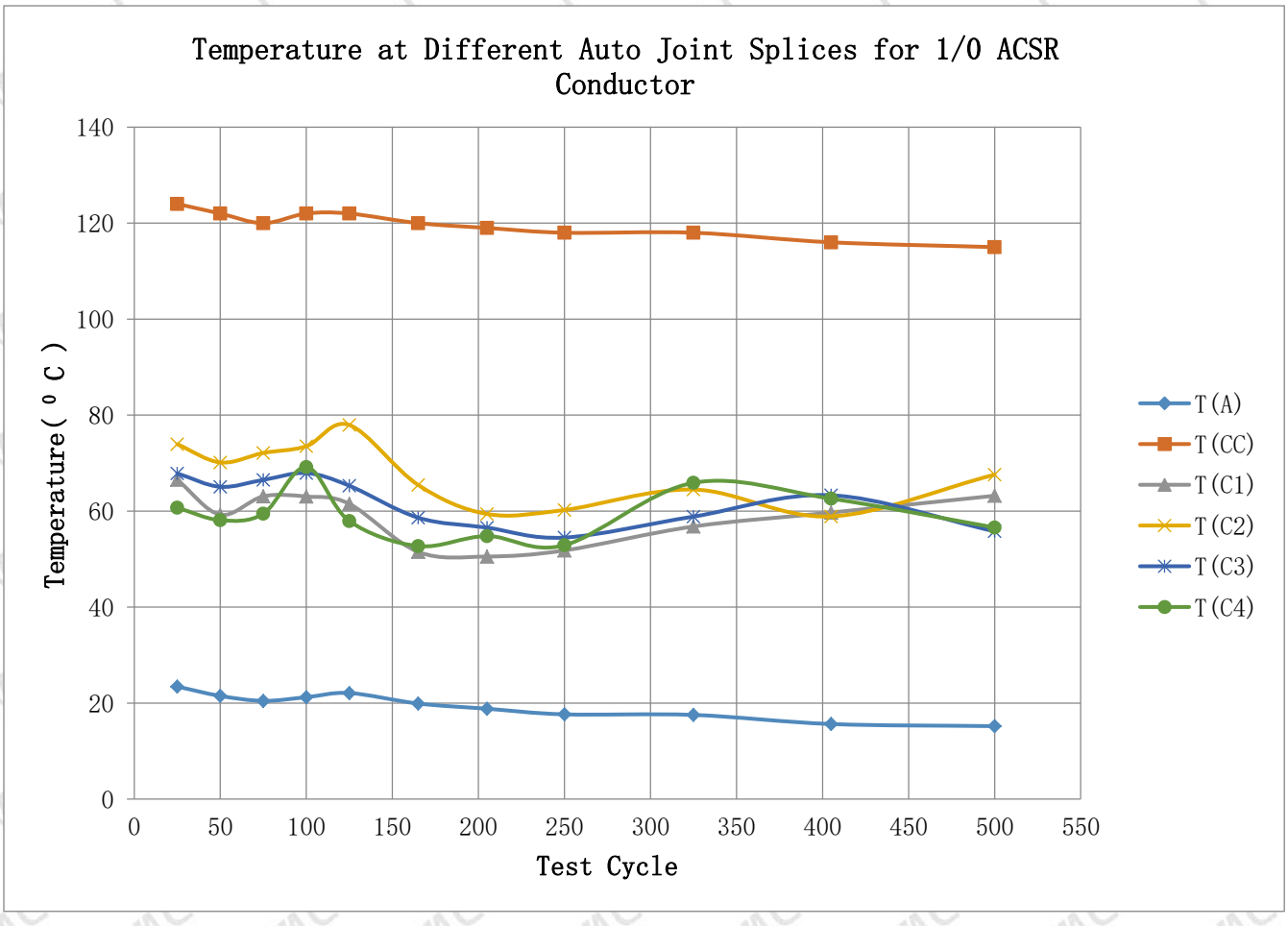


Table 4 Chart

Table 5: Test data of auto joint splices Resistance for Loop 2 with current cycle (1 Hour ON and 1 Hour OFF) and test current of 240A

Cycle Number	Ambient (^{0}C)	Control conductor (^{0}C)	Auto joint splices Resistance (Measured) Micro Ohms (μΩ)				Auto joint splices Resistance (Corrected to 20^0 C) (Micro Ohms (μΩ)			
			C1	C2	C3	C4	C1	C2	C3	C4
0	23.20	23.30	293	292	297	290	291.14	290.14	295.11	288.16
25	23.44	124.0	304.75	315.75	309.25	307.5	306.22	317.27	310.74	308.98
50	21.50	122.0	304	291.25	304	291	305.47	292.65	305.47	292.40
75	20.47	120.0	297.75	307.5	308.25	301.75	300.39	310.23	310.99	304.43
100	21.23	122.0	308	302	313.5	307.5	308.00	302.00	313.50	307.50
125	22.10	122.0	314	312.75	308	312.75	312.13	310.88	306.16	310.44
165	19.91	120.0	299.5	310.25	314.25	298.5	296.18	306.81	310.77	295.19
205	18.83	119.0	309.75	306.5	310.25	309.75	307.54	304.31	308.03	307.54
250	17.66	118.0	310	303.75	312	304.75	309.63	303.39	311.63	304.38
325	17.54	118.0	312.25	308.25	309.5	308	310.26	306.29	307.53	306.04
405	15.64	116.0	304.5	309.5	309.5	312	299.82	304.75	304.75	307.21
500	15.20	116.0	302	302	310	299.5	296.27	295.27	303.09	292.82
Average Resistance							303.50	303.67	307.31	302.13
Minimum Acceptable Resistance							288.33	288.48	291.95	287.02
Max Allowable Resistance							318.68	318.85	322.68	317.24

Comments: The resistances of auto joint splices remain within maximum and minimum allowable limits throughout the test cycle (refer Table 5). The resistance variations of auto joint splices **HAS1020** for 1/0 ACSR conductor during the heat cycle test are satisfactory.

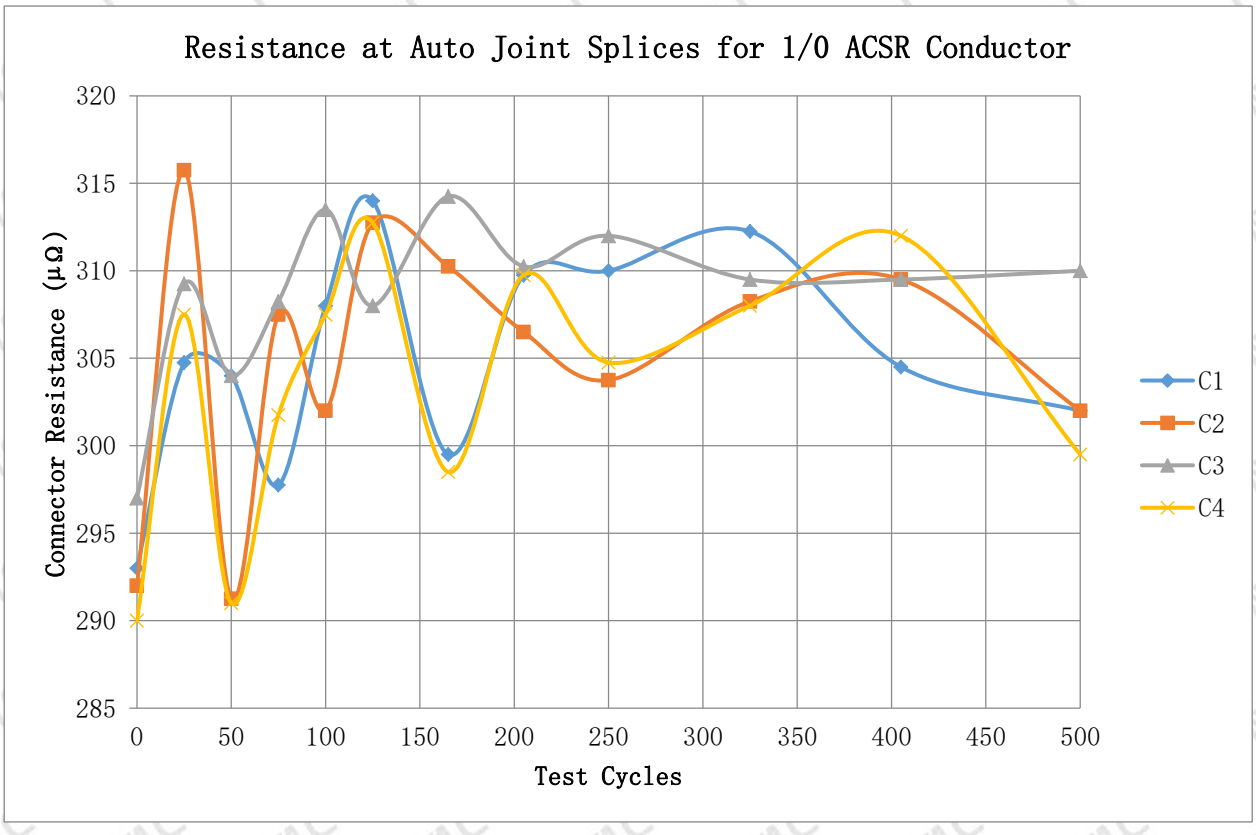


Table 5 Chart

4.3 Loop 3：Test Loop with auto joint splice HAS3040 for 4/0 ACSR

The temperature and resistance values obtained during the tests are shown in Table 6 and Table 7, respectively

Table 6: Test data of auto joint splices Temperature for Loop 3 with current cycle (1 Hour ON and 1 Hour OFF) and test current of 385A.

