

## **Curtain Wall Works**

In giving this approval of plans, I hereby impose the following conditions under item 6 in section 17(1) of the Buildings Ordinance (BO):

- (a) Safety test on a representative portion of the proposed curtain wall system should be carried out in accordance with the Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers (PNAP) APP-37 and the Code of Practice for the Structural Use of Glass 2018. The test should be carried out by an independent laboratory\* accredited by the Hong Kong Laboratory Accreditation Scheme (HOKLAS) or by other laboratory accreditation bodies which have reached mutual recognition agreements/arrangements with HOKLAS. The test results<sup>@</sup> should be appended with a statement signed by the Registered Structural Engineer and submitted prior to the application of occupation permit or the submission of Form BA14 as appropriate to confirm that the acceptance criteria appropriate to the test have been complied with.
- (b) Where steel welding is used for the connection of the curtain wall supports, welding procedures and welders should be assessed/tested in accordance with the appropriate provisions of the Annex A to the Code of Practice (CoP) for the Structural Use of Steel 2011.

2. The following conditions in respect of qualified supervision of works are imposed under item 6 in section 17(1) of the BO:

- (a) Qualified site supervision of the curtain wall works, including fabrication, erection and examination of the structural elements/fixings, by experienced and competent persons as defined in (b) and (c), should be provided to ensure that the works are carried out in accordance with the plans approved and that the required standards are complied with.
- (b) The Registered Structural Engineer (RSE) should assign a quality control supervisor to supervise the works, determine the necessary frequency of inspection by the quality control supervisor which should not be less than once a week, and devise inspection check lists. The minimum qualifications and experience of the quality control supervisor is to be the same as the Technically Competent Person of grade T3 under the RSE's stream, as stipulated in the CoP for Site Supervision 2009.
- (c) The Registered General Building Contractor (RGBC) should assign a quality control co-ordinator to provide full time on site supervision of the works and devise inspection check lists. The minimum qualifications and experience of the quality control co-ordinator is to be the same as the Technically Competent Person of grade T1 under the RGBC's/Registered Specialist Contractor's stream, as stipulated in the CoP for Site Supervision 2009.

/(d) ...

- (d) The names and qualifications of the supervisory personnel representing the RSE and the RGBC respectively should be recorded in an inspection log book. The date, time, items inspected and inspection results should be clearly recorded in the log book. The log book should be kept on site for inspection by representatives of the BD.

3. Also, under regulation 10 of the Building (Administration) Regulations (B(A)R), the following document(s) issued by the manufacturer(s) or supplier(s) and endorsed by the RSE are required to be submitted prior to the application of occupation permit or the submission of Form BA14 as appropriate:

- (a) Where structural sealant is proposed, compliance certificate comprising sealant compatibility report, sealant adhesion report and print review report.
- (b) Where insulating glass unit (IGU) is used, with load sharing consideration in the structural design, certificate to demonstrate seal durability requirement as per ASTM E2190-10 or equivalent.
- (c) With respect to the connection of the curtain wall supports, a copy of mill certificate of the structural steel used, which should be appended with a statement signed by the RSE to confirm that the requirements on chemical composition and mechanical properties appropriate to the class and grade of steel used have been complied with and the structural steel used is produced from a manufacturer with an acceptable Quality Assurance system.
- (d) With respect to the surface compressive stress of heat treated glass used, test reports for measurement using Grazing Angle Surface Polarimeter (GASP) in accordance with ASTM C1279-09 and assessment based on ASTM C1048-12e1 demonstrating compliance with the stress ranges, i.e. greater than 69 MPa for tempered glass and lying between 24 and 52 MPa for heat-strengthened glass.
- (e) Where the glazing of the curtain wall performs the function of a protective barrier complying with regulation 8 of the Building (Construction) Regulations, test reports demonstrating the type of glass achieving an impact resistance not inferior to the class 1 requirements with no glass breakage for safety glazing materials as stipulated in BS EN 12600:2002.
- (f) Where decorative glass/fritted glass is used, bending test reports to recognised testing standard such as BS EN 1288-3, with minimum 5 nos. test specimens to substantiate the strength of the glass.

4. Where laminated glass is used with composite action not greater than 70% of the stiffness of an equivalent monolithic glass with a total thickness equal to the sum of thickness of individual glass panes, under regulation 10 of the B(A)R, the following document(s) issued by the manufacturer(s) or supplier(s) and endorsed by the RSE are required to be submitted prior to the application of occupation permit or the submission of Form BA14 as appropriate:

/(a) ...

- (a) Test report to justify the composite action by bending test as stipulated in Annex B1 of the CoP for the Structural Use of Glass 2018.
- (b) Reports of the following durability tests to verify the long term effects on interlayer materials now approved:
  - (i) Boil test and weathering test as stipulated in ANSI Z97.1; or
  - (ii) High-temperature test and radiation test as stipulated in BS EN ISO 12543.

