GENERAL SPECIFICATION

FOR

CATERING EQUIPMENT INSTALLATION

IN

GOVERNMENT BUILDINGS

OF

THE HONG KONG SPECIAL ADMINSTRATIVE REGION

2012 EDITION

ARCHITECTURAL SERVICES DEPARTMENT
THE GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION

PREFACE

This General Specification aims to lay down the technical requirements of materials and equipment, the standards of workmanship, the requirements on testing and commissioning as well as requirements on document submissions for catering equipment installation in Government Buildings of the Hong Kong Special Administrative Region (HKSAR).

The 2012 edition of this General Specification was developed based on its 2007 edition by the Mechanical Specialist Support Group that was established under the Building Services Branch Technical Information and Research & Development Committee. This new edition incorporates updated international standards as well as technological developments which find applications in Hong Kong. To be in line with the department's endeavour to reduce the environmental burden on our neighbours and to help preserving common resources while improving the quality of our service, this new edition has continued putting emphasis on green initiatives and initiatives for enhancement of client satisfaction on completed projects.

With the benefit of information technology, electronic version of this new edition is to be viewed on and free for download from the Architectural Services Department (ArchSD) Internet homepage. As part of the Government's efforts to limit paper consumption, hard copies of this General Specification will not be put up for sale.

The draft of this edition has been circulated to stakeholders within and external to the Government before finalization. Nevertheless, the Architectural Services Department welcomes comments on its contents at anytime since the updating of this General Specification is a continuous process for the inclusion of any developments that can help meeting the needs of our community.

DISCLAIMER

This General Specification is solely compiled for a catering equipment installation carried out for or on behalf of the ArchSD in Government buildings of the HKSAR.

There are no representations, either expressed or implied, as to the suitability of this General Specification for purposes other than that stated above. Users who choose to adopt this General Specification for their works are responsible for making their own assessments and judgement of all information contained here. The ArchSD does not accept any liability and responsibility for any special, indirect or consequential loss or damage whatsoever arising out of or in connection with the use of this General Specification or reliance placed on it.

The materials contained in this document may not be pertinent or fully cover the extent of the installation in non-government buildings and there is no intimated or implied endorsement of the sales, supply and installation of the materials and equipment specified in this General Specification within the territory of the HKSAR.

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PART A – SCOPE AND GENERAL REQUIREMENTS

SECTION A1

SCOPE OF SPECIFICATION

A1.1 INSTALLATION TO COMPLY WITH THIS GENERAL SPECIFICATION

The catering equipment installation shall comply with this General Specification which details the intrinsic properties (including materials and workmanship) of the installation, in so far as it is not overridden by the General Conditions of Contract, Special Conditions of Contract, Particular Specification for the Works, Drawings and/or written instructions of the Architect.

A1.2 SCOPE OF THE WORKS

This General Specification, Particular Specification, Tender Equipment Schedule and Drawings detail the performance requirements of the Works. The Works to be carried out in accordance with this General Specification shall include the whole of the installation and supply of all materials necessary to form a complete installation including any necessary tests, adjustments, commissioning and maintenance as prescribed and all other incidental sundry components together with the necessary labour for installing such components, for the proper operation of the installation.

A1.3 TERMS AND DEFINITIONS

In this General Specification, the following words or expressions shall have the meanings assigned to them except when the context otherwise requires: -

A1.3.1 Terms and Definitions

Architect	The Architect or the Maintenance Surveyor or the Supervising Officer as defined in the Contract.
Building Contractor	The Contractor employed by the Employer for the execution of the Works as defined in the Contract or the contractor separately employed by the Employer to execute the builder's work associated with the Works as appropriate.
Contract	The Contract defined in the General Conditions of Contract for the Works or the Sub-contract defined in the Specialist Sub-contract for the Works or the Sub-contract defined in the Nominated Sub-contract for the Works as appropriate

Contractor	The contractor employed by the Employer or the Specialist Sub-contractor employed by the Building Contractor or the Nominated Sub-contractor nominated by the Architect for the execution of the Works as appropriate
Temporary Works	All temporary work of every kind required for the construction, completion and maintenance of the Works.
Tender	The Contractor's tender for the Works Contract or the Specialist Sub-contractor's tender for the Works Specialist Sub-contract or the Nominated Sub-contractor's tender for the Works Nominated Sub-contract as appropriate.

A1.3.2 Abbreviations

BS	British Standards, including British Standard Specifications and British Standard Codes of Practice, published by the British Standards Institution
BS EN	European Standard adopted as British Standard
FSD	Fire Services Department of the Hong Kong Special Administrative Region
EMSD	Electrical and Mechanical Services Department of the Hong Kong Special Administrative Region
HKSAR	Hong Kong Special Administrative Region
IEC	International Electrotechnical Commission Publications
IEE	Institution of Electrical Engineers of United Kingdom
ISO	International Organisation for Standardization
LPG	Liquefied Petroleum Gas as defined under the Gas Safety Ordinance (Cap 51)
LPGA	Liquefied Petroleum Gas Association of United Kingdom (previously known as Liquefied Petroleum Gas Industry Technical Association)
EE_TC	Testing and Commissioning Procedure for Electrical Installation in Government Buildings, Hong Kong, issued by the Architectural Services Department, the HKSAR

KE_TC	Testing and Commissioning Procedure for Catering Equipment Installation in Government Buildings, Hong Kong, issued by the Architectural Services Department, the HKSAR
WSD	Water Supplies Department of the Hong Kong Special Administrative Region.

A1.4 SINGULAR AND PLURAL

Words importing the singular only also include the plural and vice versa where the context requires.

A1.5 DESIGN RESPONSIBILITY

Where design is specified for any part of the Works, the Contractor shall design the catering equipment installation to comply with the statutory requirements as well as the requirements in the Specification. Where design is not specified, the Contractor shall still develop the design shown in the Drawings or in the Particular Specification, complete the detailed design and installation details of the whole catering equipment installation and select the most appropriate equipment design to comply with the statutory requirements and all other requirements of the Specification. All design drawings, calculation and installation details shall be submitted to the Architect for approval.

All design shall be checked and endorsed by a qualified and experienced staff of the Contractor approved by the Architect before submission.

The design shall take into consideration of the catering operational flow in the kitchen to achieve maximum efficiency in operation and to serve the required number and types of meals during the peak hours.

