

工程指示 / 要求簡箋 ENGINEER INSTRUCTIONS(E.I.)

工程指示編號:	EI- 5364	修改版本:	-
	HK-		
工程編號:	J 856	工程名稱:	TSWTL23
收件人:	Maggie	發件人:	BearLam
工程項目:	天榮幕牆玻璃大貨	日期:	18/11/2022

<input type="checkbox"/> 原合約工程包	<input type="checkbox"/> 原合約工程加 / 減賬 QT-	<input type="checkbox"/> 新工程報價 QT-
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信件批核號碼/圖紙參考編號:	批核模具圖紙編號:
客戶指示附件:	管理內部批簽署:

<input type="checkbox"/> 初步鋁料 B.M.	<input type="checkbox"/> 加工拆圖, 然後生產	<input type="checkbox"/> 尺寸表
<input type="checkbox"/> 正式鋁料 B.M.	<input type="checkbox"/> 技術上資料/指示	<input type="checkbox"/> 報價
<input type="checkbox"/> 配件 B.M.	<input type="checkbox"/> 樣辦或貨品說明書	<input type="checkbox"/> 分判合約
<input type="checkbox"/> 其他:		

內容: 現附上天榮站工程幕牆玻璃總數之訂單, 總數約:4870件、5090平方米.Low-e : SDCE-55T#2  
請根據附件要求之規格進行玻璃生產及質量檢測  
G1:8mm THICK HEAT STRENGTHENED GLASS + 12mm THICK AIR + 10mm THICK TEMPERED  
G1A: 8mm THICK HEAT STRENGTHENED GLASS + 12mm THICK AIR + 12mm THICK TEMPER  
G3:10mm THICK HEAT STRENGTHENED GLASS  
G4:12mm THICK HEAT STRENGTHENED GLASS  
G5: 12mm THICK TEMPERED GLASS

完成上列要求日期: 25/11/2022

國內

<input type="checkbox"/> 生產技術總監	<input type="checkbox"/> 連附件	<input type="checkbox"/> 技術部	<input type="checkbox"/> 連附件	<input type="checkbox"/> 生產部	<input type="checkbox"/> 連附件
<input type="checkbox"/> 採購部	<input type="checkbox"/> 連附件	<input type="checkbox"/> 生產統籌部	<input type="checkbox"/> 連附件	<input type="checkbox"/> 報關組	<input type="checkbox"/> 連附件
<input type="checkbox"/> 質檢部	<input type="checkbox"/> 連附件	<input type="checkbox"/> 會計部	<input type="checkbox"/> 連附件	<input type="checkbox"/> 機械設計部	<input type="checkbox"/> 連附件
<input type="checkbox"/> 香港辦	<input type="checkbox"/> 連附件	<input type="checkbox"/> 其他:			

香港

<input type="checkbox"/> 行政部	<input type="checkbox"/> 連附件	<input type="checkbox"/> 會計部	<input type="checkbox"/> 連附件	<input type="checkbox"/> 統籌部	<input type="checkbox"/> 連附件	<input type="checkbox"/> 工程部	<input type="checkbox"/> 連附件
<input checked="" type="checkbox"/> 採購部	<input checked="" type="checkbox"/> 連附件	<input type="checkbox"/> QS部	<input type="checkbox"/> 連附件	<input type="checkbox"/> 地盤管理	<input type="checkbox"/> 連附件	<input checked="" type="checkbox"/> 維修部	<input type="checkbox"/> 連附件

