Test Report

Report No. THAH21071232167-2EN **Job No.:**32167 **Date:** July 18, 2022

The following information was/were submitted and identified by/on behalf of the client:

Applicant	:	Sungrow Energy Storage Technology Co.,Ltd
Address	:	No. 788, Mingchuan Road, High-tech Zone, Hefei City
Sample Name	:	Container side wall
Description of Sample(s)	:	Size: Length: 3000 mm; Width: 3000 mm; Thickness: 90 mm Number: 1 Color: Gray
Sample Receive Date	:	Jun. 17, 2022
Sample Testing Period	:	Jun. 24, 2022 - Jun. 29, 2022
Test Requested	:	ASTM E119-2020 Standard Test Methods for Fire Tests of Building Construction and Materials
Test Results	:	According to the test results, the submitted sample fire resistance performance as follows: Fire resistance time: 60 min.
Conclusion	:	According to the test results, the submitted sample meets the requirements of 1 h fire resistance test.

For and on behalf of
Shanghai Global Testing Services Co., Ltd.

Authorized Signature

Shi Lei/Kevin
General Manager -GTS/SHO

Shanghai Global Testing Services Co., Ltd.
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I. Test Conducted

This test was conducted in accordance with ASTM E119-2020 Standard Test Methods for Fire Tests of Building Construction and Materials.

II. Sample Details

Sample description	Container side wall
Separating elements	Vertical
Reasons for the sample	Customer designated