SECTION A2

STATUTORY OBLIGATIONS AND OTHER REGULATIONS

A2.1 STATUTORY OBLIGATIONS AND OTHER REQUIREMENTS

The catering equipment installation shall comply with the following:

A2.1.1 Statutory Obligations

(a) Gas Safety Ordinance, Chapter 51, Laws of the Hong Kong Special Administrative Region and all the Gas Safety Regulations;

(b) Codes of Practice and other requirements published by the Gas Authority;

(c) Codes of Practice for Minimum Fire Service Installations and Equipment and Inspection, Testing and Maintenance of Installation and Equipment published by the Fire Services Department, the HKSAR;

(d) Requirements and Circular Letters of Fire Services Department of the Hong Kong Special Administrative Region;

(e) Buildings Ordinance, Chapter 123, Laws of the Hong Kong Special Administrative Region and all subsidiary Regulations and associated Codes of Practice published by the Buildings Department, the HKSAR;

(f) Dangerous Goods Ordinance, Chapter 295, Laws of the Hong Kong Special Administrative Region;

(g) Electricity Ordinance, Chapter 406, Laws of the Hong Kong Special Administrative Region and all subsidiary Regulations and associated Codes of Practice published by the Electrical and Mechanical Services Department, the HKSAR;

(h) Waterworks Ordinance, Chapter 102, Laws of the Hong Kong Special Administrative Region;

(i) Fire Service (Installation and Equipment) Regulations, Fire Services Ordinance, Chapter 95, Laws of the Hong Kong Special Administrative Region;

(j) Water Pollution Control Ordinance, Chapter 358, Air Pollution Control Ordinance, Chapter 311, Noise Control Ordinance, Chapter 400, Waste Disposal Ordinance, Chapter 354, Laws of the Hong Kong Special Administrative Region and all the statutory regulations related to the environmental protection;

(k) Environmental Impact Assessment Ordinance, Chapter 499 and other subsidiary legislation made under the Ordinance;

(l) All gas works shall be carried out in person by registered gas installers employed by registered gas contractor in compliance with Gas Safety Ordinance. All electrical works shall be carried out or supervised by appropriate grade of registered electrical workers in compliance with Electricity Ordinance. Relevant work completion certificates shall be submitted; and

(m) All domestic gas appliances supplied and installed in the Works shall have the approval by the Gas Authority in accordance with the Code of Practice GU05 "Approval of Domestic Gas Appliances" published by the Gas Authority, the HKSAR.

A2.1.2 Other Requirements

(a) British Standard Specifications and British Standard Codes of Practice published by the British Standards Institution, or equivalent International Standards acceptable to the Gas Authority and demonstrated to be equivalent in overall technical substitute on the type of construction, functions, performance, general appearance and standard of quality of manufacture and approved by the Architect;

(b) General Specification for Electrical Installation in Government Buildings of the Hong Kong Special Administrative Region issued by the Architectural Services Department (hereinafter referred as General Electrical Specification);

(c) General Specification for Fire Service Installation in Government Buildings of the Hong Kong Special Administrative Region issued by the Architectural Services Department;

(d) General Specification for Liquefied Petroleum Gas Installation in Government Buildings of the Hong Kong Special Administrative Region issued by the Architectural Services Department;

(e) General Specification for Air-conditioning, Refrigeration, Ventilation and Central Monitoring and Control System Installation in Government Buildings of the Hong Kong Special Administrative Region issued by the Architectural Services Department (hereinafter referred as General A/C Specification);

(f) General Specification for Building issued by the Architectural Services Department of the Hong Kong Special Administrative Region;

(g) Rules and regulations for town gas supply of The Hong Kong and China Gas Co. Ltd.; and

(h) Requirements from relevant authorities for licensed premises.

A2.1.3 Safety Requirements

(a) Occupational Safety and Health Ordinance, Chapter 509, Laws of the Hong Kong Special Administrative Region;

(b) Public Health and Municipal Service Ordinance, Chapter 132, Provision of Municipal Service (Reorganisation) Ordinance, Chapter 552, Laws of the Hong Kong Special Administrative Region;

(c) Factories and Industrial Undertakings Ordinance, Chapter 59, and other subsidiary legislation made under the Ordinance;

(d) Construction Site (Safety) Regulations; and

(e) Construction Site Safety Manual issued by the Environment, Transport and Works Bureau, the Government of the HKSAR.

A2.1.4 Technical Standards

BS, BS EN, ISO Standards, IEC Standards and Codes of Practice, etc., and other technical standards, quality standards, rules, design manuals, guidelines, technical requirements and specifications in this General Specification shall be deemed to include all amendments, revisions and standards superseding the standards listed herein, which are current at the closing date of the tender of the Contract, unless otherwise specified or unless the latest amendments are not allowed or approved by relevant authorities under the statutory regulations. Equivalent International Standards may be used if approved by the Architect.

Materials, equipment and products that comply with equivalent technical standards and demonstrated to be equivalent in overall technical substitute on the type of construction, functions, performance, general appearance and standard of quality of manufacture to the standards and requirements listed herein may be submitted to the Architect for consideration and approval.

A summary of technical standards quoted in this General Specification to which the Works shall comply is listed in Annex I.

A2.2 CASE OF CONFLICT

The documents forming the Contract are to be taken as mutually explanatory of one another but in case of ambiguities or discrepancies the same shall be explained by the Architect who shall issue to the Contractor instructions clarifying such ambiguities or discrepancies.

SECTION A3

EXECUTION OF WORKS

A3.1 THE INTERNATIONAL SYSTEM OF UNITS (SI)

The International System of Units (System International d'Unites) of weights and measures shall be used for all materials, equipment and measurements.

A3.2 PROGRAMME OF WORKS

The Contractor shall submit to the Architect a detailed programme of the Works within 4 weeks from the acceptance of his Tender showing the intended method, stages and order of work execution in coordination with the building construction programme, together with the duration he estimated for each and every stage of the Works. The programme shall include at least the following:

(a) Dates for placement of orders for equipment and materials.

(b) Expected completion dates for builder's work requirements, i.e. when work site needs to be ready.

(c) Delivery dates of equipment and materials to Site.

(d) Dates of commencement and completion of every stage of the Works in line with the building construction programme, i.e. each floor level and/or zone area.

(e) Dates of documents/drawings submissions to relevant Government departments to obtain the necessary approvals.

(f) Dates of requirement of temporary facilities necessary for testing & commissioning, e.g. electricity supply, water and town gas.

(g) Dates of completion, testing and commissioning.

(h) Short term programmes showing the detailed work schedules of coming weeks and months shall also be provided to the Architect. Programmes shall be regularly updated to reflect the actual progress and to meet the Contractor's obligations under the Contract.

In addition, detailed submission schedules for installation drawings, equipment and testing and commissioning shall be submitted to the Architect for approval. The formats and information to be included in the schedules shall be as required by the Architect.

