Large Metal Gates

The installation of metal gates[1] involves building works as defined under the Buildings Ordinance. This practice note provides guidelines on design and installation of large metal gates at fence walls or entrance of building as well as maintenance of metal gates.

2. For new buildings, metal gates should be shown on the building plans submitted for prior approval and consent by the Building Authority. For large metal gates with a height exceeding 3.2m, plans showing structural details of the metal gates including design calculations are also required to be submitted for approval. For the installation of new metal gates in existing buildings, if the height of the metal gate exceeds 3.2m, both building and structural plans are required to be submitted for approval prior to installation. Registered Contractors (RC) should ensure that the metal gates installed in their projects are properly designed and constructed.

Minor Works Relating to Metal Gates

3. Under the Minor Works Control System, certain works relating to installation of metal gates in existing buildings have been designated as minor works, which may be carried out under the simplified requirements as an alternative to obtaining prior approval and consent from the Building Authority (BA). For the list of minor works items and the simplified requirements, please refer to Schedule 1 of the Building (Minor Works) Regulation and PNRC 71 respectively.

Design and Installation Requirements

4. In general, all metal gates should be constructed of suitable materials and satisfy the performance requirements stipulated in the Building (Construction) Regulation 3. They should be properly designed and constructed in accordance with recognised standards to ensure their satisfactory and safe operation under the expected conditions of use. All parts of the metal gate installations, whether fixed or movable, including the fixings, should in all respects be of sound construction, adequate strength and free from obvious defects for their intended working life.

5. The installation of large metal gates should be under the qualified supervision of a registered general building contractor (RGBC) or registered minor works contractors (RMWC) as the case may be to ensure that the works are carried out in accordance with the approved plans or the prescribed plans of minor works and the required standards are complied with. Upon completion of installation, the metal gate should be inspected and trial operated to ensure that it has been properly installed.

/6. ...

[1] Manually or electrically operated.

6. In the erection of metal gate, special attention should be paid to the following structural details to ensure that they are properly constructed in accordance with the approved plans:

(a) the elements of the gate framework, post support and foundation to maintain the stability of the metal gate during operation;

(b) connection to fix the gate framework to the surrounding structure;

(c) for swing-type metal gate, hinge pin fittings to permit pivotal movement;

(d) for sliding metal gate, end stoppers to prevent the metal gate from over-travel at both ends; and similar provisions made for multi-passing metal gate which also serve as connection between gate leaves; and

(e) additional measures that are provided to stop the metal gate from being lifted off or derailment during operation.

Additional Measures and Reference Standards

7. Recommendations on additional measures, design considerations and maintenance for enhancing the safety of metal gates are given in Appendix A. Some relevant standards/specifications for the design and installation of metal gates are given in Appendix B. RC may also make reference to other national standards and specifications if equivalent performance can be demonstrated.

Tests on Anchors

8. Where drilled-in anchors are proposed to secure the stability of metal gate, at least 5 numbers of each type and size of the anchors installed should be tested by pull-out test to demonstrate that its pull-out capacity is not less than 1.5 times the recommended tensile load as specified by the anchor manufacturer. The tested anchor should be considered satisfactory if it does not show any signs of separation, plastic deformation or deleterious effect during the test. Such tests should be carried out under the direction of the Authorized Person (AP)/Registered Structural Engineer (RSE) for metal gates with plans approved by the BA or submitted as minor works submissions with the Prescribed Building Professionals (PBP) appointed. Regarding metal gates with plans submitted as minor works submissions without the PBP appointed, such tests should be carried out under the direction of the RGBC or RMWC as the case may be.

Electrically Operated Metal Gates

9. For electrically operated metal gates, reference should also be made to the "Code of Practice for Installation of Electrically Operated Sliding Gates, Sliding Glass Doors and Rolling Shutters"[2] published by the Electrical and Mechanical Services Department.

/Guidelines ...

