

JAS (Inspection & Testing) Ltd

A

Surface Compression Measurement Report

To

ASTM C1279-13 & ASTM C1048-18

For

Tempered Glass

Manufactured by

广东中融玻璃科技有限公司

Prepared By : JAS (Inspection & Testing) Limited

Test Date: 28th September 2024

Report Date: 30th September 2024

Our Ref.: J24-183-R01-240930



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1. TEST INFORMATION

Test Consultant	JAS (Inspection & Testing) Ltd.
Tester	Jin Cheng
Glass Manufacturer	广东中融玻璃科技有限公司
Address	肇庆高新区迎宾大道 6 号之二
Date of Specimen manufactured	26 th September 2024
Test Date	28 th September 2024
Selected Procedure	ASTM C 1279-13 - Procedure A
Test Points Reference	ASTM C 1048-18
Identification of the specimen	Clear Tempered Glass 6 & 8mm
Room Temperature	22°C
Humidity	90%
Condition period	4 hours
Apparatus	A Grazing Angle Surface Polarimeter.

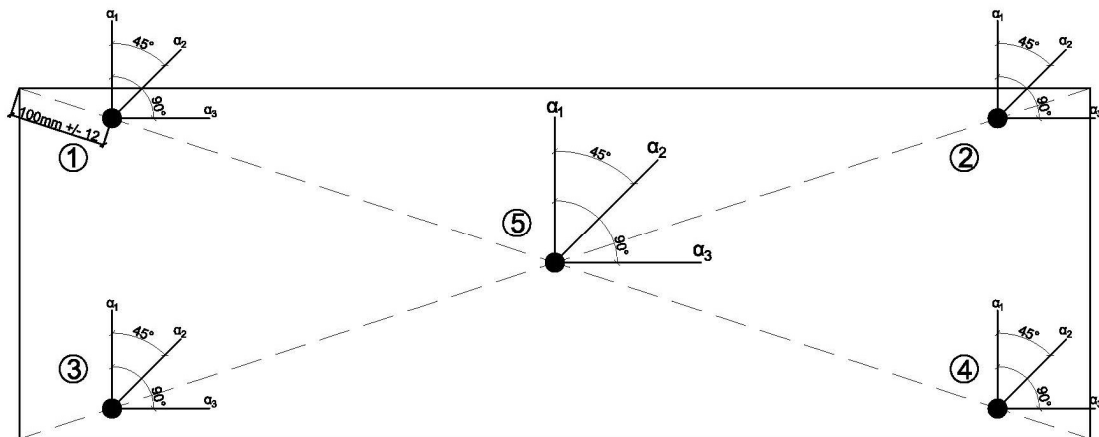


Fig.1 Five Locations Examined and the orientation of the instrument



2. PROCEDURE & REQUIREMENT

2.1 Test to ASTM C 1279-13 Procedure A

- a. Clean the surface of any trace of oil or other chemical deposits.
- b. Place a few drops of index liquid on the tin side surface of the specimen at the point of interest. The index of refraction of the liquid should be higher than the index of the examined glass and lower or equal to the index of the prism.
- c. Perform the adjustments of the optical path in accordance with manufacturer's specifications to obtain a clear image of an equally-spaced set of fringes in the compensator plane.
- d. Using the goniometer, measure the angle θ (in degrees) of these fringes to the plane of symmetry.
- e. Where the surface stress at the point to be measured is known to be uniform (within 1° in the three directions α_1 , α_2 , α_3) or its is specifically prescribed to be measured at a certain direction, take a measurement at each location(s) prescribed in ASTM C1048-18.
- f. In those instances where the direction of maximum and minimum stress is uncertain (as a result of irregular geometry, proximity of edges, or non-uniformity of heat-treating process), orient the instrument along direction α_1 , α_2 & α_3 , and measure the fringe pattern angle θ_1 , θ_2 & θ_3 , in degrees. For each direction . Select α_1 , α_2 & α_3 as follows:
 - α_1 - parallel to the nearest edge.
 - α_2 - 45° to the nearest edge, and
 - α_3 - perpendicular to the nearest edge.

2.2 Requirement to C1048-18

- a. Heat Strengthened Glass shall have a surface compression between 24 to 52MPa.
- b. Fully tempered glass shall have a minimum surface compression of 69MPa.