A3.3 BUILDER'S WORK

All builder's work including pipework openings, holes through building structure, partition walls; trenches, ducts and cutting; and all plinths, concrete bases, supports, ducts etc. required for the installation will be carried out as part of the building works by the Building Contractor at the expense of the Employer provided that the Contractor has submitted full details of such requirements within a reasonable time to the Architect for approval, so that due consideration may be given before the Building Contractor commences the building works in accordance with the building programme in the areas concerned. After obtaining the said approval of the Architect, the Contractor is required to mark out at the relevant locations of the Site the exact positions and sizes of all such works and to provide detailed information of such works to the Building Contractor to facilitate him to carry out the builder's works as the works proceed.

All 'cutting-away' and 'making-good' as required to facilitate the Contractor's works will be carried out by the Building Contractor, except for minor provisions required for the fixing of screws, raw plugs, redhead bolts, etc. which shall be carried out by the Contractor. The Contractor shall mark out on Site and/or supply drawings of all 'cutting-away' to the Building Contractor within a reasonable time.

All expenses properly incurred and losses suffered by the Employer as a result of the Contractor's failure to comply with the above requirements are recoverable by the Employer from the Contractor.

The Contractor shall ensure that such works are essential for the execution of the Works. In the event that any of such works is proved to be non-essential, unnecessary and/or abortive, the Contractor shall bear the full cost of such works including but not limited to any unnecessary or incorrect cutting-away and making-good and shall reimburse the Employer for all cost incurred in this connection.

Upon completion of the builder's works by the Building Contractor, the Contractor shall forthwith check and examine that all builder's works so executed have been completed in accordance with his requirements. If at any time it becomes apparent to the Contractor that any builder's works completed by the Building Contractor does not comply with his requirements in any respect whatsoever, the Contractor shall forthwith give notice in writing to the Architect and specify in details the extents and effects of such non-compliance in that notice. The Contractor is deemed to have satisfied with the builder's works after a period of 14 days from the date of completion of the builder's works if the above notice is not served to the Architect within such period. All additional expenditure properly incurred and all loss suffered in this connection by the Employer in having such works re-executed and rectified shall be recoverable by the Employer from the Contractor.

A3.4 COORDINATION OF CONTRACT WORKS

The Contractor shall coordinate the Works with those works of the Building Contractor and any other contractors and sub-contractors.

The Contractor shall note that the Drawings supplied to him only indicate the approximate locations of the work. He shall make any modification reasonably required of his programme, work sequence and physical deployment of his work to suit the outcome of work coordination or as necessary and ensure that all cleaning, adjustment, test and control points are readily accessible while keeping the number of loops, cross-overs and the like to a minimum.

The Contractor shall pay particular attention to the building works programme and shall plan, coordinate and programme his works to suit and adhere to the building works in accordance with the building programme.

Any significant problems encountered during the coordination work, which are beyond the Contractor's control, shall promptly be reported to the Architect.

A3.5 COOPERATION WITH OTHER CONTRACTORS

The Contractor shall cooperate at all times with the Building Contractor and all other contractors and sub-contractors in order to achieve efficient workflow on Site.

Any significant problems beyond the Contractor's control shall promptly be reported to the Architect.

A3.6 SITE SUPERVISION

The Contractor shall keep on the Site a competent and technically qualified site supervisor to control, supervise, co-ordinate and manage all his Works on site. The supervisor shall be vested with suitable powers to receive instructions from the Architect.

The site supervisor shall be technically competent and have adequate site experience for the Works. The Contractor shall also refer to the Particular Specification for other specific requirements, if any, on site supervision.

Approval by the Architect shall be obtained prior to the posting of the supervisor on Site. The Contractor shall immediately replace any site supervisor whose experience, skill or competency is, in the opinion of the Architect, found to be inadequate for the particular work.

A3.7 SAMPLE BOARD

Within 6 weeks of the acceptance of his Tender and prior to the commencement of installation work, the Contractor shall submit to the Architect for approval in good time a sample board of essential components proposed to be used in the Contract. However, the Contractor may request the Architect in writing for an extended period of submission, if 6 weeks are practically insufficient.

Items displayed shall deemed to be adequate for the Works unless otherwise clearly indicated. Each sample, with clear numbering and labelling, shall be firmly fixed onto a rigid wooden or metal board. A list shall also be affixed on the sample board to show the item description, make and brand, country of origin and locations of installation (if not generally used). Samples rejected by the Architect shall be replaced as soon as possible. Upon approval of all items, the Architect will endorse the list on the sample board and the Contractor shall deliver the board to the site office for reference.

The following items shall be included in the sample board as a minimum. Additional items may be required by the Architect and/or specified in the Particular Specification.

(a) Stainless steel panel;

(b) Valves;

(c) Water taps;

(d) Cables; and

(e) Electrical wiring accessories.

A3.8 ADVICE OF ORDER PLACED

The Contractor shall submit copies of all orders placed for major items of equipment and materials to the Architect for record.

A3.9 RECORD OF MATERIALS DELIVERY

All materials delivered to Site shall be accurately listed and recorded in the site record books maintained by the representatives of the Architect on Site.

Materials and equipment delivered to Site and paid for in interim payment shall be the Employer's property. Such materials and equipment shall not be removed from Site without the approval of the Architect in writing and appropriate deduction shall be made in the next interim payment in accordance with the Contract.

Where the Building Contractor is in overall control of the Site, the Building Contractor may also be required to record details of all incoming/outgoing materials. In this case, the Contractor shall comply with the Building Contractor's arrangements.

A3.10 PROTECTION OF MATERIALS AND EQUIPMENT

Unless the responsibility is clearly defined in the Contract that the protection on Site for delivered equipment, materials and installation is solely by other contractors, the Contractor shall be responsible for the safe custody of all materials and equipment as stored or installed by him until finally inspected, tested and accepted. In addition, the Contractor shall protect all work against theft, fire, damage or inclement weather and carefully store all materials and equipment received on Site but not yet installed in a safe and secure place unless otherwise specified.

All cases of theft and fire must immediately be reported to the police, the Building Contractor, the Architect and the Architect's representatives on Site with full details.

Where necessary the Contractor shall provide lockable steel containers or other equally secure enclosures placed within a securely fenced-in compound provided by the Building Contractor on Site for the storage of materials and equipment.

The Contractor shall co-ordinate and arrange with the Building Contractor who shall provide clean, reasonably finished and lockable secure accommodation for the storage of sensitive and/or expensive items before installation.

If there is no Building Contractor, all the storage facilities and spaces shall be provided by the Contractor.