Cycle Number	Ambient (^{0}C)	Control Conductor (^{0}C)	Auto joint splices Temperatures (^{0}C)				Temperature Difference (^{0}C)			
			C1	C2	C3	C4	C1	C2	C3	C4
25	23.44	124.0	66.54	73.95	67.86	60.7	57.46	50.05	56.14	63.3
50	21.50	122.0	59.25	70.14	65.07	58.11	62.75	51.86	56.93	63.89
75	20.47	120.0	63.08	72.12	66.51	59.46	56.92	47.88	53.49	60.54
100	21.23	122.0	63.04	73.52	67.92	69.17	58.96	48.48	54.08	52.83
125	22.10	122.0	61.51	77.95	65.29	57.93	60.49	44.05	56.71	64.07
165	19.91	120.0	51.51	65.45	58.63	52.71	68.49	54.55	61.37	67.29
205	18.83	119.0	50.54	59.41	56.56	54.8	68.46	59.59	62.44	64.2
250	17.66	118.0	51.81	60.24	54.49	52.9	66.19	57.76	63.51	65.1
325	17.54	118.0	56.8	64.5	58.86	65.9	61.2	53.5	59.14	52.1
405	15.64	116.0	59.7	58.9	63.3	62.6	56.3	57.1	52.7	53.4
500	15.20	116.0	63.2	67.6	55.8	56.59	51.8	47.4	59.2	58.41
		Average Temperature Difference					60.82	52.02	57.79	60.46

Comments: The auto joint splices temperatures are found lesser than the temperature of the control conductor. The auto joint splices **HAS3040** for 4/0 ACSR conductor performance are satisfactory.

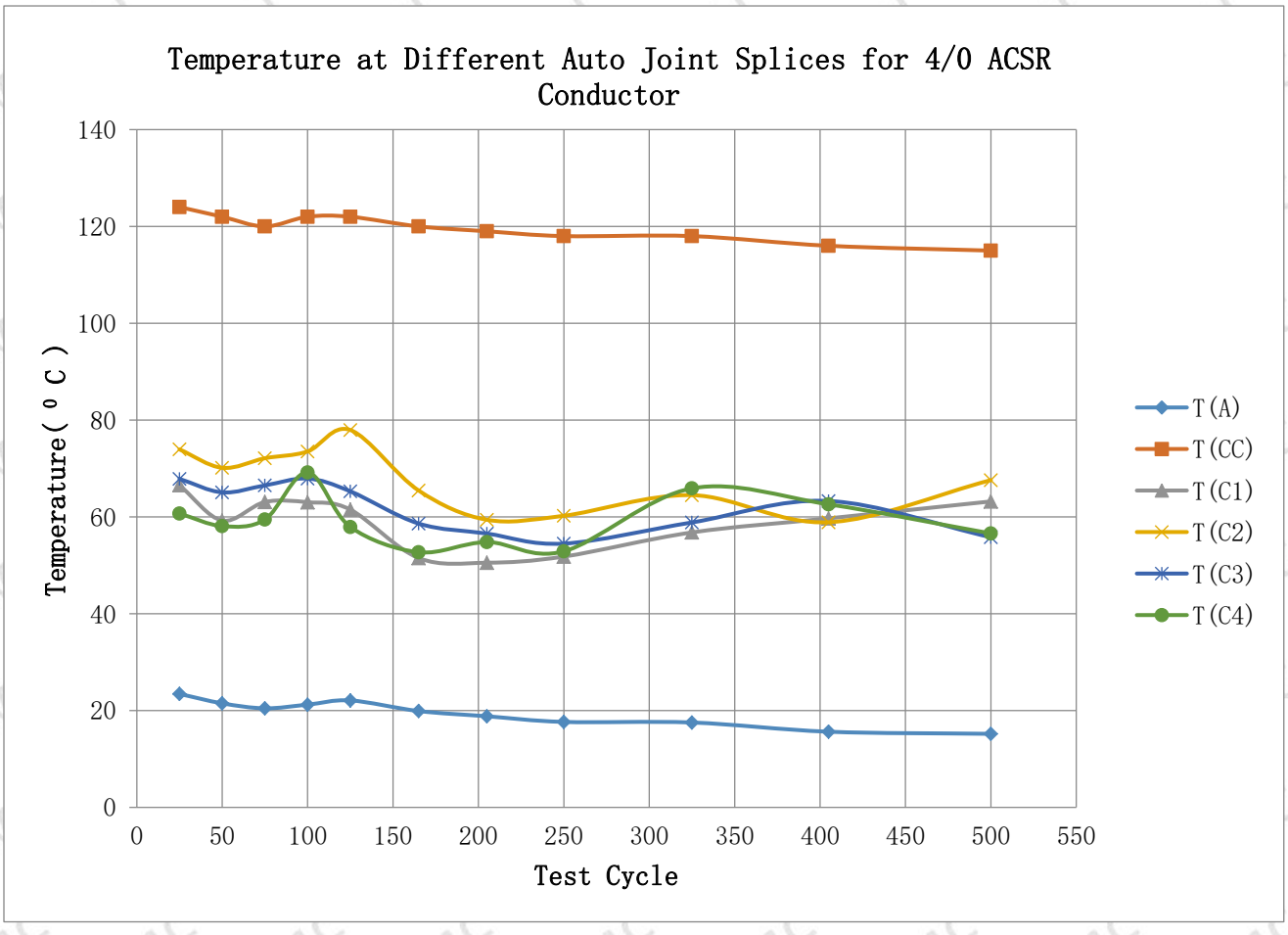


Table 6 Chart

Table 7: Test data of auto joint splices Resistance for Loop 3 with current cycle (1 Hour ON and 1 Hour OFF) and test current of 385A.

Cycle Number	Ambient (^{0}C)	Control conductor (^{0}C)	Auto joint splices Resistance (Measured) Micro Ohms (μΩ)				Auto joint splices Resistance (Corrected to 20^0 C)) Micro Ohms (μΩ)			
			C1	C2	C3	C4	C1	C2	C3	C4
0	23.20	23.30	274.5	293.5	269	271	272.75	291.63	267.29	269.28
25	23.44	124.0	289.25	291.75	287.25	279.25	290.65	293.16	288.64	280.60
50	21.50	122.0	271.25	266	284.5	277.25	272.56	267.28	285.87	278.59
75	20.47	120.0	288.25	281.25	286.25	284.25	290.81	283.75	288.79	286.77
100	21.23	122.0	280.5	288.5	279.25	274.5	280.50	288.50	279.25	274.50
125	22.10	122.0	285.25	294.5	285.75	289.25	283.55	292.74	284.05	287.52
165	19.91	120.0	290.5	286.75	274	280	287.28	283.57	270.97	276.90
205	18.83	119.0	285	293.75	287	287	282.96	291.65	284.95	284.95
250	17.66	118.0	287	294	289.75	285	286.66	293.65	289.40	284.65
325	17.54	118.0	287	288.5	282.75	286.75	285.17	286.67	280.95	284.93
405	15.64	116.0	287.75	285.5	280.75	280.5	283.33	281.11	276.44	276.19
500	15.20	116.0	299	288.75	278.75	285	292.33	282.31	272.54	278.65
Average Resistance							284.05	286.34	280.76	280.29
Minimum Acceptable Resistance							269.84	272.02	266.72	266.28
Max Allowable Resistance							298.25	300.65	294.80	294.31

Comments: The resistances of auto joint splices remain within maximum and minimum allowable limits throughout the test cycle (refer Table 7). The resistance variations of auto joint splices **HAS3040** for 4/0 ACSR conductor during the heat cycle test are satisfactory.

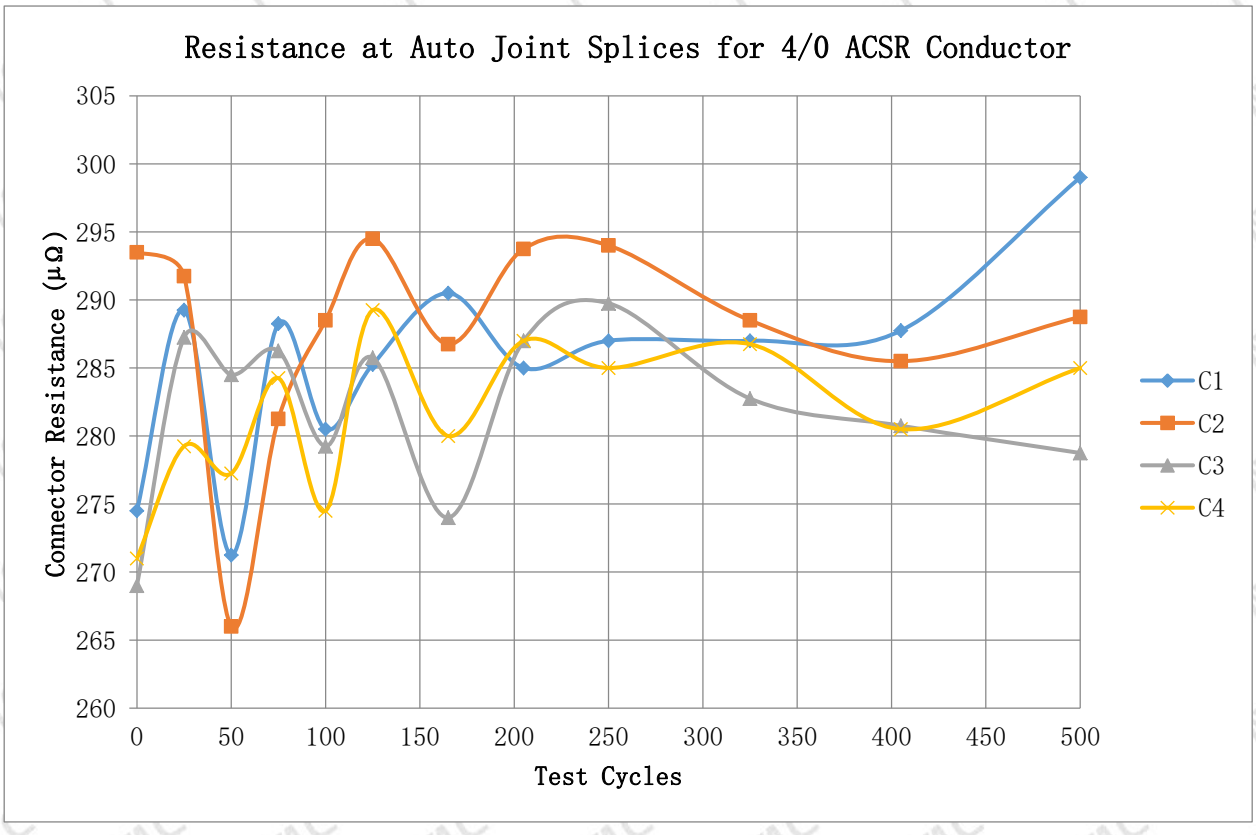


Table 7 Chart

4.4 Loop 4: Test Loop with auto joint splice HAS477 for #477 MCM ACSR

The temperature and resistance values obtained during the tests are shown in Table 8 and Table 9, respectively

Table 8: Test data of auto joint splices Temperature for Loop 4 with current cycle (1.5 Hour ON and 1.5 Hour OFF) and test current of 700A.