III. Test conditioning

Temperature	28°C	Relative Humidity	54%

IV. Examination of specimen and Installation

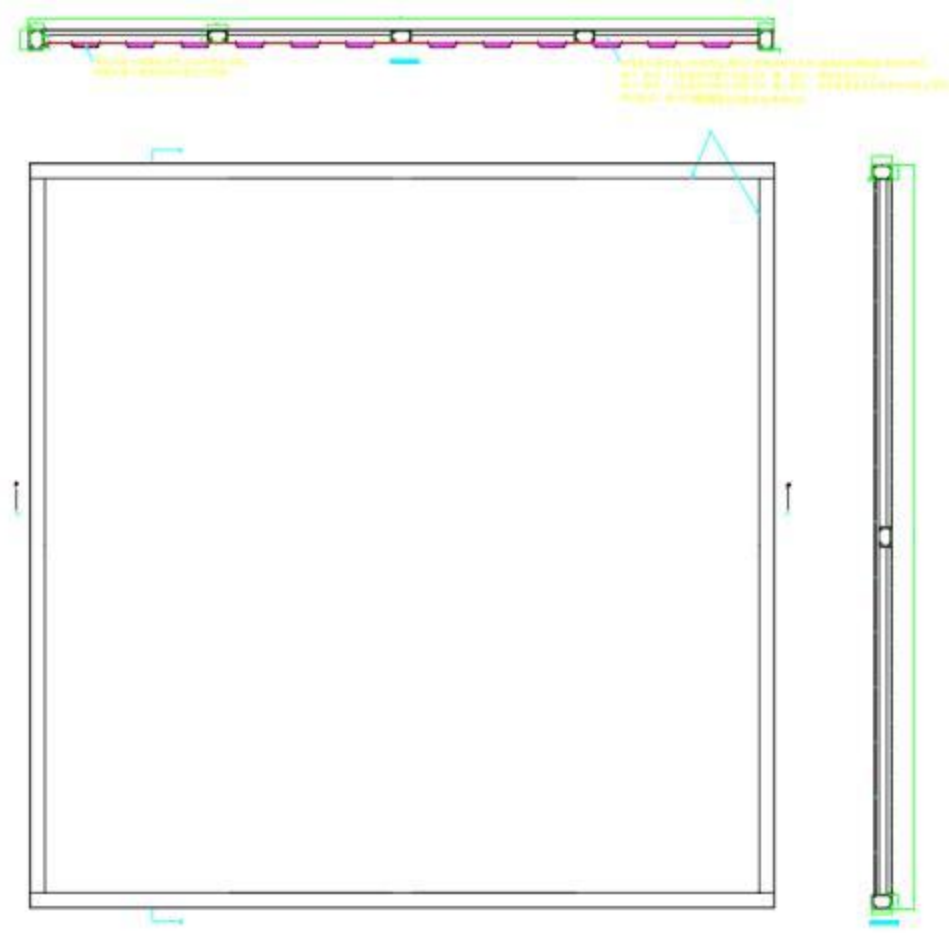

Figure 1-Sample size

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V. Test Results

Clause	Conditions of acceptance	Result
ASTM E119-2020 8.3	During the tests, the construction shall have complied with the following conditions: a) The wall or partition shall have sustained the fire endurance test without passage of flame or passage of gases hot enough to ignite cotton waste during the classification period.	60 min, the cotton pad was not ignited.
	b) The wall or partition shall have sustained the hose stream test without development of an opening that would permit a projection of water from the hose stream beyond the unexposed surface.	60 min, no passage of water to other side.
	c) Transmission of heat through the wall or partition during the classification period shall not have raised the temperature on its unexposed surface to more than 250° F (139° C) above its initial temperature.	60 min, the average temperature rise was 55℃.
ASTM E119-2020 7.3.1.4	Where the conditions of acceptance place a limitation on the rise of temperature of the unexposed surface, the temperature end point of the fire-resistance period shall be determined by the average of the measurements taken at individual points; except that if a temperature rise 30% in excess of the specified limit occurs at any one of these points, the remainder shall be ignored and the fire- resistance period judged as ended.	

VI. Test behavior:

Fire-resistance test observations

Time(mm:ss)	Test behavior
00:00	Start of test
4:26	A small amount of smoke was released from the top of the sample.
60:14	The sample remained fire resistance, and the test was terminated.

Hose stream test

Time(mm:ss)	Test behavior
00:00	Test started.
01:02	No passage of water to other side. Hose stream test concluded.

VII. Conclusion

The specimen satisfied the performance requirements for the following period:

Fire resistance time: 60 min

Hose stream test: Pass

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VIII. Statement

The test report shall provide detailed structural data of the specimen, test conditions and experimental results obtained from the test of the specimen according to the method specified in this Part ASTM E119-2020.The test results are invalid if the specimen has large deviations in terms of size, detailed structural data, load, stress, constraint or boundary conditions.

IX. Test result curve:

The following data were collected during the test:

a) The standard and actual furnace temperature / time curve , as shown in Figure 2.

b) The temperature / time curve of unexposed surface, as shown in Figure 3.

c) Unexposed surface temperature, as shown in Table 1.

d) Temperature in the furnace, as shown in Table 2.

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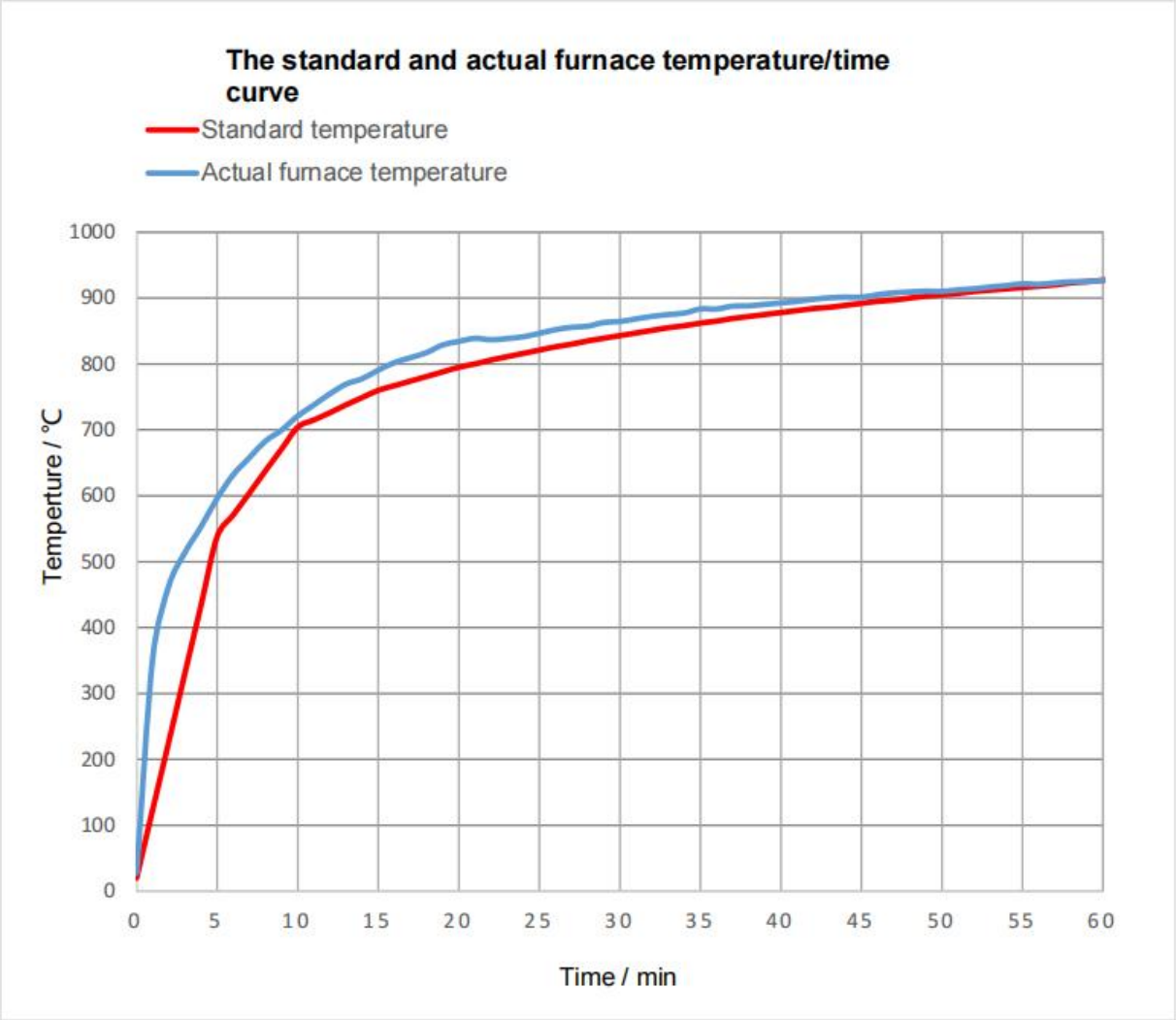