A3.11 REGISTERED PERSONNEL

The Contractor shall employ registered personnel to carry out the Works under the Catering Equipment Installation as follows: -

(a) Town gas, liquefied petroleum gas and natural gas works - Registered gas installer(s) under Gas Safety Ordinance, Cap 51, Laws of the Hong Kong Special Administrative Region. Such registered gas installer(s) shall be registered in the appropriate class of work with the Gas Authority;

(b) Electrical works – Electrical contractor(s) and worker(s) registered under Electricity Ordinance, Cap 406, Laws of the Hong Kong Special Administrative Region in the grade(s) relevant to the type(s) of installation concerned;

(c) Water works – Licensed plumber(s) registered under Waterworks Ordinance, Cap 102, Laws of the Hong Kong Special Administrative Region.

SECTION A4

DRAWINGS AND MANUALS

A4.1 DRAWINGS IN ELECTRONIC FORMAT

The Contractor shall provide drawings in electronic format as required in the following clauses. These drawings shall conform to the latest version of CAD Standard of Works Projects (CSWP) as posted in the web site of the Works Branch, Development Bureau and in accordance with the latest version of CAD Manual for Architectural Services Department Projects. Should any technical conflict between the CSWP and the CAD Manual arise, the CSWP shall take precedence.

A4.2 INSTALLATION DRAWINGS

A4.2.1 Drawing Submission Schedule

The Contractor shall submit a detailed installation drawings and builder's work drawings submission schedule and programme to the Architect. The Contractor shall allow reasonable time in the programme for vetting of the installation drawings by the Architect and for drawing resubmissions as necessary.

The Contractor shall submit to the Architect a comprehensive "Submission Schedule" of installation drawings and builder's work drawings within 2 weeks after the acceptance of Tender, taking into account of the overall programme of the Works including any Specialist Works and works by the utility undertakings. No equipment shall be delivered to the Site and no work shall be executed until the installation drawings have been approved by the Architect. The Contractor shall ensure that the installation drawings and builder's work drawings are progressively submitted in accordance with the approved "Submission Schedule".

The Contractor shall provide at least 6 hard copies and 1 electronic copy, unless otherwise specified in the Contract, of the approved installation drawings to the Architect for distribution.

A4.2.2 Size of Installation Drawings

Drawings submitted by the Contractor shall only be of standard sizes from A0 to A4 or B1 size as stipulated in ISO 5457: 1999.

A4.2.3 Contents of Installation Drawings

The Contractor shall ensure all installation drawings are accurate representation of the Works, before submitting them to the Architect. All installation drawings shall be fully dimensioned and suitably scaled showing construction, sizes, weights, arrangements, operating clearances and performance characteristics.

A4.2.4 Builder's Work Drawings

Unless otherwise approved by the Architect, the Contractor shall submit to the Architectin in accordance with the approved submission schedule, 6 copies of drawings showing details of all builder's work required e.g. the weight and the load on each support of equipment. Such drawings shall clearly indicate the details and positions of all holes, trenches, ducts and cutting required and construction details for plinths and equipment bases.

A4.2.5 Manufacturer's Shop Drawings

The manufacturer's shop drawings are drawings for equipment or plant to be manufactured by a specialist manufacturing supplier in their own workshops and places away from the Site.

The drawings shall show detailed construction, principal dimensions, weights and clearances for maintenance, etc. Immediately after placing of any order or at any event within 4 weeks unless otherwise approved in writing by the Architect, the Contractor shall forward to the Architect for comment 4 copies of manufacturer's shop drawings, indicating detailed construction, principal dimensions and weights, clearances for withdrawals and/or cleaning, etc. No work shall proceed on or off Site unless drawings requiring approval are so approved in writing by the Architect.

A4.3 AS-BUILT DRAWINGS

A4.3.1 Submission of As–built Drawings

The Contractor shall submit 3 sets of the first draft prints of as-built drawings within 28 days of the issuance of the certification of completion to the Architect for checking. The Architect after checking the above draft prints shall return one set of the marked up copies of these as-built drawings to the Contractor within 42 days from the date of submission of the Contractor's draft print with comments. The Contractor shall within a further 28 days from the date of receiving the Architect's comments on the draft as-built drawings re-submit to the Architect for his approval another 3 sets of the second draft prints of as-built drawings with the Architect's comments incorporated. This process of submission and approval shall continue until the final approval of the Architect on these as-built drawing is obtained.

The final approved as-built drawings shall be in 3 sets of hard copy and 3 sets of electronic copies. These shall be submitted within 21 days from the date of final approval. Each electronic copy shall be in the form of CD-ROM, labelled, with cross reference to a printed list of files explaining the contents and purpose of each file and supplied in sturdy plastic containers.

The detailed requirements and the media of as-built drawings set out in the Preliminaries of the Bills of Quantities or the Specification Preliminaries shall be followed as appropraite.

A4.3.2 Size of As-built Drawings

As-built drawings shall only be of standard sizes of A0, A1 or B1 size as stipulated in ISO 5457: 1999.

A4.3.3 Content of As-built Drawings

The Contractor shall ensure all as-built drawings are accurate representation of the Works, before submitting them to the Architect. The as-built drawings required to be provided by the Contractor for various types of BS/E&M installations shall include, but not limited to the followings:

(a) Building services layout plans such as ducting arrangement, trunking arrangement, piping arrangement, etc.;

(b) System schematic diagrams, control diagrams and wiring diagrams;

(c) Concealed work layout plan such as concealed conduit routing, etc.; and

(d) Installation details and assembly drawings such as LV cubicle switchboard layout, motor control cubicle layout, etc.

A4.4 OPERATION AND MAINTENANCE (O&M) MANUAL AND USER MANUAL

A4.4.1 General

The Contractor shall provide two types of manuals to the Architect with all changes made to the installation during the course of the Contract suitably incorporated.

The O&M Manual is for use by the maintenance agent of the completed installation. It shall contain detailed technical information covering both operation and maintenance aspects of the installation.

The User Manual seeks to give users of the completed installation an overview of the essential information of the installation. The contents of the manual should be concise and succinct for ease of comprehension by people with a non-technical background.

A4.4.2 Checking and Approval

The Contractor shall submit 3 sets of the first draft of O&M Manuals together with a list of recommended spare parts for one year's operation and a list of special tools, both complete with prices to the Architect for comment at least 56 days prior to the testing and commissioning of the plant and equipment.

The Contractor shall submit 3 sets of the first draft of the User Manual to the Architect for comment at least 56 days before the date of completion.

The Architect will check the drafts and return them to the Contractor within 42 days from the date of submission with comments necessary for a final and approved set of document. The Contractor shall then make all necessary amendments to the documents and resubmit them to the Architect within 21 days from the date of receipt of comments.

The Contractor shall submit 3 sets of hard copies (one of which shall be the original) and 1 set of electronic copy of the final approved O&M Manuals in CD-ROM, labelled, with cross reference to a printed list of files explaining the contents and purpose of each file and supplied in sturdy plastic containers, within 21 days from the date of approval by the Architect.