Cycle Number	Ambient (^{0}C)	Control Conductor (^{0}C)	Auto joint splices Temperatures (^{0}C)				Temperature Difference (^{0}C)			
			C1	C2	C3	C4	C1	C2	C3	C4
25	22.00	122.00	88.3	92.0	90.2	95.6	33.7	30.0	31.8	26.4
50	21.50	122.00	86.2	89.5	87.1	92.2	35.8	32.5	34.9	29.8
75	22.50	123.00	87.5	91.8	88.2	92.5	35.5	31.2	34.8	30.5
100	21.00	121.00	88.2	92.1	89.8	92.3	32.8	28.9	31.2	28.7
125	20.50	121.00	92.1	92.9	93.3	86.1	28.9	28.1	27.7	34.9
165	22.00	122.00	93.2	92.5	88.0	87.4	28.8	29.5	34.0	34.6
205	23.00	123.00	91.8	92.2	93.2	95.0	31.2	30.8	29.8	28.0
250	22.70	123.00	92.3	91.9	89.6	93.2	30.7	31.1	33.4	29.8
325	23.30	124.00	91.6	92.1	90.7	89.9	32.4	31.9	33.3	34.1
405	23.00	123.00	90.5	89.8	92.2	91.5	32.5	33.2	30.8	31.5
500	22.50	123.00	89.3	92.4	90.0	92.8	33.7	30.6	33.0	30.2
		Average Temperature Difference					**32.3**	**30.7**	**32.2**	**30.7**

Comments: The auto joint splices temperatures are found less than the temperature of the control conductor. The performance of auto joint splices **HAS477** for # 477 MCM ACSR conductors are satisfactory.

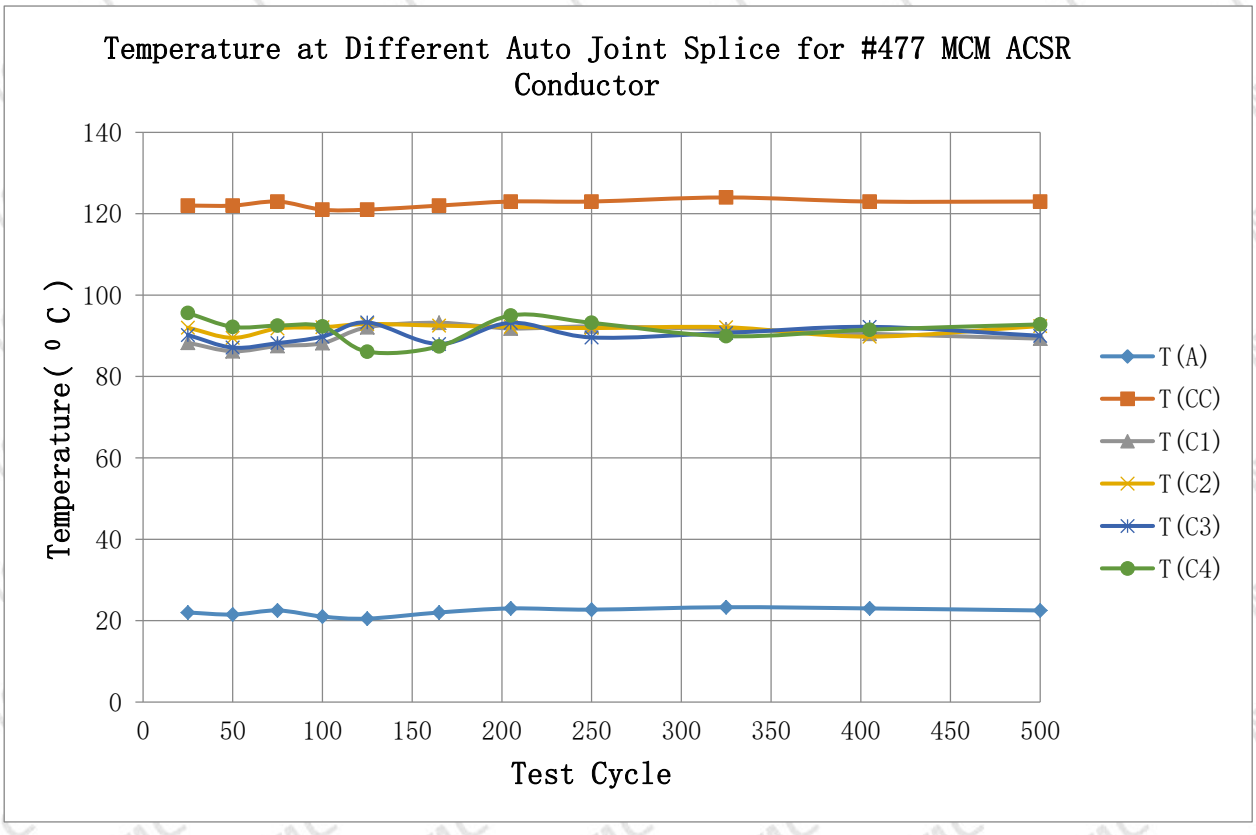


Table 8 Chart

Table 9: Test data of auto joint splices Resistance with current cycle (1.5 Hour ON and 1.5 Hour OFF) and test current of 700A

Cycle Number	Ambient (^{0}C)	Control conductor (^{0}C)	Auto joint splices Resistance (Measured) Micro Ohms (μΩ)				Auto joint splices Resistance (Corrected to 20^0 C)) Micro Ohms (μΩ)			
			C1	C2	C3	C4	C1	C2	C3	C4
0	20.8	21.0	210.3	209.9	202.5	191.2	201.359	201.024	193.871	183.118
25	21.50	122.0	209.3	208.5	210.2	210.3	199.106	198.364	200.010	200.096
50	22.50	123.0	207.7	210.2	207.7	210.2	197.701	200.110	197.682	200.081
75	21.00	121.4	209.0	208.7	209.1	207.2	200.223	199.964	200.290	198.518
100	20.50	121.0	208.1	210.0	208.9	208.1	198.002	199.782	198.735	198.031
125	22.00	122.0	207.3	208.4	208.6	208.3	197.587	198.665	198.835	198.531
165	23.00	123.0	208.4	209.6	206.1	210.1	197.841	198.961	198.534	199.445
205	22.70	123.0	209.4	209.3	208.3	209.4	199.239	199.154	198.231	199.277
250	23.30	124.0	208.1	208.5	208.9	210.3	199.701	198.660	197.680	198.525
325	23.00	124.0	207.3	210.2	206.1	207.2	199.095	199.825	198.800	199.345
405	22.50	123.0	209.3	208.4	209.1	208.3	197.587	200.367	198.325	200.081
500	21.50	122.0	209.0	209.6	208.3	210.1	199.239	199.456	200.850	198.125
Average Resistance							**198.9**	**199.5**	**198.4**	**197.7**
Minimum Acceptable Resistance							**188.9**	**189.5**	**188.4**	**187.7**
Max Allowable Resistance							**208.9**	**209.5**	**208.4**	**207.7**

Comments: The resistances of auto joint splices remain within maximum and minimum allowable limits throughout the test cycle (refer Table 3). The resistance variations of auto joint splices **HAS477** for #477 MCM ACSR Conductor during the heat cycle test are satisfactory.