*發件人簽署:	<i>Bear Lam</i>	*組別成員批核簽署:	<i>Wm 18/11/22</i>
傳遞編號:		項目經理簽署:	<i>Wm</i>

1856 Curtain Wall 尺數表

	G1		G3		G4		G5		G1A	
	m <sup>2</sup>	Qty	m <sup>2</sup>	Qty	m <sup>2</sup>	Qty	m <sup>2</sup>	Qty	m <sup>2</sup>	Qty
T1	PE101-1	334.65	222		109.707	104	5.87	74		
	PE101-2	314.41	222	151.58	148	103.78	104	5.87	74	
	PE102-1	144.4	111			47.67	52	2.93	37	
T2	PE102-2	334.65	222			110.46	104	5.87	74	
	PE201-1	255.19	185			84.23	78	6.18	74	
	PE201-2	263.09	190			122.04	114	6.35	76	
T3	PE202-1	334.65	222			108.96	104	5.87	74	
	PE202-2	334.65	222			108.96	104	5.87	74	
	PE301-1	367.89	296			119.9	130	9.57	111	
T1	PE301-2	239.91	185			78.11	78	5.73	74	
	PE302-1	172.3	111			56.09	52	2.93	37	
	PE302-2	255.21	190			83.84	81	6.35	76	
T2	PE303-1	108.11	111			36.58	52	2.93	37	
	SU-CW-1	19.57	14			7.11	9	0.51	5	4.13
	SU-CW-2	8.62	6			2.59	4	1.6	2	
	SU-CW-3	8.62	6			2.59	4	1.6	2	
T3	SU-CW-4	19.57	14			7.11	9	0.51	5	4.13
	SU-CW-1	19.57	14			7.11	9	0.51	5	4.13
	SU-CW-2	8.62	6			2.59	4	1.6	2	
T4	SU-CW-3	8.62	6			2.59	4	1.6	2	
	SU-CW-4	19.57	14			7.11	9	0.51	5	4.13
T5	SU-CW-1	19.57	14			7.11	9	0.51	5	4.13
	SU-CW-2	8.62	6			2.59	4	1.6	2	
T6	SU-CW-3	8.62	6			2.59	4	1.6	2	
	SU-CW-4	19.57	14			7.11	9	0.51	5	4.13
T7	SU-CW-1	19.57	14			7.11	9	0.51	5	4.13
	SU-CW-2	8.62	6			2.59	4	1.6	2	
T8	SU-CW-3	8.62	6			2.59	4	1.6	2	
	SU-CW-4	19.57	14			7.11	9	0.51	5	4.13
T9	SU-CW-1	19.57	14			7.11	9	0.51	5	4.13
	SU-CW-2	8.62	6			2.59	4	1.6	2	
T10	SU-CW-3	8.62	6			2.59	4	1.6	2	
	SU-CW-4	19.57	14			7.11	9	0.51	5	4.13
T11	SU-CW-1	19.57	14			7.11	9	0.51	5	4.13
	SU-CW-2	8.62	6			2.59	4	1.6	2	
T12	SU-CW-3	8.62	6			2.59	4	1.6	2	
	SU-CW-4	19.57	14			7.11	9	0.51	5	4.13
T13	SU-CW-1	19.57	14			7.11	9	0.51	5	4.13
	SU-CW-2	8.62	6			2.59	4	1.6	2	
T14	SU-CW-3	8.62	6			2.59	4	1.6	2	
	SU-CW-4	19.57	14			7.11	9	0.51	5	4.13
T15	SU-CW-1	19.57	14			7.11	9	0.51	5	4.13
	SU-CW-2	8.62	6			2.59	4	1.6	2	
T16	SU-CW-3	8.62	6			2.59	4	1.6	2	
	SU-CW-4	19.57	14			7.11	9	0.51	5	4.13
T17	SU-CW-1	19.57	14			7.11	9	0.51	5	4.13
	SU-CW-2	8.62	6			2.59	4	1.6	2	
T18	SU-CW-3	8.62	6			2.59	4	1.6	2	
	SU-CW-4	19.57	14			7.11	9	0.51	5	4.13
T19	SU-CW-1	19.57	14			7.11	9	0.51	5	4.13
	SU-CW-2	8.62	6			2.59	4	1.6	2	
T20	SU-CW-3	8.62	6			2.59	4	1.6	2	
	SU-CW-4	19.57	14			7.11	9	0.51	5	4.13
T21	SU-CW-1	19.57	14			7.11	9	0.51	5	4.13
	SU-CW-2	8.62	6			2.59	4	1.6	2	
T22	SU-CW-3	8.62	6			2.59	4	1.6	2	
	SU-CW-4	19.57	14			7.11	9	0.51	5	4.13
T23	SU-CW-1	19.57	14			7.11	9	0.51	5	4.13
	SU-CW-2	8.62	6			2.59	4	1.6	2	
T24	SU-CW-3	8.62	6			2.59	4	1.6	2	
	SU-CW-4	19.57	14			7.11	9	0.51	5	4.13