The Contractor shall submit 3 sets of hard copies and 1 electronic copy of the final approved User Manuals in CD-ROM, labelled, with cross reference to a printed list of files explaining the contents and purpose of each file and supplied in sturdy plastic containers, within 21 days from the date of approval by the Architect.

A4.4.3 Structure and Content of O&M Manual

The detailed requirements, structure and contents of the O&M Manual shall be as specified in elsewhere in the Contract or shall include the following information under separate sections where appropriate:

(a) Project Information

This shall included:

Project title, site address, contract no., contract title, contractor/sub-contractor name, address, contact persons and their telephone/fax nos., contract commencement date, substantial completion date and end date of Maintenance Period.

(b) System Description

(i) Type(s) of system(s) and equipment installed;

(ii) Design criteria, design data and parameters;

(iii) Locations of the system and major equipment, and what they serve;

(iv) Description of operation and functions of the system and equipment; and

(v) General operating conditions, expected performance and energy and resources consumption where applicable.

(c) List of Installed Equipment

Schedule of all items of equipment and plant stating the location, name, model no., manufacturer's serial or reference no., manufacturer's design duties and data.

(d) Spare Parts and Special Tools Lists

(i) List of Spare Parts supplied by the Contractors: -
Item descriptions, supplied quantities, model nos., manufacturer's serial or reference nos. and storage locations;

(ii) Recommended Spare Parts List and Spare Tools List: -
Manufacturers'/suppliers' recommendations for spare parts and special tools with item description, unit rate, recommended stock quantities as well as the agents for the spare parts and special tools.

(e) Manufacturers' Certificates/Guarantees

(i) Manufacturers' certificates such as factory test certificate, laboratory test reports, guarantees and any others where required for the equipment and plants etc.; and

(ii) Originals of Statutory Inspection Certificate for various installations, including:

- Electrical installations (Work Completion Certificate - Form WR1);
- Others equipment such as surveyor's test certificates for high pressure vessel, surveyor's load certificates for electrical operated roller shutters, lifting devices/appliances, etc.

(f) Safety Precautions for Operation & Maintenance

State, where applicable, hazard warnings and safety precautions of which the operation and maintenance staff need to be aware:

(i) mandatory requirements relating to safety;

(ii) known hazards against which protection measures shall be taken;

(iii) known features or operational characteristics of the installed equipment or systems which may cause hazard and the related safety precautions.

(g) Operation Instructions

Instructions for the safe and efficient operation, under both normal and emergency conditions, of the installed system which shall comprise:

(i) an outline of the operating mode;

(ii) control logic and data (sequence, effect, limits of capability, modes and set points);

(iii) procedures and sequences for start-up and shut-down;

(iv) interlocks between equipment/system;

(v) calling on of stand-by equipment;

(vi) precautions necessary to overcome known hazards;

(vii) means by which any potentially hazardous equipment can be made safe;

(viii) estimation of energy consumption and energy costs;

(ix) forms for recording plant running hours, energy consumption and energy costs; and

(x) operating data such as running current, operating pressure, operating flow rates etc.

(h) Maintenance

(i) Maintenance instructions

Manufacturers' and the Contractor's recommendations and instructions for the maintenance of the installed equipment. Clear distinction should be made between planned tasks (preventive maintenance) and fault-repair tasks (corrective maintenance). Instructions shall be given on each of the following, as appropriate:

- nature of deterioration, and the defects to be looked for;
- isolation and return to service of plant and equipment;
- dismantling and reassembly;
- replacement of components and assemblies;
- dealing with hazards which may arise during maintenance;
- adjustments, calibration and testing; and
- special tools, test equipment and ancillary services.

(ii) Maintenance schedules

Proposed maintenance schedules for all the preventive maintenance tasks identified above. The schedules shall be based on both manufacturers' recommendations and other authoritative sources (e.g. statutory or mandatory requirements) and should include:

- routine servicing;
- inspections;
- tests and examinations;
- adjustments;
- calibration; and
- overhaul.

The frequency of each task may be expressed as specific time intervals, running hours or number of completed operations as appropriate. Collectively, the schedules will form a complete maintenance cycle, repeated throughout the whole working life of the installation.

(i) Drawing Lists

(i) A complete list of as-built drawings identified with drawing number/reference;

(ii) A complete list of manufacturers' shop drawings with drawing number/reference, where applicable; and

(iii) A brief description of CD-ROM for these drawings.

(j) Technical Literatures

A complete set of manufacturers' literatures for all the plant and equipment installed in the system. The contents of these literatures shall cover the following areas where applicable:

(i) description of equipment with model numbers highlighted;

(ii) performance - behavioural characteristics of the equipment;

(iii) applications - suitability for use;

(iv) factory/laboratory test reports, detailed drawings, circuit diagrams;

(v) methods of operation and control;

(vi) operation instructions;

(vii) cleaning and maintenance requirements;

(viii) plants, materials and space required for maintenance;

(ix) protective measures and safety precautions for operation & maintenance; and

(x) part lists.

(k) Contact addresses and telephone numbers of suppliers of major equipment.

A4.4.4 Structure and Content of User Manual

The detailed requirements, structure and contents of the User Manual shall include, where applicable, the following information:

(a) Project Information

This shall include:

Project title, site address, contract no., contract title, contract commencement date, substantial completion date and end date of Maintenance Period.

(b) System Description

(i) Type(s) of system(s) and equipment installed, and their purposes;

(ii) Location of major plant rooms and riser ducts;

(iii) Brief description of the operation and functions of the systems and equipment; and

(iv) Listing of set points which can be adjusted by the user to suit their operation needs.

(c) Schedule of Major Plant Rooms and Installed Equipment

(i) Schedule of major plant rooms and riser ducts including their locations;

(ii) Schedule of major equipment and plants including their locations and serving areas.

(d) Safety Precautions for Operation
State safety precautions and warnings signals that the users shall be aware of in the daily operation of the various systems and equipment in the installation including:

(i) mandatory requirements relating to safety;

(ii) features or operational characteristics of the installed systems or equipment which may cause hazard and the related safety precautions;

(iii) protective measures and safety precautions for operation; and

(iv) list of warning signals and the related meanings that the user shall be aware of and the actions to be taken.

(e) Operation Instructions

Instructions for the safe and efficient operation, under both normal and emergency conditions, of the installed system which shall comprise:

(i) an outline of the operating mode;

(ii) step by step operation instructions for systems and equipment that are to be operated by the user, including at least procedures for start-up and shut-down;

(iii) means by which any potentially hazardous situation can be made safe;

(iv) cleaning and basic maintenance procedures.