Figure 2 -- The standard and actual furnace temperature / time curve

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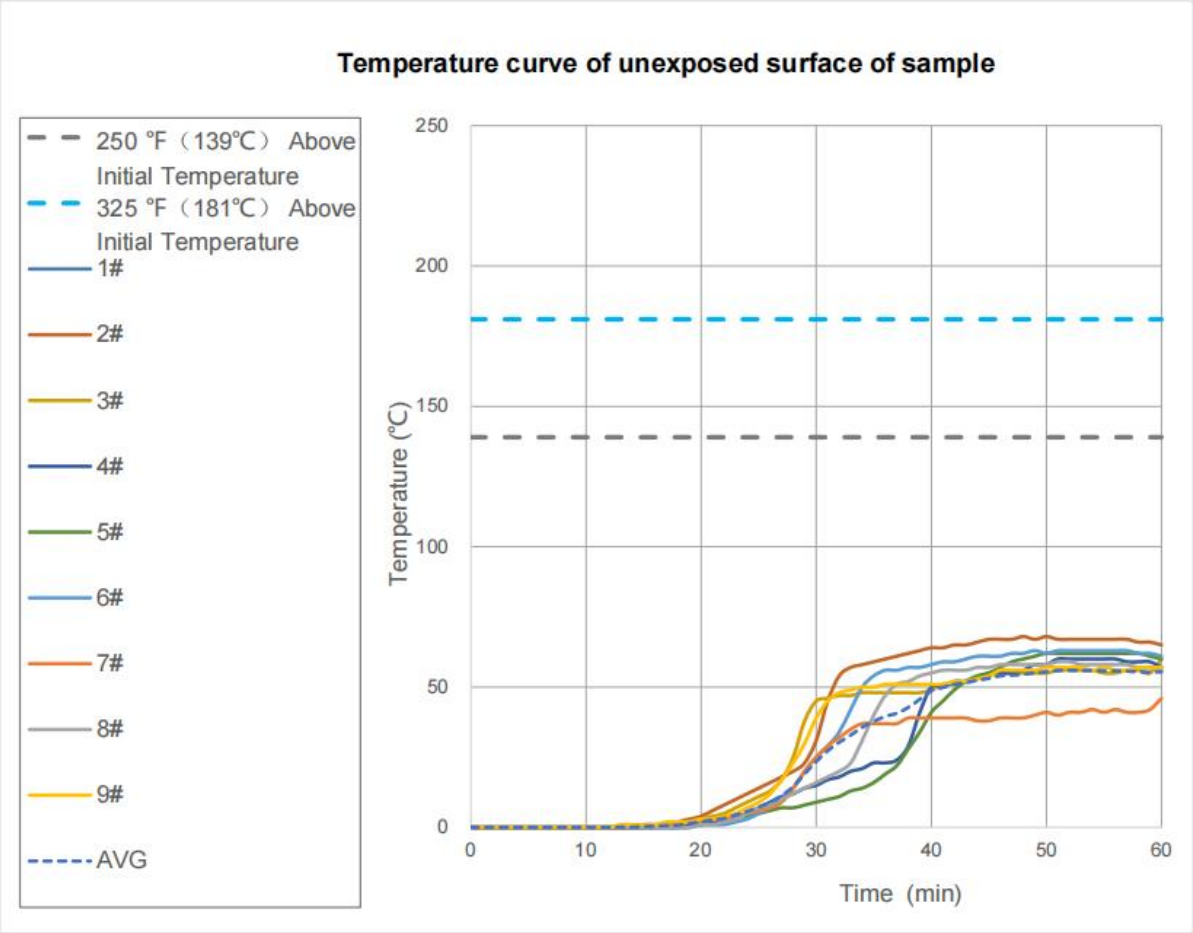