T25	SU-CW-1	19.57	14			7.11	9	0.51	5	4.13
	SU-CW-2	8.62	6			2.59	4	1.6	2	
T26	SU-CW-3	8.62	6			2.59	4	1.6	2	
	SU-CW-4	19.57	14			7.11	9	0.51	5	4.13
T27	SU-CW-1	19.57	14			7.11	9	0.51	5	4.13
	SU-CW-2	8.62	6			2.59	4	1.6	2	
T28	SU-CW-3	8.62	6			2.59	4	1.6	2	
	SU-CW-4	19.57	14			7.11	9	0.51	5	4.13
T29	SU-CW-1	19.57	14			7.11	9	0.51	5	4.13
	SU-CW-2	8.62	6			2.59	4	1.6	2	
T30	SU-CW-3	8.62	6			2.59	4	1.6	2	
	SU-CW-4	19.57	14			7.11	9	0.51	5	4.13
T31	SU-CW-1	19.57	14			7.11	9	0.51	5	4.13
	SU-CW-2	8.62	6			2.59	4	1.6	2	
T32	SU-CW-3	8.62	6			2.59	4	1.6	2	
	SU-CW-4	19.57	14			7.11	9	0.51	5	4.13
T33	SU-CW-1	19.57	14			7.11	9	0.51	5	4.13
	SU-CW-2	8.62	6			2.59	4	1.6	2	
T34	SU-CW-3	8.62	6			2.59	4	1.6	2	
	SU-CW-4	19.57	14			7.11	9	0.51	5	4.13
T35	SU-CW-1	19.57	14			7.11	9	0.51	5	4.13
	SU-CW-2	8.62	6			2.59	4	1.6	2	
T36	SU-CW-3	8.62	6			2.59	4	1.6	2	
	SU-CW-4	19.57	14			7.11	9	0.51	5	4.13
T37	SU-CW-1	19.57	14			7.11	9	0.51	5	4.13
	SU-CW-2	8.62	6			2.59	4	1.6	2	
T38	SU-CW-3	8.62	6			2.59	4	1.6	2	
	SU-CW-4	19.57	14			7.11	9	0.51	5	4.13
T39	SU-CW-1	19.57	14			7.11	9	0.51	5	4.13
	SU-CW-2	8.62	6			2.59	4	1.6	2	
T40	SU-CW-3	8.62	6			2.59	4	1.6	2	
	SU-CW-4	19.57	14			7.11	9	0.51	5	4.13
T41	SU-CW-1	19.57	14			7.11	9	0.51	5	4.13
	SU-CW-2	8.62	6			2.59	4	1.6	2	
T42	SU-CW-3	8.62	6			2.59	4	1.6	2	
	SU-CW-4	19.57	14			7.11	9	0.51	5	4.13
T43	SU-CW-1	19.57	14			7.11	9	0.51	5	4.13
	SU-CW-2	8.62	6			2.59	4	1.6	2	
T44	SU-CW-3	8.62	6			2.59	4	1.6	2	
	SU-CW-4	19.57	14			7.11	9	0.51	5	4.13
T45	SU-CW-1	19.57	14			7.11	9	0.51	5	4.13
	SU-CW-2	8.62	6			2.59	4	1.6	2	
T46	SU-CW-3	8.62	6			2.59	4	1.6	2	
	SU-CW-4	19.57	14			7.11	9	0.51	5	4.13
T47	SU-CW-1	19.57	14			7.11	9	0.51	5	4.13
	SU-CW-2	8.62	6			2.59	4	1.6	2	
T48	SU-CW-3	8.62	6			2.59	4	1.6	2	
	SU-CW-4	19.57	14			7.11	9	0.51	5	4.13
T49	SU-CW-1	19.57	14			7.11	9	0.51	5	4.13
	SU-CW-2	8.62	6			2.59	4	1.6	2	
T50	SU-CW-3	8.62	6			2.59	4	1.6	2	
	SU-CW-4	19.57	14			7.11	9	0.51	5	4.13
T51	SU-CW-1	19.57	14			7.11	9	0.51	5	4.13
	SU-CW-2	8.62	6			2.59	4	1.6	2	
T52	SU-CW-3	8.62	6			2.59	4	1.6	2	
	SU-CW-4	19.57	14			7.11	9	0.51	5	4.13
T53	SU-CW-1	19.57	14			7.11	9	0.51	5	4.13
	SU-CW-2	8.62	6			2.59	4	1.6	2	
T54	SU-CW-3	8.62	6			2.59	4	1.6	2	
	SU-CW-4	19.57	14			7.11	9	0.51	5	4.13
T55	SU-CW-1	19.57	14			7.11	9	0.51	5	4.13
	SU-CW-2	8.62	6			2.59	4	1.6	2	
T56	SU-CW-3	8.62	6			2.59	4	1.6	2	
	SU-CW-4	19.57	14			7.11	9	0.51	5	4.13
T57	SU-CW-1	19.57	14			7.11	9	0.51	5	4.13
	SU-CW-2	8.62	6			2.59	4	1.6	2	
T58	SU-CW-3	8.62	6			2.59	4	1.6	2	
	SU-CW-4	19.57	14			7.11	9	0.51	5	4.13
T59	SU-CW-1	19.57	14			7.11	9	0.51		