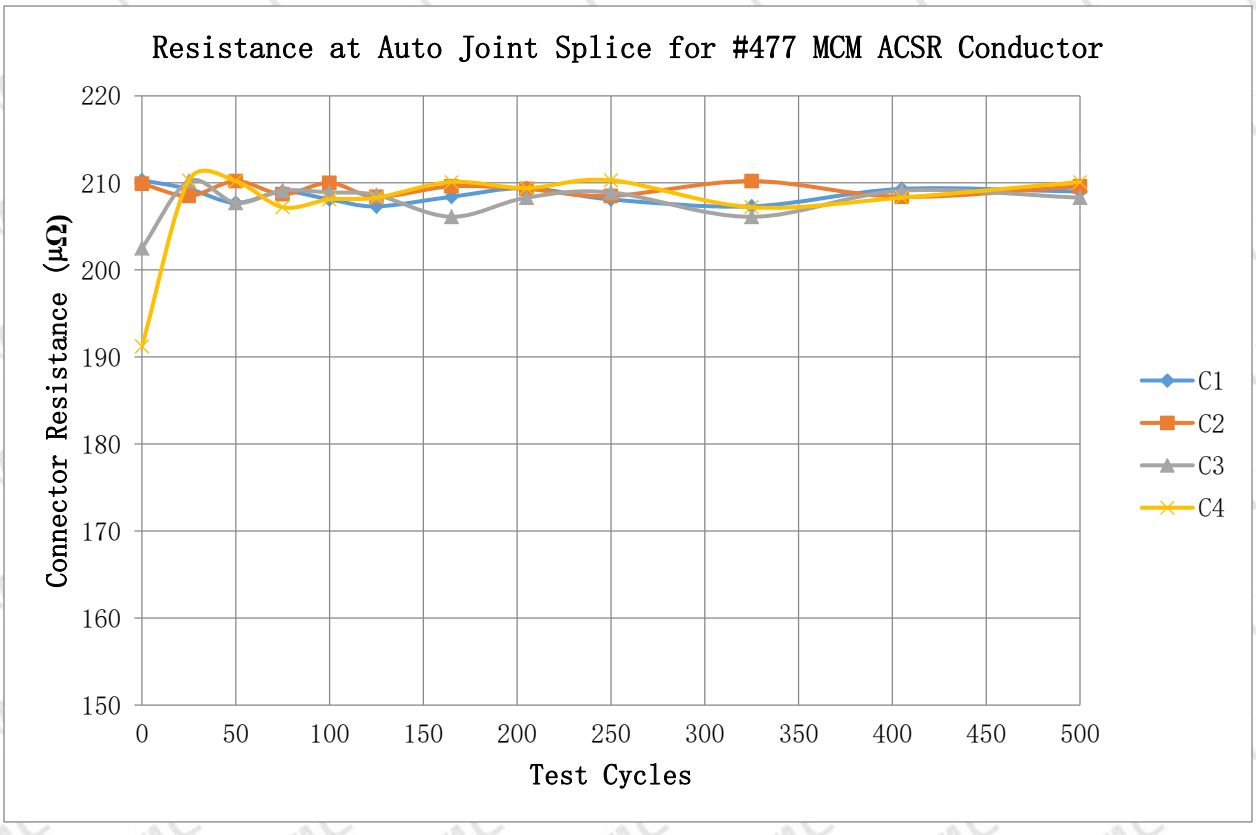


Table 9 Chart

4.5 Loop 5：Test Loop with Compression Sleeve HAS636 for #636 MCM ACSR Conductor

The temperature and resistance values obtained during the tests are shown in Table 10 and Table 11, respectively

Table 10: Test data of Compression Sleeve Temperature for Loop 5 with current cycle (1.5 Hour ON and 1.5 Hour OFF) and test current of 825A.

Cycle Number	Ambient (^{0}C)	Control Conductor (^{0}C)	Auto joint splices Temperatures (^{0}C)				Temperature Difference (^{0}C)			
			C1	C2	C3	C4	C1	C2	C3	C4
25	22.0	123.0	73.4	73.95	65.5	60.7	49.6	49.05	57.5	62.3
50	23.0	123.0	69.25	70.14	63.7	58.1	53.75	52.86	59.3	64.9
75	22.5	122.0	68.5	72.12	66.5	59.5	53.5	49.88	55.5	62.5
100	21.9	122.0	65.1	73.52	68.9	69.2	56.9	48.48	53.1	52.8
125	22.1	122.0	68.2	77.95	65.3	55.9	53.8	44.05	56.7	66.1
165	21.5	122.0	59.3	65.45	58.5	52.7	62.7	56.55	63.5	69.3
205	20.9	121.0	61.5	59.41	56.4	48.3	59.5	61.59	64.6	72.7
250	20.5	121.0	58.7	60.24	55.2	51.2	62.3	60.76	65.8	69.8
325	19.8	120.0	60.5	63.5	58.8	48.5	59.5	56.5	61.2	71.5
405	19.7	121.0	68.5	73.6	62.1	58.9	52.5	47.4	58.9	62.1
500	19.5	120.0	65.2	69.5	59.4	63.4	54.8	50.5	60.6	56.6
		Average Temperature Difference					56.25	52.51	59.7	64.6

Comments: The Compression Sleeves temperatures are found less than the temperature of the control conductor. The performance of Compression Sleeves **HAS636** for # 636 MCM ACSR conductors are satisfactory.

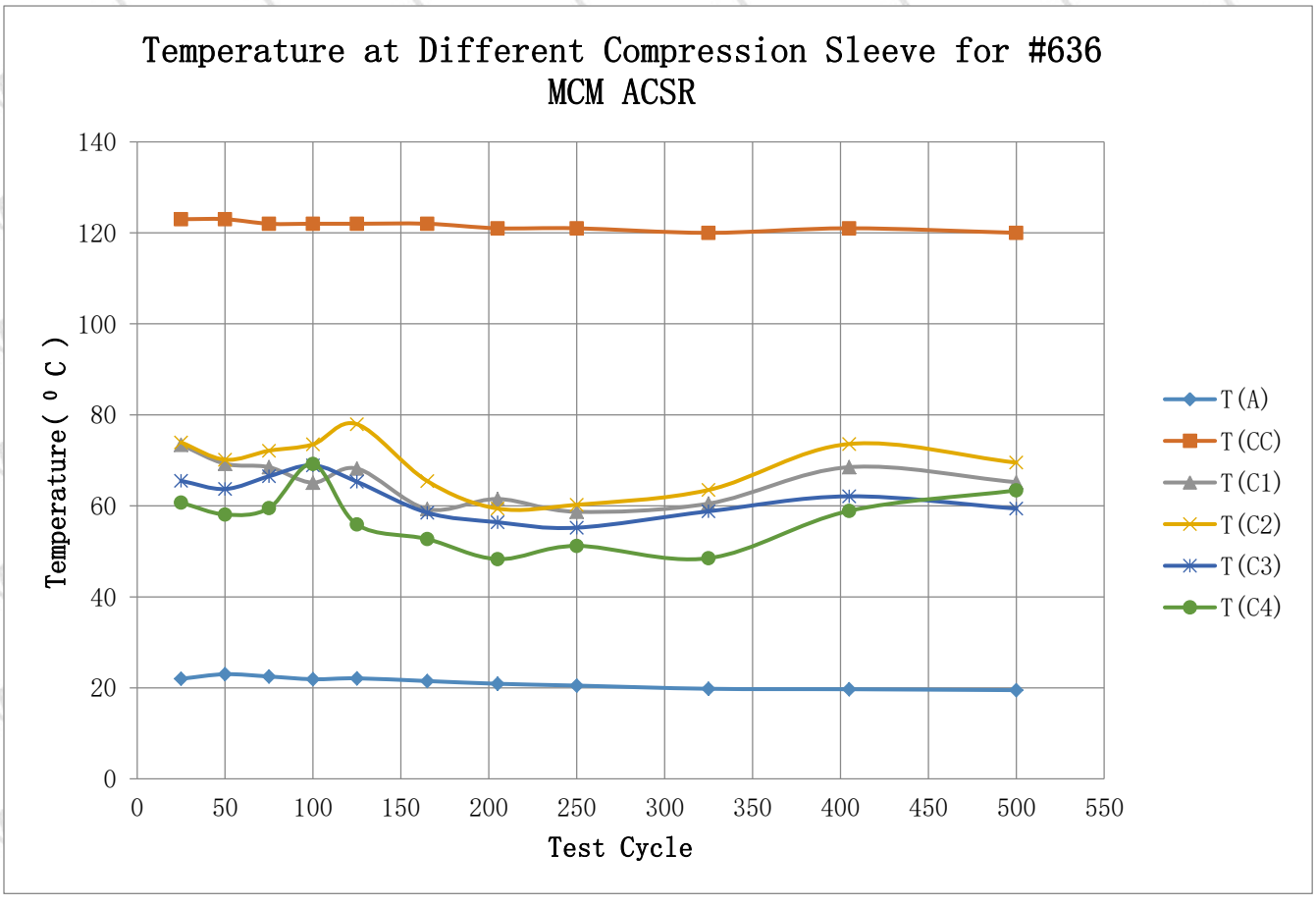


Table 10 Chart

Table 11: Test data of Compression Sleeve Resistance with current cycle (1.5 Hour ON and 1.5 Hour OFF) and test current of 825A

Cycle Number	Ambient (^{0}C)	Control conductor (^{0}C)	Auto joint splices Resistance (Measured) Micro Ohms (μΩ)				Auto joint splices Resistance (Corrected to 20^0 C)) Micro Ohms (μΩ)			
			C1	C2	C3	C4	C1	C2	C3	C4
0	20.8	21.0	208.3	211.9	201.9	192.2	201.359	201.024	193.871	183.118
25	22.0	123.0	211.3	207.5	211.2	209.3	199.106	198.364	200.010	200.096
50	23.0	123.0	208.7	209.2	206.9	210.1	197.701	200.110	197.682	200.081
75	22.5	122.0	210.1	209.7	208.7	209.2	200.223	199.964	200.290	198.518
100	21.9	122.0	209.1	211.3	209.1	207.9	198.002	199.782	198.735	198.031
125	22.1	122.0	206.3	210.4	208.2	208.3	197.587	198.665	198.835	198.531
165	21.5	122.0	208.4	209.6	206.9	207.1	197.841	198.961	198.534	199.445
205	20.9	121.0	209.4	207.3	207.3	209.4	199.239	199.154	198.231	199.277
250	20.5	121.0	210.3	208.5	210.1	210.3	199.701	198.660	197.680	198.525
325	19.8	120.0	208.3	211.2	207.3	207.2	199.095	199.825	198.800	199.345
405	19.7	121.0	209.3	209.4	208.9	208.3	197.587	200.367	198.325	200.081
500	19.5	120.0	211.2	208.8	209.2	211.1	199.239	199.456	200.850	198.125
Average Resistance							**198.9**	**199.5**	**198.4**	**197.7**
Minimum Acceptable Resistance							**188.9**	**189.5**	**188.4**	**187.7**
Max Allowable Resistance							**208.9**	**209.5**	**208.4**	**207.7**

Comments: The resistances of Compression Sleeve remain within maximum and minimum allowable limits throughout the test cycle (refer Table 11). The resistance variations of Compression Sleeves **HAS636** for #636 MCM ACSR Conductor during the heat cycle test are satisfactory.