Figure 3 - The temperature / time curve of unexposed surface

Table 1 - Unexposed surface temperature

Time (min)	Thermocouple No.								
	1#(°C)	2#(°C)	3#(°C)	4#(°C)	5#(°C)	6#(°C)	7#(°C)	8#(°C)	9#(°C)
0	30	33	29	29	29	29	29	31	31
0.5	30	33	29	29	29	29	29	31	31
1	30	33	29	29	29	29	29	31	31
1.5	30	33	29	29	29	29	29	31	31
2	30	33	29	29	29	29	29	30	31
2.5	30	33	29	29	29	29	29	31	31
3	30	33	29	29	29	29	29	31	31
3.5	30	33	29	29	29	29	29	31	31
4	30	33	29	29	29	29	29	31	31
4.5	30	33	29	29	29	29	29	30	31

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5	30	33	29	29	29	29	29	30	31
5.5	30	33	29	29	29	29	29	31	31
6	30	33	29	29	29	29	29	31	31
6.5	30	33	29	29	29	29	29	30	31
7	30	33	29	29	29	29	29	31	31
7.5	30	33	29	29	29	29	29	31	31
8	30	33	29	29	29	29	29	30	31
8.5	30	33	29	29	29	29	29	31	31
9	30	33	29	29	29	29	29	30	31
9.5	30	33	29	29	29	29	29	31	31
10	30	33	29	29	29	29	29	31	31
10.5	30	33	29	29	29	29	29	31	31
11	30	33	29	29	29	29	29	31	31
11.5	30	33	29	29	29	29	29	31	31
12	30	33	29	29	29	29	29	31	31
12.5	30	33	29	29	29	29	29	31	31
13	30	33	29	29	29	29	29	31	32
13.5	30	34	29	29	29	29	29	31	32
14	30	33	29	29	29	29	29	31	32
14.5	30	34	29	29	29	29	29	31	32
15	30	34	29	29	29	29	30	31	32
15.5	30	34	29	29	29	29	30	31	32
16	30	34	29	29	30	29	30	31	32
16.5	30	34	30	29	30	29	30	31	33
17	30	34	30	29	30	29	30	31	33
17.5	30	35	30	29	30	29	30	31	33
18	31	35	30	29	30	29	30	31	33
18.5	31	36	31	30	31	29	31	31	33
19	31	36	31	30	31	30	31	31	33
19.5	31	37	32	30	31	30	31	32	34
20	31	38	32	30	31	30	31	32	34
20.5	31	39	33	31	32	30	32	32	34
21	31	40	34	31	32	30	32	33	35

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Time (min)	Thermocouple No.								
	1#(°C)	2#(°C)	3#(°C)	4#(°C)	5#(°C)	6#(°C)	7#(°C)	8#(°C)	9#(°C)
21.5	31	41	34	31	32	30	32	33	35
22	31	42	35	32	32	31	33	34	36
22.5	31	43	36	33	33	31	33	34	36
23	31	44	37	33	33	32	33	35	37
23.5	31	45	38	34	33	32	34	36	38
24	32	46	39	35	34	33	34	37	39
24.5	32	47	40	36	34	34	35	38	40
25	32	48	41	37	34	35	36	39	42
25.5	32	49	42	38	35	36	36	39	43
26	33	50	44	39	35	37	37	40	45
26.5	33	51	46	40	36	39	38	41	48
27	33	52	49	40	36	41	40	42	50
27.5	34	53	54	41	36	43	43	43	54
28	34	54	61	42	37	46	45	44	57
28.5	35	56	67	43	37	49	49	45	61
29	35	58	71	44	38	51	52	46	65
29.5	36	64	74	44	38	54	54	47	70
30	37	71	75	45	39	56	56	48	74
30.5	37	78	75	46	39	58	58	49	76
31	38	83	76	46	40	60	59	50	78
31.5	39	87	76	47	40	63	61	51	79
32	39	89	76	48	41	67	62	52	80
32.5	40	90	76	49	42	71	64	54	80
33	41	91	77	50	42	75	65	57	81
33.5	42	91	77	50	43	79	66	62	81
34	42	92	77	51	44	82	66	67	81
34.5	43	92	77	52	45	83	66	71	81
35	44	92	77	52	46	84	66	75	82
35.5	45	93	77	52	48	85	66	78	82
36	46	94	77	52	49	85	66	80	82
36.5	46	94	77	53	51	85	66	82	82
37	47	95	77	55	54	86	68	83	82
37.5	49	95	77	58	57	86	68	83	82
38	51	95	77	63	60	86	68	84	82