professional opinion for visual acceptance or do not satisfy this criteria; the Sub-Contractor shall have no claim whatsoever on cost and time.

11. Upon Architect and Consultant request, computation should be submitted demonstrating the elimination of thermal stress breakage risk, method of overcoming thermal stress problem, and all assumptions. The Sub-contractor shall consider all potential risk locations including but not limited to the following:
  - i) Heat build-up at shadow box and other unvented spaces/zones.
  - ii) Make provision for internal curtain or blind, which may temporarily create unvented space prone to heat build-up adjacent to the vision section of the System.
  - iii) Shadowing effect.
12. Glass replacement. Submit detail of replacement procedure, including glass size limitation, and equipment required. Include estimated maximum lead-time required by the glass manufacturer to supply replacement unit for each type of glass unit. On-site structural glazing work is not allowed for any future glass replacement work in residential projects.

### 3.5.2 Source

1. The source of glass supply shall be subject to review and approval by the Architect prior to the award of The Works. The source must have a satisfactory proven track record of glass supplied for the type, size and thickness concerned, appropriate QA/QC measures, and compliance with the design / manufacturing / testing standards as specified in the Specifications or the best practice in glass manufacture approved by the Architect.
2. All glass units shall be supplied, manufactured, assembled and warranted by a single manufacturer. The glass shall be from a single source and the Sub-Contractor shall submit details of how he will control the colour consistency, flatness and other visual manufacturing quality issues for each elevation prior to glass ordering.
3. Products from the approved manufacturers are to be assessed individually in satisfying the technical requirement of this Project. Various specific quality control procedures may be implemented for manufacturers who have been submitted for Architect's approval. Agreement with and compliance with all required quality control procedures will be a requirement for Architectural approval as a glass source for this project.
4. Glass that requires replacement through breakage by the Sub-Contractor or other causes shall be replaced with the same glass as was damaged which shall be from the same source.



### 3.5.3 Annealed glass (Float glass)

1. All flat glass shall be in accordance with ASTM C1036, Table 4, Type "Q3".
2. All glass shall be free from crack, scratch, bubble, blister, all inclusion of deleterious matter including nickel sulphide and other defects, which detract from appearance or interfere with performance.
3. All glass shall have clean, wheel cut edges with minimum feather, free from vents, notches, or shell.
4. Submit production and test records to ASTM 1036, Table 4, proportionally adjusted to proposed project glass thickness. Indicate test procedure, acceptance criteria and pass and/or fail rate.

5. Dimensional tolerances of glass generally shall comply with ASTM C1036, but the minimum requirement shall be one-half the published tolerances in this standard.