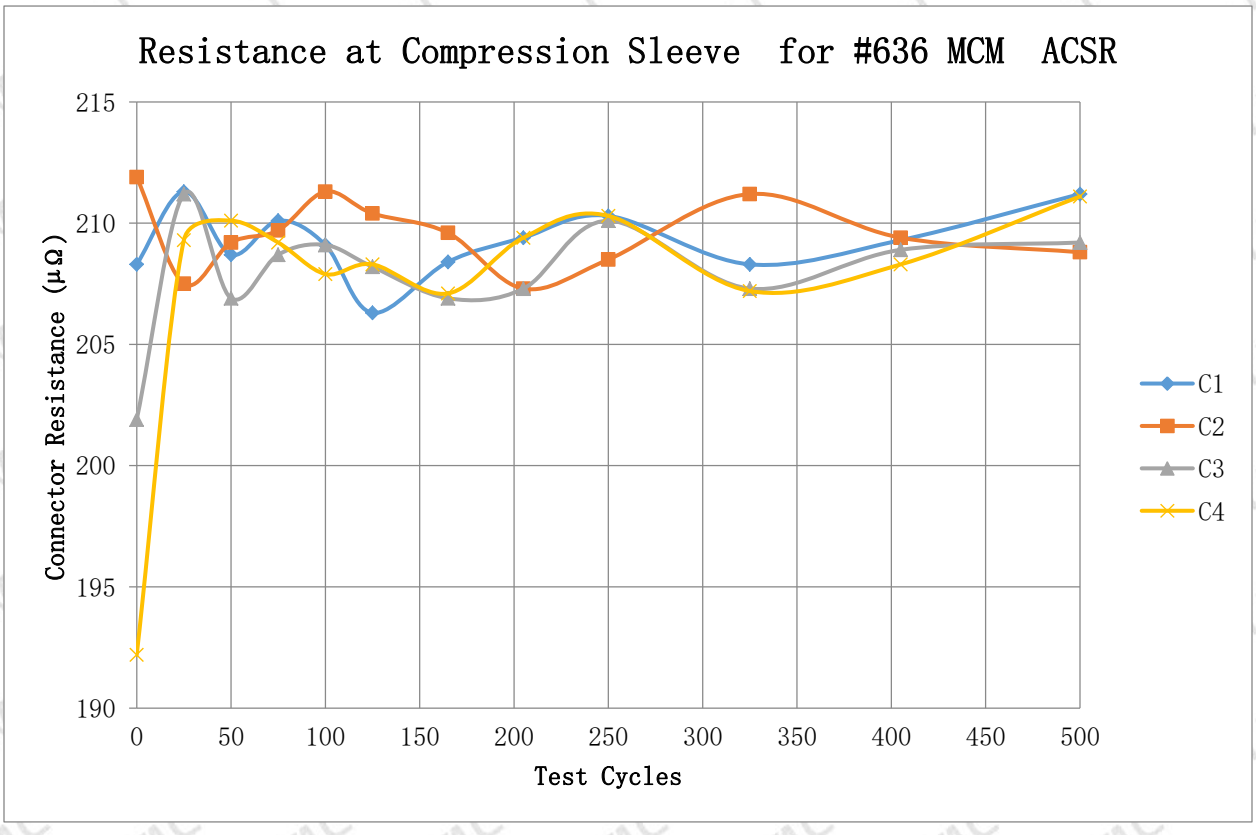


Table 11 Chart

5.0 Summary of Heat Cycle Testing

There was no evidence of physical damage to the test specimens after 500 heat cycles. The temperatures of the specimens did not exceed the temperature of the control conductor and the temperature difference between the control conductor and the specimens was stable between the 25th cycle and the 500th cycle for #3 ACSR HAS42, 1/0 ACSR HAS1020 & 4/0 ACSR HAS3040, #477 MCM ACSR HAS477 & # 636 MCM ACSR HAS636 conductor. Stability was achieved when the temperature difference between the control conductor and the specimen, including allowance for measurement error, is not more than 10℃ from the average of the measured temperature differences. The resistances of all specimens remain within 5% maximum and minimum allowable limits throughout the test cycle. The performances of samples for #3 ACSR HAS42, 1/0 ACSR HAS1020 & 4/0 ACSR HAS3040, #477 MCM ACSR HAS477 & # 636 MCM ACSR HAS636 conductor are satisfactory.

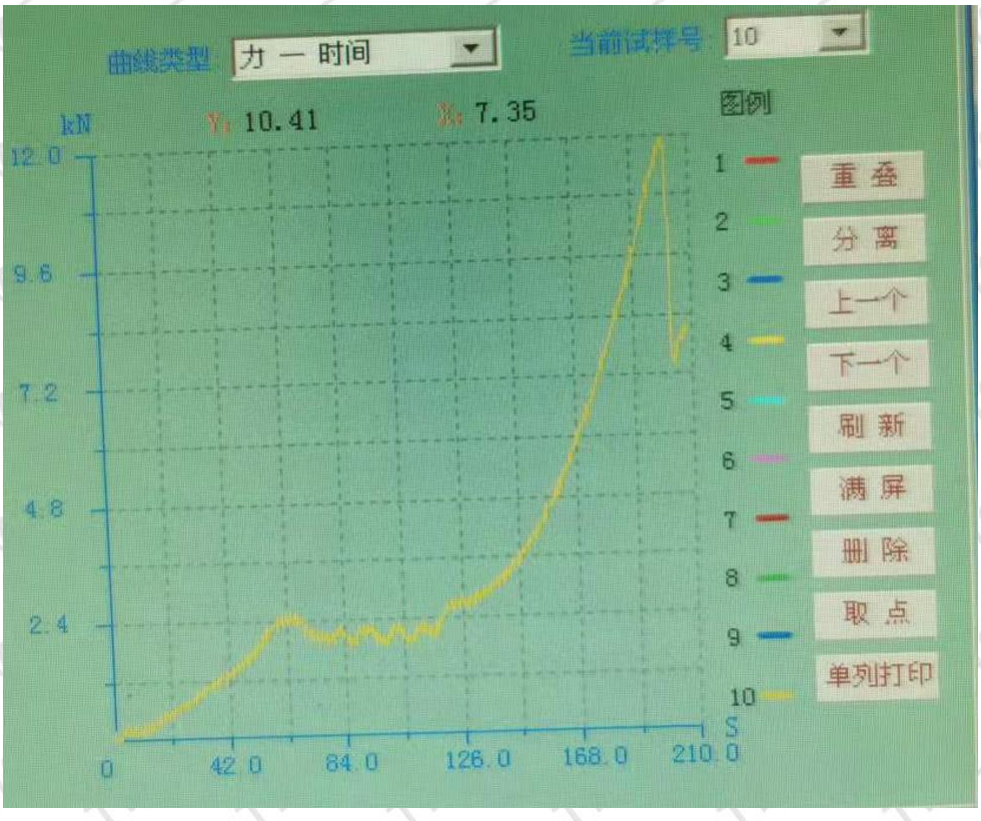
Mechanical of Automatic Tension Joint Splices

SUSTAINED LOAD TEST OF AUTO-JOINT SPLICE
Standard Used: ANSIC-119.4 & NEMA CC-3

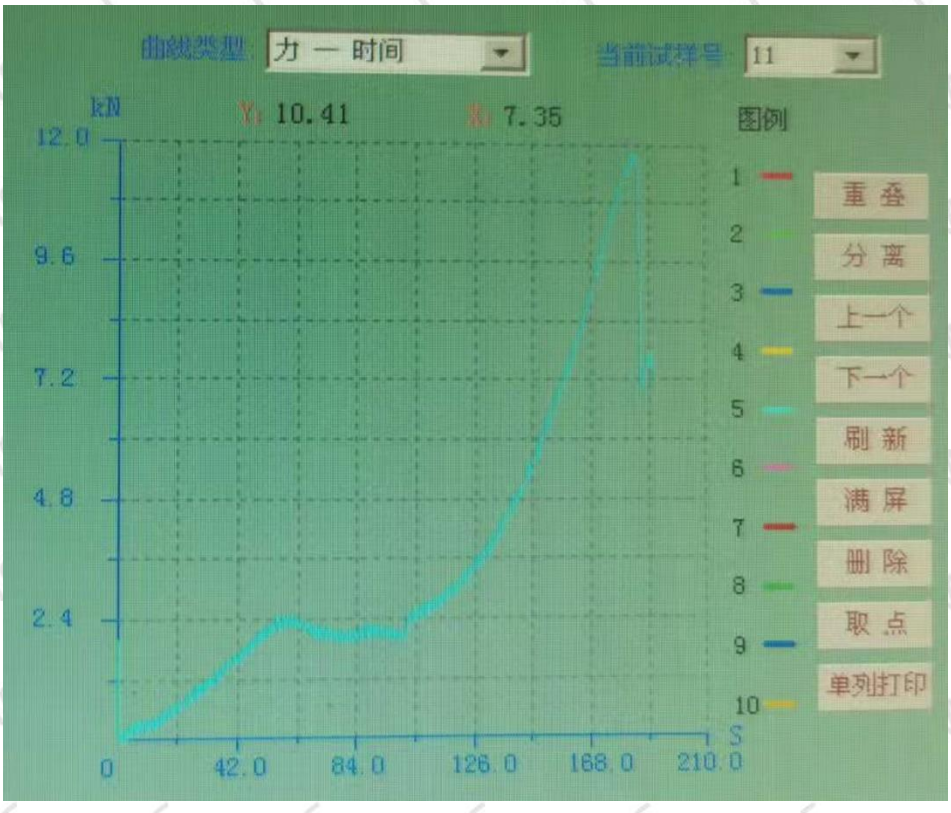
Type of Test	Material Tested	Conductor Dia (mm)	Nominal Breaking Load (kN)	Sustained Load (kN) (77% + - 2% of Nominal Breaking Load)	No. of Specimen Tested	Duration of Test (Hours)	Observation
Class-1: Full Tension	Auto Joint Splice for # 3 ACSR Conductor	7.17	10.21	7.66-8.07	3	168	No Slippage has been Observed in the Auto-Joint Splices during the Test
	Auto Joint Splice for 1/0 ACSR Conductor	10.11	19.35	14.51-15.29	3	168	No Slippage has been Observed in the Auto-Joint Splices during the Test
	Auto Joint Splice for 4/0 ACSR Conductor	14.31	36.54	27.40-28.87	3	168	No Slippage has been Observed in the Auto-Joint Splices during the Test
	Auto Joint Splice for #477 MCM ACSR Conductor	21.80	86.73	6983-6630	3	168	No Slippage has been Observed in the Auto-Joint Splices during the Test
	Compression Sleeve for # 636 MCM ACSR Conductor	25.15	111.90	83.93-88.40	3	168	No Slippage has been Observed in the Compression Sleeved during the Test