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(min)	1#(°C)	2#(°C)	3#(°C)	4#(°C)	5#(°C)	6#(°C)	7#(°C)	8#(°C)	9#(°C)
38.5	54	96	77	70	63	86	68	85	82
39	58	96	77	76	67	87	68	86	82
39.5	61	97	78	79	70	87	68	86	82
40	63	97	79	79	72	87	68	87	82
40.5	64	97	80	79	74	88	68	87	82
41	65	98	80	80	77	88	67	87	83
41.5	66	98	80	81	78	88	68	87	83
42	66	98	81	81	80	89	67	87	84
42.5	66	98	81	81	81	89	68	87	83
43	67	99	81	81	82	89	67	87	84
43.5	67	99	82	82	83	90	67	88	84
44	67	100	83	83	84	90	67	88	85
44.5	67	100	83	84	84	90	67	88	85
45	68	100	83	84	85	90	67	88	86
45.5	68	100	84	84	86	90	68	89	87
46	67	100	84	84	87	91	68	89	87
46.5	67	100	84	84	88	91	68	89	87
47	67	100	84	85	89	91	68	89	87
47.5	67	101	84	85	89	91	68	89	87
48	67	100	84	86	90	91	69	89	87
48.5	68	100	84	87	90	92	69	89	87
49	68	100	84	87	90	91	69	89	87
49.5	68	101	84	87	91	91	70	89	88
50	69	101	85	88	91	92	70	89	88
50.5	69	100	85	89	91	92	69	90	88
51	69	100	85	89	91	92	70	90	88
51.5	69	100	85	89	91	92	70	90	88
52	69	100	85	89	91	92	70	90	88
52.5	69	100	85	89	91	92	70	89	88
53	69	100	85	89	91	92	71	89	87
53.5	69	100	85	89	91	92	71	89	87
54	69	100	84	89	91	92	70	89	88
54.5	69	100	84	89	91	92	70	89	88
55	69	100	84	89	91	92	71	89	88

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	1#(°C)	2#(°C)	3#(°C)	4#(°C)	5#(°C)	6#(°C)	7#(°C)	8#(°C)	9#(°C)
55.5	69	100	84	89	91	92	71	89	87
56	69	100	85	88	91	92	71	89	87
56.5	69	100	85	88	91	92	70	89	87
57	69	100	84	88	91	92	70	89	87
57.5	69	99	85	88	91	91	70	88	88
58	69	99	85	88	91	91	70	88	88
58.5	69	99	84	88	90	91	71	88	88
59	69	99	85	88	90	91	71	88	88
59.5	67	98	89	86	89	90	75	87	88
60	66	96	88	84	87	89	75	86	88

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Table 2 - Temperature in the furnace

TIME (min)	Standard temperature (℃)	Actual furnace temperature (℃)	TIME (min)	Standard temperature (℃)	Actual furnace temperature (℃)
0	20	28	31	847	868
1	124	354	32	851	872
2	227	463	33	855	875
3	331	514	34	858	877
4	434	553	35	862	884
5	538	596	36	865	883
6	571	632	37	869	888
7	604	658	38	872	888
8	638	683	39	875	891
9	671	700	40	878	893
10	704	721	41	881	895
11	715	738	42	884	898
12	726	755	43	886	900
13	738	769	44	889	901
14	749	778	45	892	901
15	760	791	46	895	905
16	767	802	47	897	908
17	774	810	48	900	909
18	781	817	49	903	911
19	788	829	50	905	910
20	795	834	51	907	913
21	800	839	52	910	914
22	806	837	53	912	917
23	811	839	54	914	919
24	816	841	55	916	922
25	821	847	56	918	921
26	826	852	57	920	923
27	830	856	58	923	925
28	835	857	59	925	925
29	839	863	60	927	927
30	843	864			

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Photo Appendix

	
Unexposed surface before test	Unexposed surface after test
	
Exposed surface before test	Exposed surface after test

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Hose stream test	Hose stream after test

*****End of Report*****

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