[2] https://www.emsd.gov.hk/filemanager/en/content_659/COP%20for%20Sliding%20Gate_E_-Final-072903.pdf

Guidelines for Authorized Person and Registered Structural Engineers

10. A similar practice note is issued to AP and RSE.

(CHEUNG Tin-cheung)
Building Authority

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Appendix A
(PNRC 68)

Recommendations for Enhancing the Safety of Metal Gates

Swing-Type Metal Gate

All hinge fittings of a swing-type metal gate should be welded all round to the gate framework and should be able to withstand the dead weight of the metal gate and wind loads during normal operation.

2. A minimum of 3 hinges should be provided for the connection between the metal gate and each supporting post. To prevent the metal gate being lifted off from its hinges after installation, measures such as installing one of the hinge fittings with the hinge pin pointing in a reverse direction should be incorporated for providing restraint against vertical movement.

Sliding Metal Gate

3. The gate leaf as well as any other moving parts of a sliding metal gate should be designed and constructed in such a way so as to prevent them from falling down, collapsing or derailment during normal operation or in case of contact with stationary obstacles. Proper design and provisions of guide and metal gate stopper of adequate size and strength are required to maintain lateral stability of the metal gate and to resist the imposed loads and impact force.

Folding Metal Gate

4. Paragraphs 1 to 3 above are applicable to a folding metal gate with two or more hinged leaves, guided and/or supported at the top or at the bottom. Similar provisions for preventing the gate leaf from being lifted off should be made for the hanging fittings connecting the hinged leaves.

Installation and Use

5. Before installation, all members and components of the metal gate should be visually inspected to ensure that they are free from visual defects and comply with the approved structural details.

Maintenance and Repair

6. All parts of the metal gate providing mechanical resistance and connection, whether fixed or movable, are subject to normal deterioration of wear and tear. Regular inspection and maintenance should be provided to safeguard the metal gate from disengagement or derailment.

/7. ...

7. The AP should coordinate with the RGBC or RMWC to prepare documentation on the safe operation and maintenance of the metal gate installed, for regular maintenance and repair to be arranged by the Incorporated Owners/management company. Routine inspection and maintenance work such as cleaning of dirt and obstacles from the track and guide rail, and application of lubrication to enable smooth movement of the metal gate should be carried out every three months.

Appendix B
(PNRC 68)

Relevant Standards and Specifications for Metal Gates

The various standards, specifications for the design and installation of metal gates as listed below are intended to provide reference information and the list is not exhaustive. Other international or national standards and specifications may also be referred to if equivalent performance can be demonstrated.

BS 4092:Part 1:1996	:	Domestic front entrance gates. Specification for metal gates.
BS EN 12433-1:2000	:	Industrial, commercial and garage doors and gates. Terminology. Types of doors.
BS EN 12433-2:2000	:	Industrial, commercial and garage doors and gates. Terminology. Parts of doors.
BS EN 12604:2000	:	Industrial, commercial and garage doors and gates. Mechanical aspects. Requirements.
BS EN 12605:2000	:	Industrial, commercial and garage doors and gates. Mechanical aspects. Test methods.
BS EN 12635:2002 +A1:2008	:	Industrial, commercial and garage doors and gates. Installation and use.
BS EN 13241-1:2003 +A2:2016	:	Industrial, commercial and garage doors and gates. Product Standard. Products without fire resistance or smoke control characteristics.
BS EN ISO 1461:2009	:	Hot dip galvanised coatings on fabricated iron and steel articles. Specifications and test methods.
BS EN ISO 12944-1 to 4:1998	:	Paints and varnishes. Corrosion protection of steel structures by protective paint systems.
BS EN ISO 12944-5:2007	:	Ditto
BS EN ISO 1294-6 to 8:1998	:	Ditto
BS EN ISO 14713-1 :2017	:	Zinc coatings. Guidelines and recommendations for the protection against corrosion of iron and steel in structures.
BS EN ISO 14713-2:2009	:	Ditto
BS EN ISO 14713-3:2017	:	Ditto
BS EN 1176-1:2017	:	Playground equipment. General safety requirements and test methods.

(Rev. 4/2018)