(f) List of Statutory Periodic Inspections and Tests

A schedule of periodic inspections and tests that owner and/or user of the installation have to arrange to achieve compliance with the requirements stipulated in the relevant Laws of the Hong Kong. The frequency of such inspections and tests shall be expressed in specific time intervals.

(g) Drawings

A set of selected as-built drawings which shall be able to illustrate to the user the general layout of the completed installation.

(h) Photographs

A set of photographs with suitable captions to illustrate to the user the appearance and locations of devices which require their setting and operation.

A4.4.5 Presentation

All manuals shall be written in English, unless otherwise specified. The text of descriptive parts shall be kept concise while at the same time ensure completeness. Diagrammatic materials shall also be supported by comprehensive descriptions. The overall aim of the manuals is to provide clarity in conjunction with brevity on a "need to know" basis.

The manuals shall comprise A4 size loose-leaf, where necessary, A3 floded losse-leaf. The loose-leaves shall be of good quality paper that is sufficiently opaque to avoid "show-through". Unless otherwise specified in the Contract, the manuals shall be bound in durable loose-leaf four ring binders with hard covers. The manuals shall have labels or lettering on the front cover and spine. The Architect's approval shall be obtained on this at the draft manual stage. The softcopy of manuals including the technical literatures, shall be in PDF format readable by Acrobat Reader Freeware.

A4.5 INTELLECTUAL PROPERTY RIGHTS

The Government shall become the absolute and exclusive owner of the Operation and Maintenance Manuals and the User Manual and all intellectual property rights subsisting therein free from all encumbrances.

In the event that the beneficial ownership of any intellectual property rights subsisting in the above Manuals are vested in anyone other than the Contractor, the Contactor shall procure that the beneficial owner shall grant to the Employer a transferable, non-exclusive, royalty-free and irrevocable licence (carrying the right to grant sub-licences) to utilize the intellectual property rights in the manuals for the purposes contemplated in the Contract. For the avoidance of doubt such purposes shall, but not limited to, include providing free copying of the materials in the manuals by any subsequent owner or user of the installation, and/or any party responsible for the operation and maintenance of the installation in connection with any subsequent alteration, extension, operation and maintenance of the installation

A4.6 CHECKING BEFORE SUBMISSION

All installation drawings, builder's works drawings, manufacturers' shop drawings, design drawings, as-built drawings, O&M manuals and User manuals shall be checked and endorsed by a qualified and experienced staff of the Contractor approved by the Architect before submission.

SECTION A5

GENERAL REQUIREMENTS OF THE WORKS

A5.1 LABELS, DATA PLATES AND WARNING NOTICES

Labels shall be provided to all pipework, valves, electric circuits, metal-clad switches, indicators, cables, internal wiring terminals and all other equipment to facilitate operation and proper maintenance of the installation.

Labels and notices required by statutory requirements shall be inscribed accordingly whereas other labels shall indicate name and purpose of the equipment together with ratings and commissioned set values where applicable.

Labels for equipment identifications shall be made of sandwich plastic material with a red outer layer and a white inner layer. Lettering shall be engraved by cutting away the outer layer to the outline of the required letters or characters, exposing the white layer underneath. All labels shall be in both Chinese and English.

Notices for safety warning and instructions shall be constructed of heavy gauge aluminium sheets painted with symbols or wording as appropriate.

Labels and notices shall be fixed by screws. Where drilling and tapping is impracticable, approved adhesive may be used subject to prior approval by the Architect.

Each cable core shall be cramped at both ends with cable ferrules for identification.

A data plate shall display the information applicable to the appliance. The data plate shall be fixed in such a position that it can be easily read with the appliances in position.

Appliances incorporating an electrical system shall display a circuit diagram of the system, preferably on the inside of the main terminal box cover.

Warning notice sufficiently durable and legible throughout the life of the equipment shall be fixed to the appliance in a prominent position drawing the attention of the operator to any potential hazard.

The Contractor shall submit a schedule for all labels, notices, identifications and instructions for the Architect's approval prior to order and installation. The information of the schedule shall include the description of the items, height and font type of the text, dimensions of the labels and material used. The Chinese translations shall be referred to the "Glossaries of Terms Commonly Used in Government Departments" issued by the Civil Service Bureau.

A5.2 PAINTING

All equipment, appliances, pipework, hangers, brackets, supports, etc. which form part of the works shall be painted after erection. Painting shall be done in accordance with the latest edition of "General Specification for Buildings issued by the Architectural Services Department of the Hong Kong Special Administrative Region". Painting materials used on heated surface shall be heat resistant.

Items that do not require to be painted unless otherwise specified shall include: -

(a) Insulated ductwork with aluminium or hammer-clad finish;

(b) Copper pipework and fitting, (except where specifically stated);

(c) Stainless steel surface;

(d) Galvanized pipework, ductwork, conduit or cable tray where concealed within duct shaft or false ceiling;

(e) UPVC pipework or ductwork;

(f) Materials with a factory applied anodised, baked enamel or painted finish, provided that the colours are approved prior to application; and

(g) Insulated pipework or ductwork concealed within duct shaft or false ceiling.

The requirement for painting of all pipework and ductwork is in addition to the colour coding or banding as specified in the latest edition of General A/C Specification.

All finishing to factory assembled appliances shall be factory applied in accordance with the manufacturer’s normal practice and to a standard suitable for the duty and location of the appliances.

Where factory applied finishes are approved, the Contractor must obtain from the manufacturer touch-up paint kits and detailed instructions for making good after completion any damage to finishes which may occur during transportation, storage, installation or commissioning.

All surfaces requiring to be painted on site shall generally be painted with one coat of an approved primer, two coats of an approved high gloss-finishing coat. Ferrous surfaces shall be painted with one coat of an approved primer, one coat of an approved undercoat and two coats of an approved high gloss.

The volatile organic compound (VOC) content, in grams per litre, of all paint applied on surfaces of catering equipment installation and any installations/equipment inside semi-enclosed/ enclosed areas of the building shall not exceed :

Type of Internal Paint		Type of External Paint	
Water-based Paint :	50g/litre	Water-based Paint :	80g/litre
Solvent-based Paint :	400g/litre	Solvent-based Paint :	400g/litre

The testing method of the VOC content of paint shall be determined by the US EPA Method 24.

A5.3 TRADESMEN

All tradesmen must be experienced in the trade and the work carried out shall be consistent with good practice in Hong Kong and to the satisfaction of the Architect. The Contractor shall employ not less than one competent foreman on Site for each trade during installation. All trade foremen shall be registered tradesmen of the relevant trade.

The Contractor shall immediately replace any trade foreman or labour whose experience, skill or competency is, in the opinion of the Architect, found to be inadequate for the particular work.