MAXIMUM TENSILE LOAD TEST OF AUTO-JOINT SPLICE
Standard Used: ANSIC-119.4 & NEMACC-3

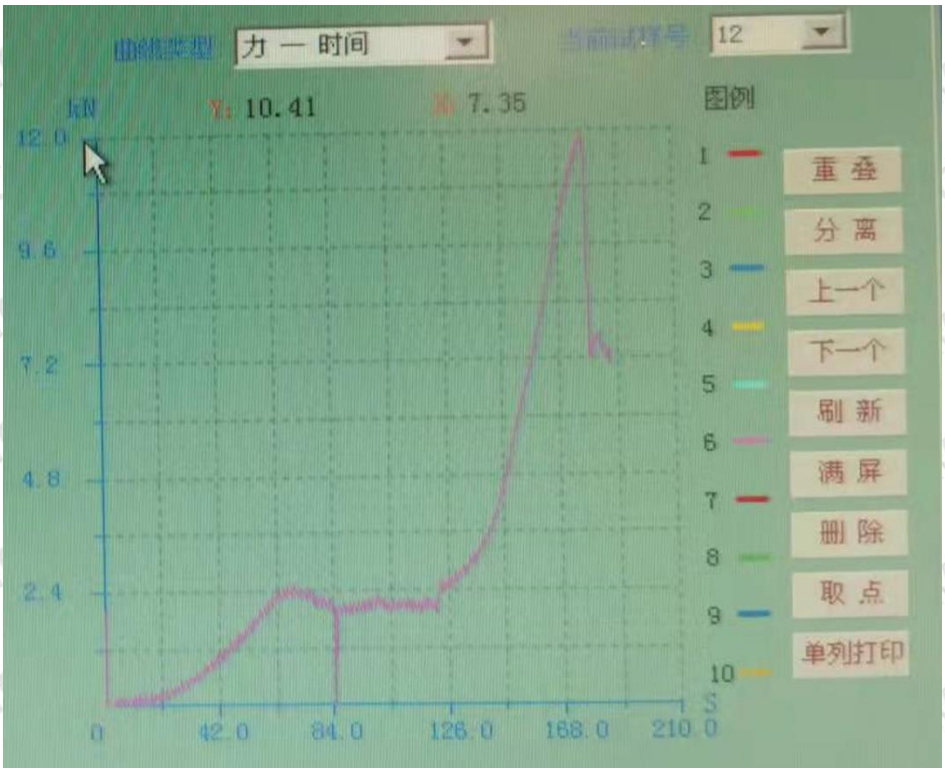
Type of Test	Material Tested	Conductor Dia (mm)	Specimen No.	Ultimate Strength (kN)	Average Load (kN)	Comment
Tensile Strength	Auto Joint Splice for # 3 ACSR Conductor	7.17	1	11.63	11.68	No failure has been observed in the Splices region
			2	11.72		
			3	11.69		



Maximum Load test of #3 ACSR conductor Chart 1

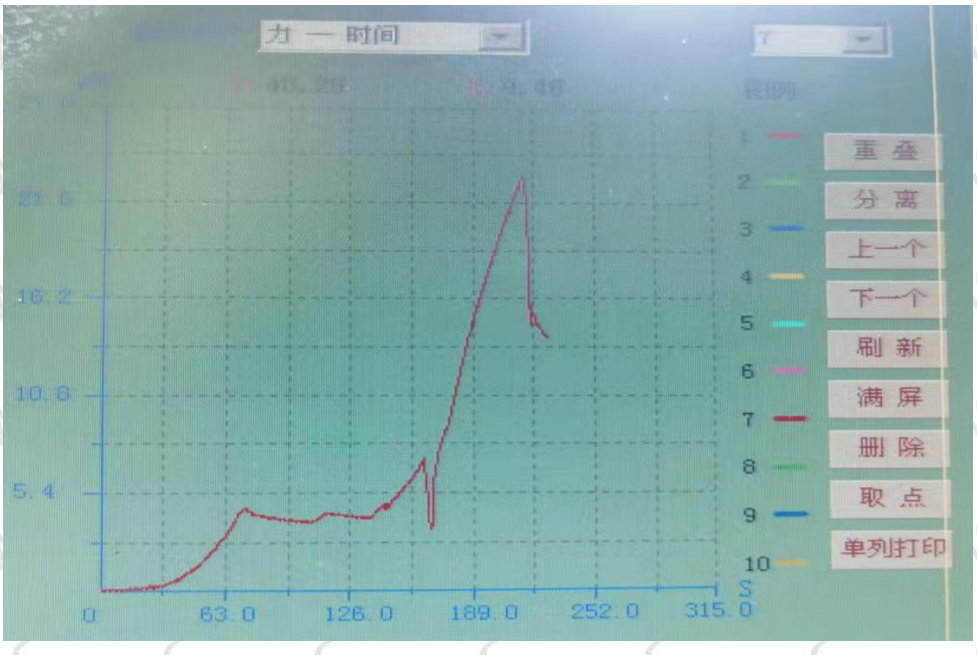


Maximum Load test of #3 ACSR conductor Chart 2

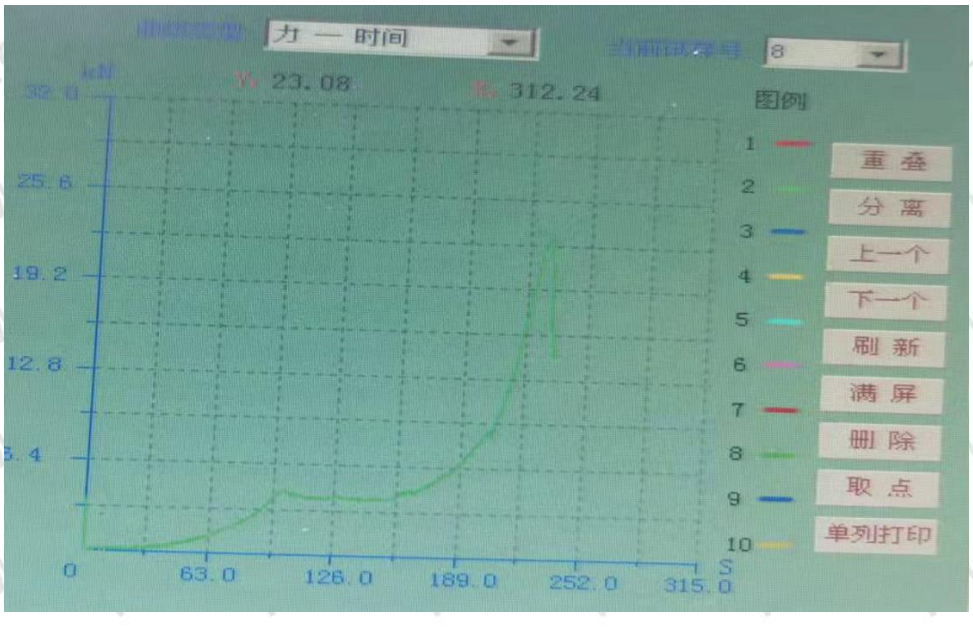


Maximum Load test of #3 ACSR conductor Chart 3

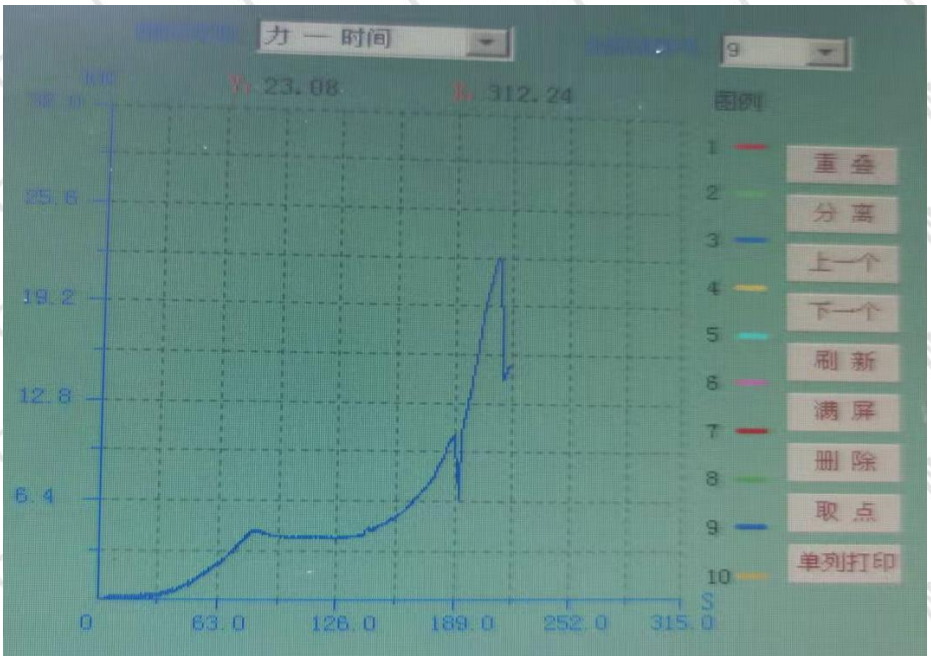
Type of Test	Material Tested	Conductor Dia (mm)	Specimen No.	Ultimate Strength (kN)	Average Load (kN)	Comment
Tensile Strength	Auto Joint Splice for 1/0 ACSR Conductor	10.11	1	20.65	20.59	No failure has been observed in the Splices region
			2	20.93		
			3	20.18		