#### 3.5.4 Heat Strengthened and Fully Tempered glass

1. Base material shall be an approved selected quality float glass in accordance with the acceptance criteria listed on annealed glass (float glass) as above. Heat strengthened glass and fully tempered glass shall be manufactured using the “roller furnace”, or an equivalent approved process in accordance with ASTM C1048 standard. Minimum requirement shall be one-half the published tolerances for this standard.
2. Surface compression stress of heat strengthened glass shall be within the range of 24 MPa and 52 MPa. Surface compression stress of fully tempered glass shall be within the range of 69 MPa and 130 MPa. The surface stress shall be checked at least once for each batch and at a regular time interval of not more than four hours.
3. All fully tempered glass shall be heat soaked in accordance with BS EN 14179-1: 2016 and fulfilling requirement as stipulated in Buildings Department Practice Notes – PNAP APP-37. Heat soak report and associated test report shall be submitted to Project office for record.
4. Submit production and test record to ASTM 1048 or equivalent. Indicate test procedure, acceptance criteria and pass and/or fail rate.
5. Unless otherwise specified by Architect, edge working shall be flat ground with small ground arris chamfers and have a frosted appearance. Exposed edges shall be chamfered and polished. Corners shall be dubbed. Small shells and/or chips shall be ground out prior to toughening. Maximum chip/shell diameter shall not exceed 2 mm, and there shall not be more than four randomly placed chip/shells in any single pane of glass. Overall bow shall be in accordance with ASTM C1048 Table 2 and all figures of maximum bow in the table shall not be exceed 3mm of any glass dimension. Localized bow or roller wave shall not exceed 0.1 mm over any 300 mm.



#### 6. Referred Standards:

- ASTM C1036 - Standard Specification for Flat Glass.
- ASTM C1048 - Standard specification for heat-treated flat glass - Kind HS, kind FT coated and uncoated glass.
- ASTM C1279 - Standard Test Method for Non-Destructive Photoelastic Measurement of Edge and Surface Stresses in Annealed, Heat-Strengthened, and Fully Tempered Flat Glass
- BS EN 14179-1: 2016 - Glass in building. Heat-soaked thermally-toughened soda lime silicate safety glass. Definition and description
- BS 6262 - Code of practice for glazing for building.
- AAMA 101 - Voluntary specification for aluminium prime window and sliding glass door.

#### 3.5.5 Laminated glass

1. Base material shall be an approved selected quality float glass or heat-treated glass in accordance with the acceptance criteria listed as above. Glass for laminating is to be cut into individual panels prior to the laminating process. Laminated glass shall be fabricated with autoclaved edges on all four sides. When large unit sizes or unusual shapes are encountered,




it may be necessary to vacuum bag each special size/shape, in addition to the autoclaving process to ensure proper lamination.

2. Lamination procedure and quality control manual should be submitted before fabrication. The manufacturer will have to prove satisfactory lamination and resistance exposure to high temperatures and humidity of special size/shape units by performing a full size (or largest size) boil test from the first batch of laminated glass.
3. Polyvinyl Butyral (PVB) interlayers shall be approved Butacite®, Saflex®, Sekosui S-Lec™ or Trosifol®. Edges of laminated glass are to be protected to prevent delamination, contamination or other defect, caused by moisture, sealant contact or other external/internal source. SentryGlas® (SGP) interlayer can be used to enhance the weathering durability of lamination glass.
4. The minimum thickness of the interlayer shall be 1.52 mm (single layer or 2 layers of 0.76 mm) for flat glass and 2.28 mm (single layer or 3 layers of 0.76 mm) for curved glass panels or glass panel thicker than 12 mm. All laminated glass edges (specifically the PVB interlayer) shall be protected from contact with silicone sealants or exposure to the atmosphere unless written acceptance of such application issued by the glass and interlayer manufacturers are made available during the tender stage. All glass holes shall be ground chamfered. Maximum allowable offset of glass panes at visible finished edges, 1.6mm over the complete length of the glass panel. In the case of 3D curved glass pane, the tolerance should follow Project Consultant Specification requirement or Architect / Consultant approval.
5. Submit production and test record to ASTM C1048, ASTM C1172 or equivalent. Indicate test procedure, acceptance criteria and pass and/or fail rate. Submit material record for interlayer. Provide daily record of maximum factory temperature and humidity and weekly record of water quality used for washing glass. In the event that Interlayer Supplier application requirement are not satisfied, batches of non-complying glass shall be rejected.
6. Use glazing material that does not cause deterioration or discolouration of the interlayer. Submit test result in accordance with and approved test programme to confirm the compatibility of laminated glass with adjacent glazing material.
7. There shall be no observable delamination or shrinkage at the edges of laminated glass by the end of defect liability period and delamination or shrinkage shall not excess 5 mm throughout the warranty period as required by this Specification. Written confirmation from the glass and interlayer manufacturers shall be made available for the Architect's approval prior to ordering of the glass. The Sub-Contractor shall replace all delaminated glass panels within the warranty; all associated costs, including but not limited to scaffolding, material and labour shall be borne solely by the Sub-Contractor.
8. Referred Standards:
  - GANA - Glazing Manual
  - ANSI Z97.1 - Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test (includes errata)
  - ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass.