3. RESULT

3.1 6mm Clear Tempered Glass

Selected procedure	ASTM C 1279 Procedure A				
Date of specimen manufactured	26 th September 2024				
Date of Test	28 th September 2024				
Identification of specimen	1,100mm x 360mm				
Measured Thickness	5.87mm				
Direction of measurement	Fig.1				
Location	1	2	3	4	5
α_1 - Measured angle in degrees	70	71	70	70	71
α_1 - Calculated stress (MPa)	115.65	122.25	115.65	115.65	122.25
α_2 - Measured angle in degrees	70	71	70	70	71
α_2 - Calculated stress (MPa)	115.65	122.25	115.65	115.65	122.25
α_3 - Measured angle in degrees	70	71	70	70	71
α_3 - Calculated stress (MPa)	115.65	122.25	115.65	115.65	122.25
Average Measured angle in degrees	70.4				
Average Calculated stress (MPa)	118.29				
Requirement ASTM C1048-18	> 69.0 MPa				
Results	Satisfactory				

3.2 8mm Clear Tempered Glass

Selected procedure	ASTM C 1279 Procedure A				
Date of specimen manufactured	26 th September 2024				
Date of Test	28 th September 2024				
Identification of specimen	1,100mm x 360mm				
Measured Thickness	7.95mm				
Direction of measurement	Fig.1				
Location	1	2	3	4	5
α_1 - Measured angle in degrees	70	70	71	70	70
α_1 - Calculated stress (MPa)	115.65	115.65	122.25	115.65	115.65
α_2 - Measured angle in degrees	70	70	71	70	70
α_2 - Calculated stress (MPa)	115.65	115.65	122.25	115.65	115.65
α_3 - Measured angle in degrees	70	70	71	70	70
α_3 - Calculated stress (MPa)	115.65	115.65	122.25	115.65	115.65
Average Measured angle in degrees	70.2				
Average Calculated stress (MPa)	116.97				
Requirement ASTM C1048-18	> 69.0 MPa				
Results	Satisfactory				



4. SUMMARY

The Surface Compression values measured according to ASTM C1279-13 Procedure A and ASTM C1048-18, are summarized as follow:

Tempered Glass Thickness	Average calculated Stress (MPa)	Results
6mm Clear	118.29	All Comply to ASTM C1048-18 & Hong Kong BD Code of for Structural Use of Glass 2018 Section 8.1.3 Surface Compressive Stress For Tempered Glass requirement (>69Mpa) The results are satisfactory
8mm Clear	116.97	

I certify this to be a true record of the test.

Reported by

Mr. Mark Lau
Test Engineer

Certified by



Mr. Sam Lau
Managing Director

Appendix

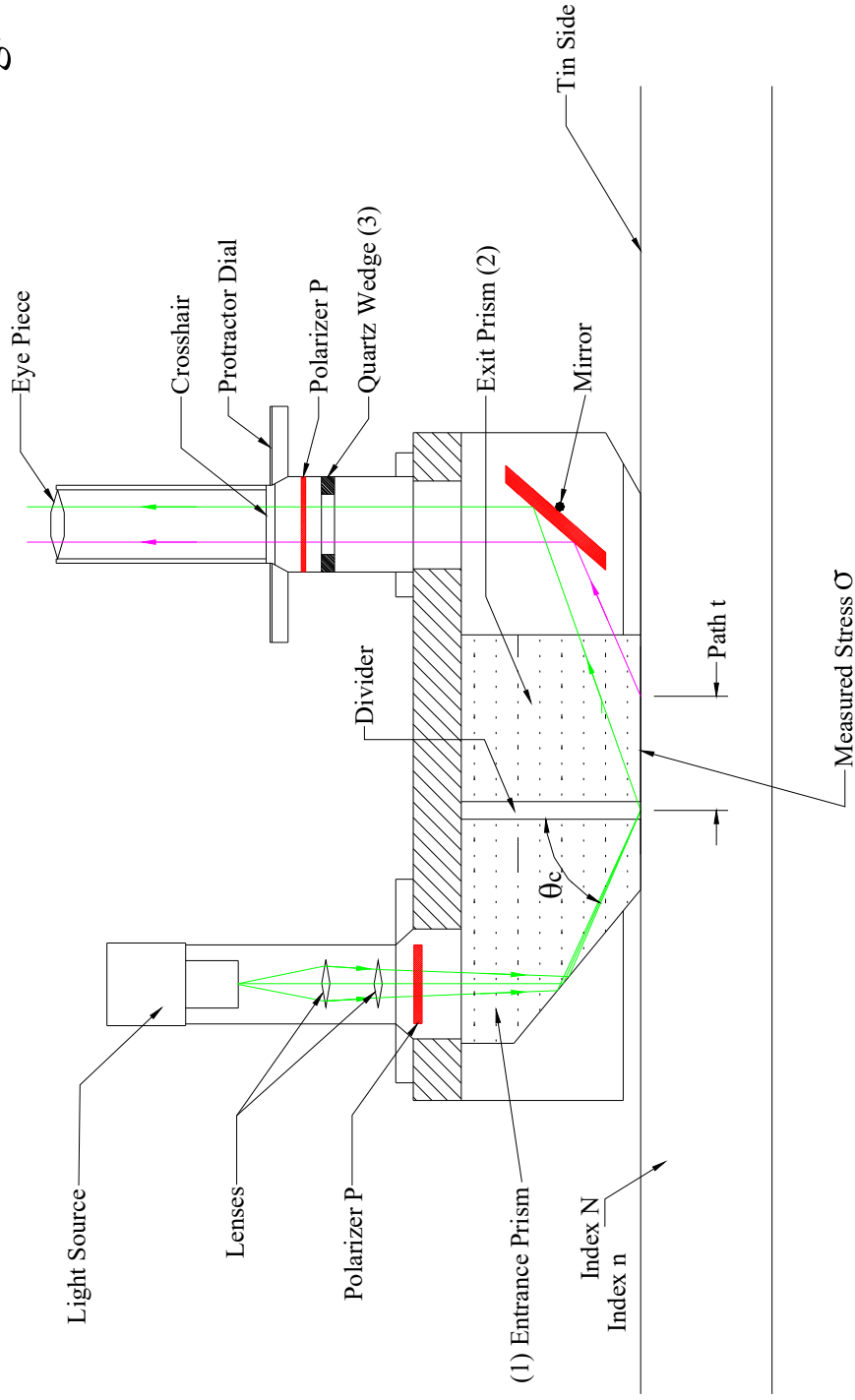
- i. **Unit-Stress Conversion Table**
- ii. **Fig. 2**
- iii. **Photos**