Maximum Load test of #1/0 ACSR conductor Chart 1

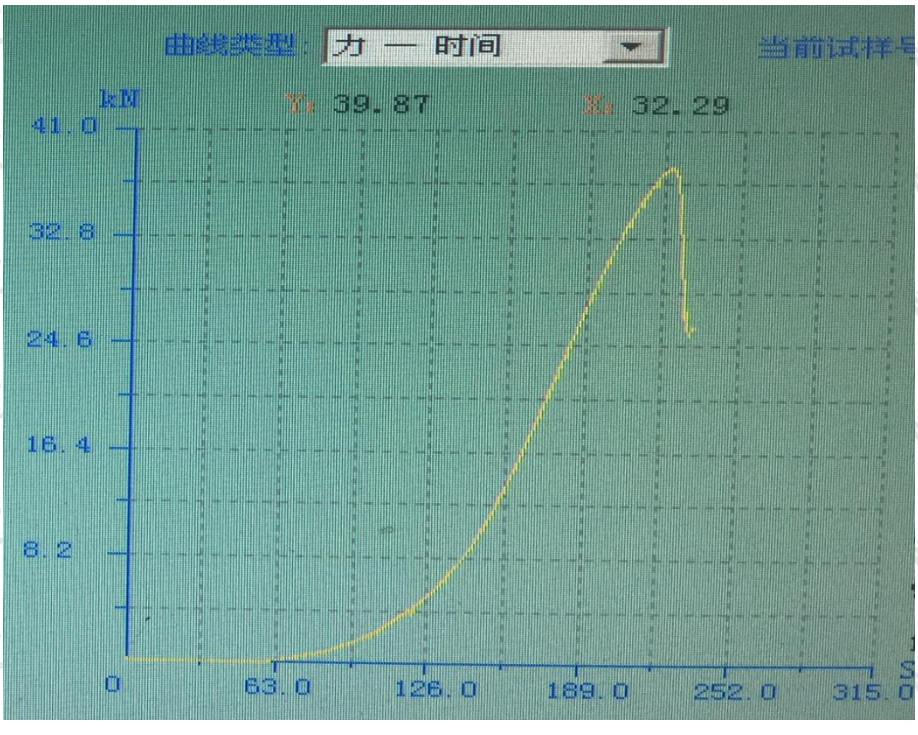


Maximum Load test of #1/0 ACSR conductor Chart 2

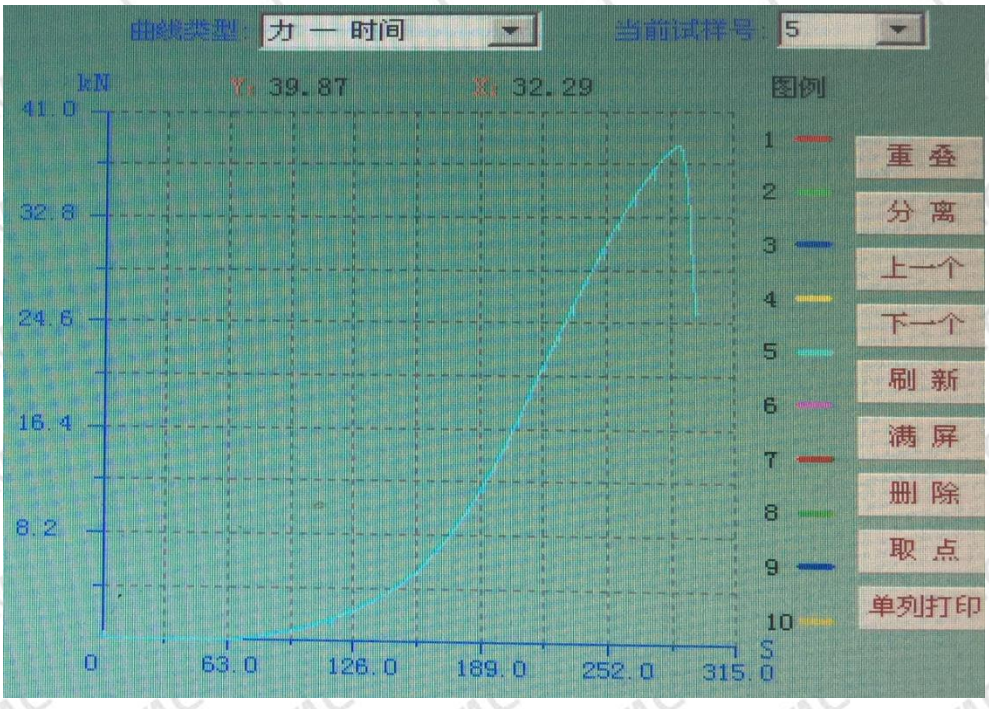


Maximum Load test of #1/0 ACSR conductor Chart 3

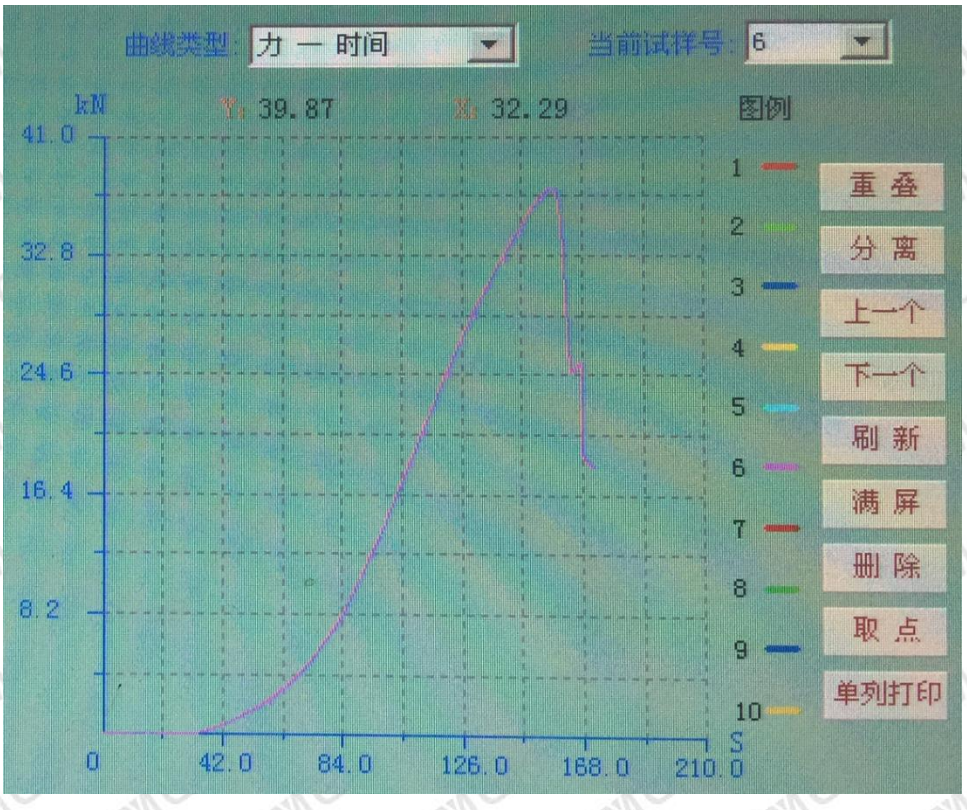
Type of Test	Material Tested	Conductor Dia (mm)	Specimen No.	Ultimate Strength (kN)	Average Load (kN)	Comment
Tensile Strength	Auto Joint Splice for 4/0 ACSR Conductor	14.31	1	38.78	38.81	No failure has been observed in the Splices region
			2	39.53		
			3	38.12		