5. The following conditions are imposed under item 6 in section 17(1) of the BO for the use of tempered glass for the curtain wall works:

- (a) The tempered glass should be manufactured by a factory acquired ISO 9001 quality assurance certification.
- (b) Heat soak process conforming to BS EN 14179-1:2016 or other equivalent international standards should be carried out to all tempered glass panes, as one of the quality control measures.
- (c) All thermocouples for heat soak process should be calibrated at 6-month intervals as recommended in the HOKLAS Supplementary Criteria No. 2.
- (d) A copy of quality supervision plan\*\* prepared by the RSE and the RGBC for the quality supervision of manufacturer's heat soak process shall be submitted prior to the application for consent to the commencement of works.

6. Also, under regulation 10 of the B(A)R, where tempered glass is used for the curtain wall works the following documents shall be submitted:

- (a) A copy of Quality Assurance Scheme issued by the manufacturer and appended with a statement signed by the Registered Structural Engineer to declare that he or she has studied the Quality Assurance Scheme and confirm that there are adequate measures incorporated in the Scheme to ensure the quality of the tempered glass produced in compliance with the provisions of the BO and the approved plans. Such submission should be prepared in accordance with PNAP APP-37 and the CoP for the Structural Use of Glass 2018 and should be submitted prior to the application for consent to the commencement of the works.
- (b) A copy of the compliance report for the heat soak process issued by the glass manufacturer and endorsed by the RSE confirming that the compliance report has adequate provisions in ensuring the heat soak process has been duly carried out to all tempered glass. Such submission should be prepared in accordance with PNAP APP-37 and the CoP for the Structural Use of Glass 2018 and should be submitted prior to the application for occupation permit.

(c) ...

- (c) A copy of the quality supervision report\*\* prepared by the RSE and the RGBC for the quality supervisions of manufacturer's heat soak process should be submitted by the RSE prior to the application for occupation permit. Such submission should be prepared in accordance with PNAP APP-37. The report should include a statement signed by the RSE to confirm that adequate supervision has been provided in accordance with the quality supervision plan as mentioned in paragraph 5(d) above. The following should be contained in the inspection log book:
  - (i) The names and qualifications of the quality control supervisors\*\* representing the RSE and the RGBC for supervising the heat soak process for all tempered glass panes should be entered into the inspection log book. The date, time of inspections and data of the independent temperature logger for the heat soak process should be clearly recorded in the inspection log book, which should be kept in the factory and a soft copy of it should be kept on site and, when required, produced to the Building Authority for inspection.

7. AP/RSE is advised, upon completion of the building, to provide a maintenance manual including all construction records and necessary information of the curtain wall system to the owners of the building to facilitate the arrangement of periodic and full inspection of the curtain/window wall system. Paragraph 24 of PNAP APP-37 and Annex D of the CoP for Structural Use of Glass 2018 refer.

\* A Directory of Accredited Laboratories in Hong Kong is obtainable from the Hong Kong Accreditation Service (HKAS) Executive, Innovation and Technology Commission.

A laboratory's accreditation for an individual test or calibration may be granted, modified or withdrawn at any time. Up-to-date information on accredited laboratories and their scopes of accreditation are available on the internet at the HKAS website at <http://www.itc.gov.hk/hkas/>.

@ The test carried out by an accredited laboratory should be within its scope of accreditation. To ensure this, test results should be reported on a HOKLAS Endorsed Certificate or equivalent Certificate/Report issued from other laboratory accreditation bodies which have reached mutual recognition agreements/arrangements with HOKLAS.

/\*\* ...

**\*\* For the Personal Data contained in the documents/reports mentioned in this Appendix**

**Purposes of Collection**

- (i) The personal data provided will be used by the Buildings Department for the following purposes:
  - (a) activities relating to the processing of the submission;
  - (b) activities relating to works specified in this appendix; and
  - (c) facilitating communication between the Buildings Department and the related personnel.

**Classes of Transferees**

- (ii) The personal data provided may be disclosed to:
  - (a) other Government departments, bureaux & relevant organisations for the purposes mentioned in paragraph (i) above; and
  - (b) any person for the purpose mentioned in paragraph (i)(b) above.

**Access to Personal Data**

- (iii) Data subject has a right of access and correction with respect to personal data as provided for in sections 18 and 22 and principle 6 of Schedule 1 of the Personal Data (Privacy) Ordinance. Data subject's right of access includes the right to obtain a copy of his/her personal data provided by AP/RSE's submission.

**Responsibility of AP/RSE**

- (iv) AP/RSE should be responsible for disseminating of the above information to the relevant data subjects.