A5.4 TRAINING OF EMPLOYER'S STAFF

The Contractor shall provide adequate training to the Employer's staff at completion of the Works after commissioning of the installation until they are fully familiar with the operation, routine testing and maintenance of the installation.

The training shall include all training facilities, material and handouts etc. The Contractor shall submit a training schedule and proposal at least 3 months prior to completion of the Works for the Architect's Approval.

A5.5 EQUIPMENT DATA SHEETS AND CIRCUIT DIAGRAMS

Unless otherwise specified, within six weeks of signing the contract, the Contractor shall submit 3 sets of the data sheet and circuit diagram for each of the equipment for approval. The data sheet and circuit diagram shall be included in the operation and maintenance manuals upon approval by the Architect.

The equipment data sheet shall include the important data, such as made, model number, serial number, capacity, rating, power consumption, operating pressure, testing pressure, operating voltage, size, etc.

The circuit diagrams for the electrical, electronic and refrigeration system of equipment shall show all parts used and how they are connected.

A5.6 ELECTRICAL AND MECHANICAL SERVICES CONNECTIONS TO THE CATERING EQUIPMENT

All mains operated electrical equipment shall be suitable for a supply of 380 V, 3 phases, 50 Hz and 220 V, 1 phase, 50 Hz.

The condition of the steam supply pressure and temperature, cold water supply pressure, town/L.P. gas etc. will be specified in the Particular Specification.

The Contractor should seek the Architect's confirmation of the conditions of services supply prior to the ordering of equipment.

A5.7 SPARES AND TOOLS

The Contractor shall also supply all the spare parts and special tools required for the whole Maintenance Period for operation and maintenance of the plant and installation. All consumable parts except fuel and water supply shall be included.

Unless otherwise specified, the Contractor shall submit before the certified completion date of the Works a price list for itemized spares and consumables pertaining to all the equipment offered as recommended by the manufacturers for a period of one year's operation and maintenance following the completion of the contract Maintenance Period. The prices listed shall be fixed and open for acceptance up to the end of the maintenance period.

In addition, the Contractor shall submit before the certified completion date of the Works a complete list of all the replaceable parts with model number, part number and price which shall be for purchase and use after the expiration of the Maintenance Period. The list shall be complete with suggested prices.

A5.8 NOISE AND VIBRATION

The Contractor shall select and offer equipment that do not have any objectionable noise and vibration and shall take all necessary steps to reduce and prevent the transmission of such noise and vibration from the equipment.

A5.9 SAFETY FACILITIES

Facilities for operational and maintenance safety shall be supplied and installed to comply with the Occupational Safety and Health Ordinance and with the requirements of Labour Department. All moving parts shall be appropriately covered and emergency stops shall be supplied and installed where necessary. Adequate spaces and facilities shall be allowed for maintenance and access.

A5.10 GUARANTEE

The Contractor in supplying a specific item of equipment or appliance, whether specified herein by name or whether of a make selected by the Contractor, shall be

deemed to warrant its satisfactory performance under all local working conditions.

In the event of anything described in the Specification or shown in the tender drawings being, in the Contractor's opinion, unsuitable for or inconsistent with the Contractor's guarantee or responsibilities, the Contractor shall draw the Architect's attention thereto at the time of tendering.

Neither the Maintenance Certificate issued by the Architect, nor the acceptance of installation by the Employer, nor the approval by the Architect of any material or method shall in any way absolve the Contractor from the Contractor's responsibility for any latent defects in the future and which are, in the opinion of the Architect, due to the Contractor's failure to use the materials and methods which comply with this General Specification and the Particular Specification and Drawings.

A5.11 QUALITY ASSURANCE STANDARDS

All materials and equipment shall be manufactured by factories with acceptable quality assurance procedures. Factories having ISO 9001:2008 certifications are deemed to have acceptable quality assurance procedures. Other similar quality assurance standards may be accepted by the Architect on their individual merits. Details of such other quality assurance standards shall be submitted with the equipment submission.

A5.12 GENERAL DESIGN REQUIREMENTS

All catering equipment installations, materials, equipment and systems provided by the Contractor shall meet with the following design objectives: -

(a) Comply with the statutory requirements.
(b) Serve the purpose of cooking, boiling, steaming, frying etc. for catering use and meet the functional and performance requirements for serving the numbers and types of meal required, in particular at peak catering hours.
(c) Cater for the catering operational flow to maximise the efficiency of kitchen operation
(d) Be safe, hygienic, convenient and effective.
(e) Be energy efficient.
(f) Allow and provide adequate maintenance facilities and accesses.
(g) Provide reliable and durable materials and equipment with a reasonably long operating life.
(h) Allow easy monitoring of system performance and equipment status.
(i) Minimize future maintenance and replacement of parts.
(j) Allow adequate standby and spare facilities to cater for the failure of any part of the installation.
(k) Achieve cost effectiveness in term of life cycle costing with low operation and maintenance cost.
(l) Select and use equipment with optimum performance and with good energy efficiency.

(m) Reduce noise, vibration and other nuisances to the occupants and neighbours.
(n) Comply with all the safety requirements in future operation and maintenance with particular attention on the occupational safety and health of the workers.
(o) Use durable materials as well as equipment having a steady and reliable supply of parts and spares.
(p) Be aesthetically acceptable for all installations in exposed positions.
(q) Minimise the environmental impact and social effect as appropriate.
(r) Be flexible to cater for future modification and expansion as appropriate.

The Contractor shall submit documentary evidence and demonstrate to the satisfaction and approval of the Architect that all the above design objectives as relevant are satisfied and complied with reasonably satisfactory solution. Where selection of the brand and model of equipment and material is done by the Contractor, the Contractor shall ensure and may be required to demonstrate to the satisfaction of the Architect that the design, configuration and installation details of equipment and material so selected shall meet with all the relevant design objectives as necessary.

A5.13 GENERAL REQUIREMENTS ON OPERATION AND MAINTENANCE PROVISIONS

All catering equipment shall be provided with facilities, permanent accesses and sundries for its proper operation, maintenance, inspection, repair, overhaul, testing and servicing after installation. Catering equipment without consideration of the maintenance and related provisions to the satisfaction of the Architect shall not be accepted.

The Contractor shall provide and allow in the equipment installation adequate facilities for future inspection, monitoring, operation, maintenance, testing, overhaul and replacement. Such facilities shall be built-in during equipment installation. All equipment that has a limited operating life shall be accessible and shall be easily removed for maintenance or replacement. Adequate and safe access shall be provided to all parts of the equipment. Adequate special tools shall be provided where necessary. The Contractor shall ensure that access to the plant and equipment is adequate to allow for its removal and/or ultimate replacement.