Maximum Load test of #4/0 ACSR conductor Chart 1

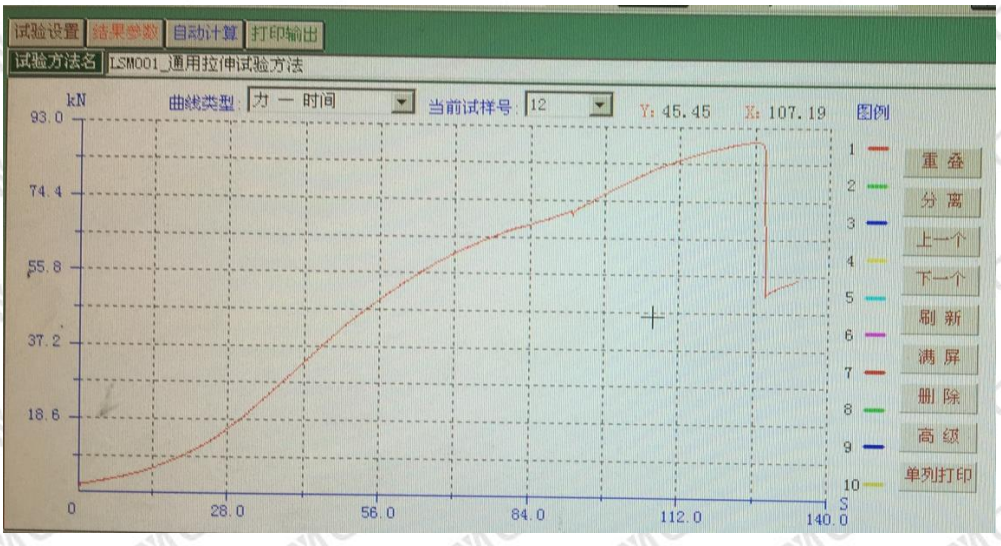


Maximum Load test of #4/0 ACSR conductor Chart 2

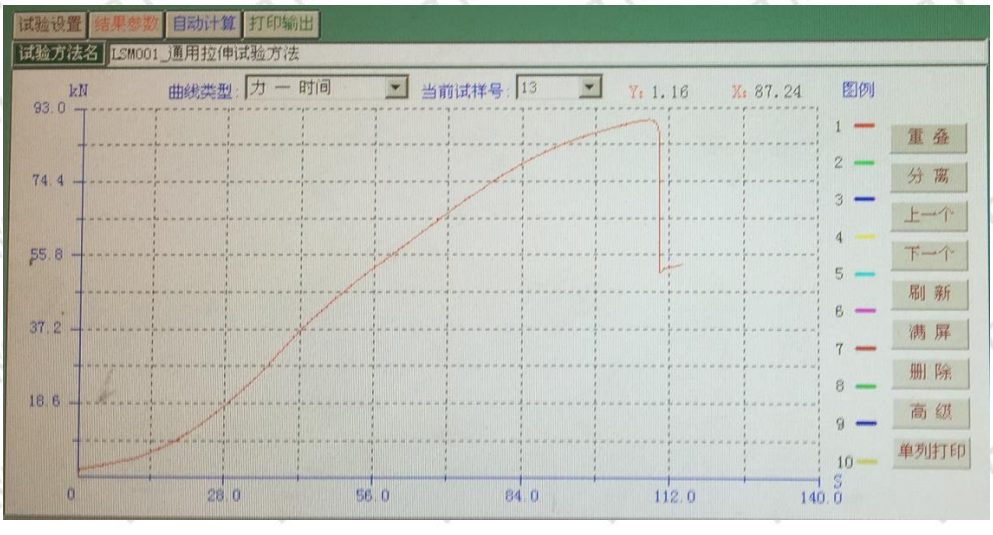


Maximum Load test of #4/0 ACSR conductor Chart 3

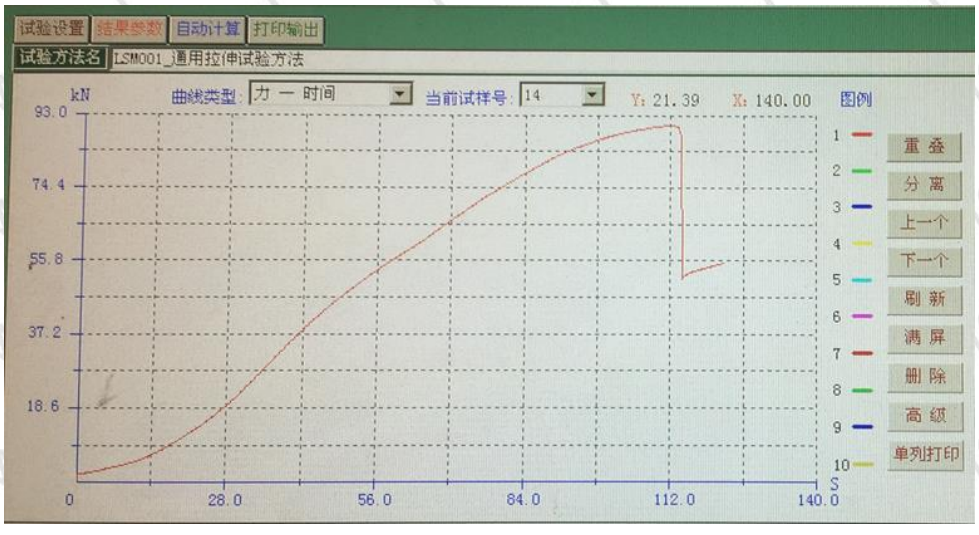
Type of Test	Material Tested	Conductor Dia (mm)	Specimen No.	Ultimate Strength (kN)	Average Load (kN)	Comment
Tensile Strength	Auto Joint Splice for #477 MCM ACSR Conductor	21.80	1	89.35	89.90	No failure has been observed in the Splices region
			2	89.96		
			3	90.40		



Maximum Load test of #477 MCM ACSR conductor Chart 1



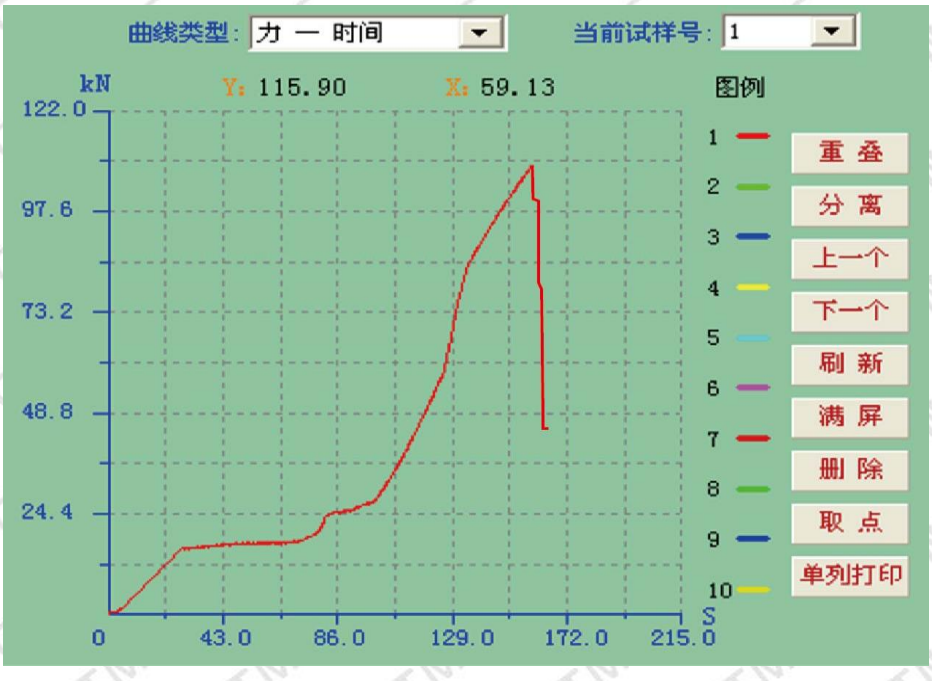
Maximum Load test of #477 MCM ACSR conductor Chart 2



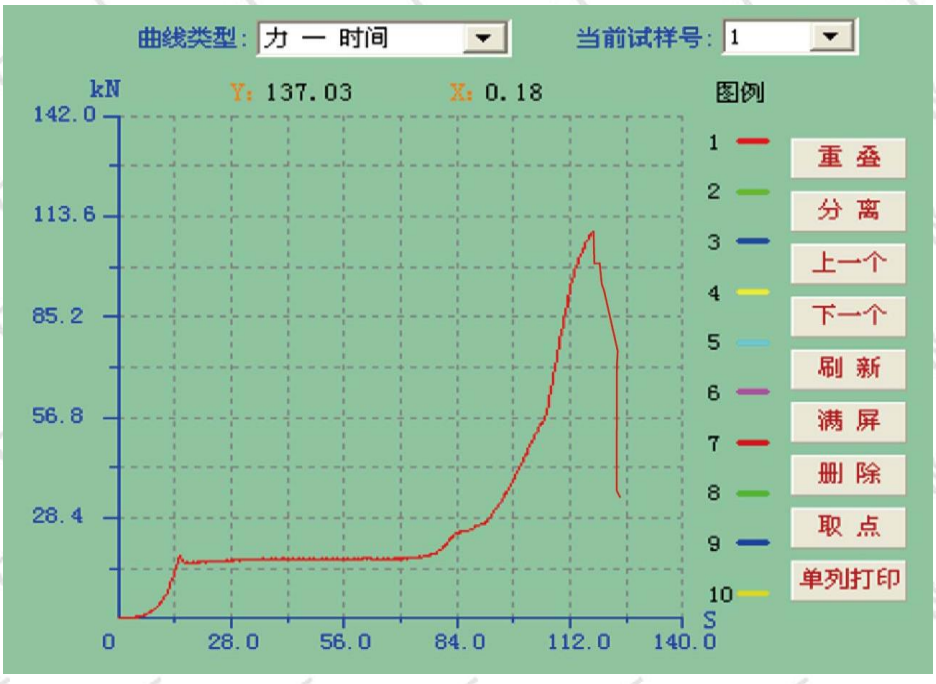
Maximum Load test of #477 MCM ACSR conductor Chart 3

Maximum Load test of #636 MCM ACSR conductor test site photo

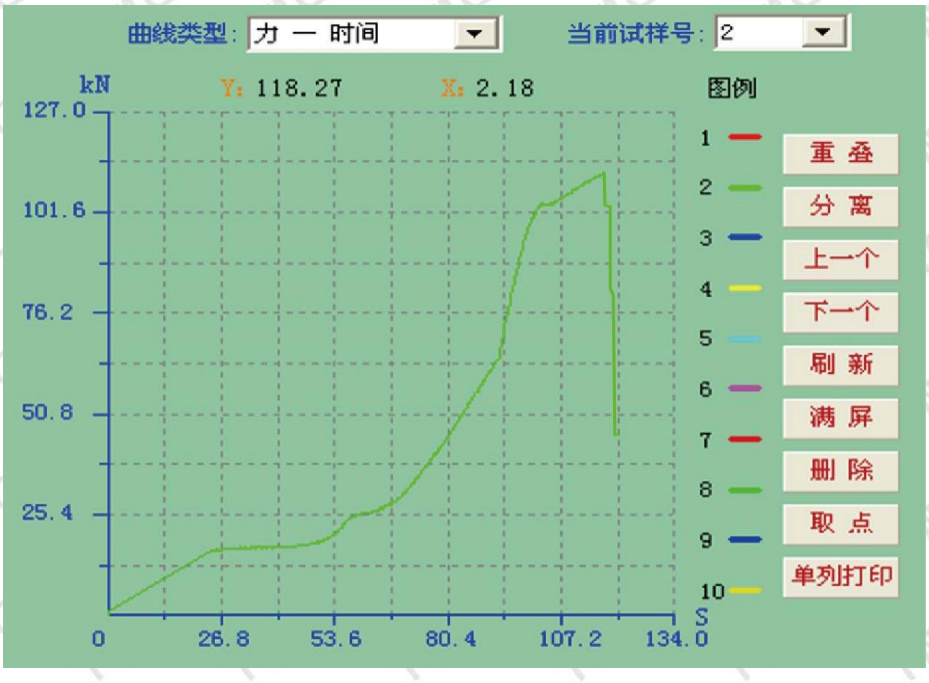
Type of Test	Material Tested	Conductor Dia (mm)	Specimen No.	Ultimate Strength (kN)	Average Load (kN)	Comment
Tensile Strength	Compression Sleeve for # 636 MCM ACSR Conductor	25.15	1	109.40	109.94	No failure has been observed in the Sleeves region
			2	111.18		
			3	109.24		



Maximum Load test of #636 MCM ACSR conductor Chart 1



Maximum Load test of #636 MCM ACSR conductor Chart 2



Maximum Load test of #636 MCM ACSR conductor Chart 3

----------End of Test Report----------