### 3.5.6 Insulating Glass Unit

1. Insulating glass units (IGU) (or also known as double glazed units) of approved types in accordance with ASTM E774, AS 2208, and the recommendations of SIGMA. Submit complete details, including all construction details, primary and secondary seals, gas filling, corner treatment, nature of spacers, moisture evacuation and assembly process.

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2. IGU shall incorporate approved polyisobutylene primary (vapor) seals continuously bonded to glass, and two-part silicone secondary (structural) seals. Primary seal shall be not less than 3 mm deep. Secondary seal shall be Dow Corning or G.E. approved equal two-part structural silicone sealant. Secondary seal shall completely cover spacer with no gaps or voids, continuously bonded to glass. Spacer bar shall be an approved proprietary aluminium type, desiccant filled, anodized in an approved colour compatible with seals. Conceal spacer bar within the depth of the glazing gasket line to ensure smooth sight line. Details and colour samples should be submitted for Architect's approval.
  3. Distance between the outer edge of the glass and the innermost edge of the aluminium spacer indicating minimum bite of secondary (structural) seal and spacer bar depth shall be supported by structural calculation in accordance with ASTM C1249. Include sealant manufacturer's recommendations and load table.
  4. IGU Production and test records (such as test procedures, acceptance criteria and pass/fail rate to AS 2208 or equivalent Standards) shall be submitted for review. Test report from a recognized testing laboratory shall be submitted which indicates the IGU type attaining Class A as defined in ASTM E774 when having tested in accordance with ASTM E773.
  5. All IGU glasses shall be fabricated in compliance with ASTM E2190. Testing proposal for the IGU to check the structural integrity should be submitted for statutory approval before production. Test report/certificate indicating compliance with ASTM E2190 with respect to specification and seal durability for IGU should be submitted.
  6. Unless otherwise specified on the Drawings, the exterior glass pane of IGU shall be heat strengthened glass and the interior glass pane of IGU should be tempered glass. Tin side of the glass panes should be located on the outermost surfaces of IGU for future surface stress measurement.
  7. All IGU shall be free from evidence of manufacturing defects and shall be from: -
    - i) Intrusion of moisture or dirt.
    - ii) Internal condensation at temperature above 10°C.
    - iii) Other visual evidence of seal failure or performance failure.
  8. Referred Standards:
    - ASTM C1087 - Standard test method for determining compatibility of liquid-applied sealants with accessories used in structural glazing techniques.
    - ASTM C1249 - Standard guide for secondary seal for sealed insulating glass units for structural sealant glazing applications.
    - ASTM C1265 - Standard test method for determining the tensile properties of an insulating glass edge seal for structural glazing applications.
    - ASTM C1369 - Standard specification for secondary edge sealants for structural glazed insulating glass units.
    - ASTM E546 - Test for dew point of sealed insulating glass units.
    - ASTM E773 - Standard test methods for seal durability of sealed insulating glass units.
    - ASTM E774 - Standard specification for sealed insulating glass units.
    - ASTM E2188 - Standard test method for insulating glass unit performance.
    - ASTM E2189 - Standard test method for testing resistance to fogging in insulating glass units.