Unit-Stress Conversion Table

STANDARD WEDGE USED IN GASP CS
WEDGE FACTOR = 1.00

Angle θ	Stress psi	Stress kgf/cm2	Stress Mpa		Angle θ	Stress psi	Stress kgf/cm2	Stress Mpa
1	107	8	0.73		39	4944	348	34.09
2	213	15	1.47		40	5123	361	35.32
3	320	23	2.21		41	5307	374	36.59
4	427	30	2.94		42	5497	387	37.90
5	534	38	3.68		43	5693	401	39.25
6	642	45	4.42		44	5896	415	40.65
7	750	53	5.17		45	6105	430	42.09
8	858	60	5.92		46	6322	445	43.59
9	967	68	6.67		47	6547	461	45.14
10	1076	76	7.42		48	6780	477	46.75
11	1187	84	8.18		49	7023	495	48.42
12	1298	91	8.95		50	7276	512	50.17
13	1409	99	9.72		51	7539	531	51.98
14	1522	107	10.50		52	7814	550	53.88
15	1636	115	11.28		53	8102	571	55.86
16	1751	123	12.07		54	8403	592	57.94
17	1866	131	12.87		55	8719	614	60.12
18	1984	140	13.68		56	9051	637	62.41
19	2102	148	14.49		57	9401	662	64.82
20	2222	156	15.32		58	9770	688	67.36
21	2343	165	16.16		59	10160	716	70.06
22	2467	174	17.01		60	10574	745	72.91
23	2591	182	17.87		61	11014	776	75.94
24	2718	191	18.74		62	11482	809	79.17
25	2847	200	19.63		63	11982	844	82.61
26	2978	210	20.53		64	12517	881	86.31
27	3111	219	21.45		65	13092	922	90.27
28	3246	229	22.38		66	13712	966	94.54
29	3384	238	23.33		67	14382	1013	99.17
30	3525	248	24.30		68	15110	1064	104.19
31	3668	258	25.29		69	15904	1120	109.66
32	3815	269	26.30		70	16773	1181	115.65
33	3965	279	27.34		71	17730	1249	122.25
34	4118	290	28.39		72	18789	1323	129.55
35	4275	301	29.47		73	19969	1406	137.68
36	4436	312	30.58		74	21291	1499	146.80
37	4600	324	31.72		75	22784	1605	157.10
38	4770	336	32.89		76	24486	1724	168.83

Fig.2



UNITS : mm 	DRAWING TITLE : Basic Principles of Operation		DRAWN : JAS (Inspection & Testing) Ltd.	
	PROJECT : Surface Compression Measurement		DATE : 10-10-2011	DWG NO : 2617
			SCALE : NTS	ISSUE No. 01

JAS

JAS (Inspection & Testing) Ltd.

INSPECTION OF WORK - PHOTO RECORD



Photo 1

Size of the specimen was checked before test.



Photo 2

Thickness of the specimen was checked before test.



Photo 3

Tinted side of the specimen was confirmed for the test.



Photo 4

Place a few drops of index liquid on the tin side surface.



Photo 5

The Grazing Angle Surface Polarimeter.



Photo 6

Specimen was confirmed as a fully tempered glass