- ASTM E2190 - Standard specification for insulating glass unit performance and evaluation.
- SIGMA - Sealed and insulating Glass Manufacturer's Association

### 3.5.7 Visual Acceptance Criteria

1. The glass shall be clean cut, without significant edge faults (including feathered edges, shells or other imperfections) and free from bubbles, inclusions, cracks, ripping, dimples or other defects. Distortion shall be kept to an absolute minimum and no local defects producing irregular reflections shall be allowed.
2. Acceptance criteria shall comply with ASTM C1036 - Type "Q3" for architectural glass product in general and ASTM C1048 for heat strengthened glass and fully tempered glass. The minimum requirement shall be one-half the published tolerances in this standard.
3. The quality of all glass shall be assessed for optical and visual faults as described in BS EN 572-2. Spot faults shall not be worse than category C. There shall be no linear/extended faults. For optical faults, acceptance levels shall be as described.
4. In the absence of a British standard covering visual process blemishes in laminated glass, reference shall be made to ASTM C1172 Table 3 for architectural quality glass.
5. Glass manufacturers' logos and glass type identification marks shall be sized as small as possible. They shall be located in the bottom left hand corner of the panes when viewed from the inside to the outside. Samples of each glass type with logo attached shall be submitted for the Architect's approval.
6. Client and Architect may invite inspectors from related parties for 100% inspection carried out from internal side after cleaning by the Sub-Contractor.
  - i) Inspection should be done at 1 meter distance from glass surface by naked eye.
  - ii) All glass shall be free from blemishes (e.g. crack, scratch, bubble, blister, all inclusion of deleterious matter and other defects).
  - iii) Point blemish size should not greater than 0.5 mm. Blemish size includes associated distortion of image. The allowable blemish size should not form a cluster that is detectable at 1.8 meter distance from glass surface by naked eye.
  - iv) Any blemish, scratch and/or any defect seen should be marked and kept record for further replacement with inspection.
  - v) Defective glass to be replaced by the Sub-Contractor on their own expenses.
7. For residential project, Client and Architect shall have the absolute right to request the Sub-Contractor to replace any glass units that in the Architect's professional opinion for visual acceptance or do not satisfy this criteria; the Sub-Contractor shall have no claim whatsoever on cost and time.

### 3.6 SEALANT MATERIAL

1. The Sub-Contractor must ensure that the sealant proposed is compatible with, and can develop adhesion to, the type of glass, cladding, stone, plaster, flashing, waterproofing, etc., that they come in contact with and are used for the project.
2. Sealant shall be one-part silicone sealant for weather and air seals and two-part silicone sealant for structural glazing:

3. It is the Sub-Contractor's responsibility to determine the need for main and secondary steelwork and to carry out the design and documentation of the steelwork. The Drawings are indicative of the design intent and illustrate the mandatory geometry and exposed surfaces.
4. All steelwork exposed to external conditions including elements hidden behind external metal cladding panels shall be hot-dip galvanized according to BS EN ISO 1461. Where steelwork is visually exposed, it shall be painted with Polyurethane paint (DFT min. 80um) as approved or directed by the Architect. Where steelwork is exposed to wet areas and not able to be inspected, it shall be grade 316 Stainless Steel.

### 3.4 STAINLESS STEEL

1. Stainless steel in plate, sheet and strip shall comply with BS EN 10029, BS EN 10048, BS EN 10088, BS EN 10258 and BS EN 10259 as appropriate.
2. Austenitic grade 1.4401 (formerly grade 316) stainless steel shall be used for exterior visible, exposed condition, unexposed condition in wet areas, or structural components. Austenitic grade 1.4301 (formerly grade 304) stainless steel can be used in all other circumstances. However, Austenitic grade 1.4404 (formerly grade 316L) stainless steel shall be used where stainless steel welding is required.
3. Grade A4 shall be used for exterior or exposed fixings and fasteners, in all other circumstances grade A2 can be used.
4. All visible surfaces in stainless steel shall be as specified by the Architect. The direction of the texturing shall be the same in any continuous run of panels. The stainless steel finish selected shall not discolour during its design life when subjected to normal atmospheric conditions. With the exception of hidden welds, welds shall be fully finished to match adjacent surfaces.



### 3.5 GLASS

#### 3.5.1 General



1. Glass shall comply with the following minimum standards:
 

Generally:	BS EN 572, BS 952, BS 6262, AS 1288, ASTM E1300
Flat Glass:	ASTM C1036 (Minimum requirement of one-half the published tolerances for this standard)
Heat-Strengthened Glass:	ASTM C1048 (Minimum requirement of one-half the published tolerances for this standard)
Tempered Glass:	ASTM C1048 (Minimum requirement of one-half the published tolerances for this standard)
Insulated Glass Unit:	ASTM E773 & E774
Laminated Glass:	ASTM C1172 (Minimum requirement of one-half the published tolerances for this standard)
Heat Soak Process:	BS EN 14179 and Buildings Department requirements
Surface Stress Testing:	ASTM C1279 & C1048
Glass Impact Testing:	BS 6206 and/or BS EN 12600 for each glass type of glass being used for safety glazing
Glass Coating:	ASTM C1376

2. Because of its high strength, tempered glass may be used in facade systems to resist high wind pressure and horizontal imposed load. However, tempered glass is susceptible to spontaneous breakage induced by Nickel Sulphide inclusions. For this reason, annealed glass, heat-strengthened glass, laminated glass or other combinations of these types are recommended to use in the facade systems above ground floor in buildings. Unless otherwise specified by Architect, a single lite of tempered glass is prohibited to use as outermost glass panel above the ground floor in buildings.
3. The thickness and heat-treatment of glass shown on drawings are not prescribed data or values. The Sub-Contractor shall calculate the required glass thickness to meet the structural, environmental, acoustic and safety requirements. Structural calculation of strength and deflection for glass panels and glass structures shall be determined by proper engineering analysis with working stress and deflection. Direct use of charts is not acceptable due to discrepancy in underlying assumption for probability of failure, load duration and other criteria. Visual distortion of the glass will not be acceptable. The Sub-contractor shall increase the glass thickness as necessary to prevent visible distortion from occurring. All Glass in the same visual pane shall be the same thickness and/or 2mm different unless otherwise approved in writing.
4. Sub-Contractor shall submit heat soak process and QC program for approval by the Architect to ensure conformance with requirements listed in BS EN 14179-1. Detailed quality assurance scheme as stipulated in PNAP APP-37 and CoP for Structural Use of Glass 2018 shall be submitted for RSE and Consultant approval prior to consent submission. All records of heat soaking shall be submitted to the Architect for review following delivery of glass to the assembly factory or to site.
5. Provide approved glazing system, glass and glazing accessories with detailed technical information that complies with all performance requirements. Use installation method that prevents the glass making direct contact with metal or other non-resilient material.
6. Test reports on glass (surface stress, heat soak process, impact resistance, inter-alia) are to be prepared by a recognized independent HOKLAS accredited or equivalent test laboratory and endorsed by the Sub-Contractor to be submitted to and approved by the Architect prior to material ordering.
7.  As part of quality assurance, 100% joint inspection by glass factory QC, SHKP QC and sub-contractor QC in factory ensure the glass panel shall be clean cut, without significant edge faults (including feathered edges, shells or other imperfections) and free from bubbles, inclusions, cracks, ripping, dimples or other defects. Inspection distance should be in 1m and/or 0.2mm<sup>M</sup> respectively from glass surface by naked eye subject to Client / PM instruction.
8.  100% non-destructive photoelastic measurement of surface stresses in heat strengthened glass to ASTM C1279 should be conducted by glass factory.  
On-site non-destructive photoelastic measurement of surface stresses in heat strengthened and tempered glass to ASTM C1279 should be conducted. Unless otherwise accepted by the Architect, the number of on-site measurement should follow SHKP “加工廠外牆系統生產監督檢查計劃” and “工地安裝外牆系統監督檢查計劃” requirement.
9. Where the glass is used as part of or whole of a protected barrier, impact test report particular to the project shall be submitted to substantiate the impact resistance for safety requirement.
10. All technical requirements and visual acceptance shall also comply with Client's and Architect's particular specification. For residential project, Client and Architect shall have the absolute right to request the Sub-Contractor to replace any glass units that in the Architect's