The Contractor shall submit and use equipment that has a reliable and steady supply of spares and parts. The installation and equipment shall be provided with adequate gauges, meters, measuring devices and monitoring facilities for indicating all the essential or necessary parameters for quick inspection and monitoring. All such measuring and monitoring facilities shall be deemed to include in the Works whether they are shown in the Drawings or not. Where necessary measuring and monitoring facilities are found missing or not provided during testing and commissioning stage or in the Maintenance Period, the Contractor shall make such alterations or additions as in the opinion of the Architect as necessary to remedy such non-compliance at the Contractor's own expense. No approval given by the Architect of the drawings and material submission shall absolve the Contractor from liability for this aspect.

Warning notices, operating instructions and working/maintenance instructions shall be provided as necessary adjacent to or near to the equipment. Adequate protective guards shall be provided.

Adequate facilities shall be allowed in the installation for carrying out tests during future inspection and maintenance of equipment.

PART B – GENERAL TECHNICAL REQUIREMENTS (DESIGN AND CONSTRUCTION)

SECTION B1

DESIGN AND CONSTRUCTION

B1.1 COMPONENT CO-ORDINATION

Equipment shall be made to meet the technical, functional, safety, dimensional and finishing requirements stipulated in the Particular Specification, this General Specification and/or indicated on the Drawings, and be designed on metric system. Equipment for European cooking shall be a dimensionally co-ordinated unit. Unless otherwise specified, it shall be designed to accommodate a range of containers with sizes selected from BS EN 631-1.

B1.2 OPERATING CONDITIONS

Equipment including all components shall be suitable for operation in tropical climatic conditions. These conditions will be -5°C to 45°C with a corresponding relative humidity of 100%.

B1.3 SOUND, RELIABLE AND SAFE CONSTRUCTION

Equipment, including its components, shall be soundly constructed so that in normal use it is reliable and will operate without danger to the user or damage to the surroundings.

Equipment shall have adequate mechanical strength and be so constructed that it will not deform and will withstand such rough treatment as may be expected in normal use.

Equipment shall be free of sharp edges and pointed protrusions that would be liable to cause injury to personnel or damage to clothing.

Equipment with hot parts shall be properly insulated or designed to avoid direct contact and injury to personnel.

B1.4 SAFETY INTERLOCKING DEVICES FOR DOOR, COVER, GUARD, ETC.

Parts that are intended to be removable by the user, e.g. for cleaning, shall be readily accessible, shall not require the use of tools for their removal, shall be easy to assemble correctly and impossible to assemble incorrectly.

Handles, knobs, hinges, catches, and fittings shall be so constructed and fixed that they do not work loose, deform or break in normal use, or harbour grease or food debris.

Any door, cover or guard accessible to the user which, if opened or displaced could expose the user to danger or injury, shall require a tool to release it or shall be interlocked so that it cannot be opened or displaced until safe conditions have been established.

B1.5 ADJUSTABLE LEGS FOR FLOOR STANDING EQUIPMENT

Floor standing equipment shall be mounted on pedestal or on legs with adjusters for levelling, with base of the equipment not less than 150 mm clear of the floor. The adjusters shall be robust and easily adjustable by hands and without the use of any special tool.

B1.6 STABILITY REQUIREMENTS

Equipment, unless fixed in position, shall comply with the stability requirements given in the relevant International Standards to the acceptance of the Architect. Any appliance for which there is no specific method of test for stability shall comply with the international standards for a similar type of equipment.

B1.7 ACCESSIBILITY

Equipment shall be constructed to allow easy access to components requiring periodic cleaning, adjusting and servicing. Access panels shall be provided as specified and indicated on the working drawings and recorded on the as-fitted drawings to shown the locations especially where panels are built-in or concealed.

B1.8 DESIGN AND CONSTRUCTION TO MAINTAIN HYGIENIC CONDITIONS

Equipment shall be so designed and constructed to permit it to be maintained in a hygienic condition without difficulty. Working surfaces and food compartments shall have smooth surfaces and be free of crevices. Wherever practicable corners shall be rounded. Where applicable, means shall be provided to collect spillage and condensate, e.g. a removable tray under open top boiling rings.

Spaces that are not easily accessible to the user, e.g. spaces between adjacent appliances in ‘en-suite’ arrangements, shall be sealed to prevent ingress of spillage, dirt and vermin or the space between each appliance shall be sufficient to allow cleaning of adjacent surfaces. Tubular legs and box section material shall be completely sealed.

Equipment e.g. deep fat fryer, that needs to be emptied for cleaning shall be provided with a means for completely draining the contents. Where a draw off tap is provided for this purpose it shall be protected against inadvertent operation.

Unless otherwise specified, steam heating equipment shall be supplied and installed with steam jacket or product having equivalent performance and function to separate steam from direct contact with items being cooked.

B1.9 LOCATION OF CONTROLLING DEVICES AND SENSORS

Suitable types of controlling devices, sensors, starters, etc. shall be supplied and installed in accordance with appropriate international standards so as to facilitate proper operation of the equipment and for maintenance purposes.

All controls mounted on external vertical surfaces of the appliances shall be set into recessed die-stamped stainless steel cups, or otherwise protected and/or guarded to prevent damage, to avoid accidental operation and to shelter from spillage in normal use.

All sensors fixed inside the appliances shall be protected by suitable compartment.

B1.10 INSULATION FOR HEATED OR REFRIGERATED APPLIANCES

Heated or refrigerated appliances shall be thermally insulated to minimise heat losses or heat gains and to prevent direct contact with hot/cold parts. Thermal insulation shall be securely located and protected against mechanical damage, spillage, and sealed against infestation by insects and ingress of fluid.

All hand wheels, knobs and handles for the heated or refrigerated appliances shall be effectively insulated.

B1.11 DESCALING OF WATERWAYS

It shall be possible to descale all waterways where the formation of scale may occur. The recommended method of descaling shall be given in the manufacturer's servicing instruction.

B1.12 NOISE AND VIBRATION LEVEL

The level of noise and vibration from any source associated with the appliances shall be as low as practicable under all operation conditions.

In particular, no rattles, vibrations, or discreet tones shall be discernible in occupied area outside the room housing the appliance or appliance enclosures. Silencers with insertion losses, sound-sealing panels, isolation and damping devices, etc. shall be supplied and installed if required, to attenuate the noise of the appliances and to damp the vibration of machinery to a reasonable level having regard to the use and nature of the building and works.

B1.13 WITHDRAWAL AND RE-INSTALLATION OF INDIVIDUAL APPLIANCE

The method of construction of 'en-suite' appliances shall permit individual appliance to be withdrawn or re-installed without difficulty.

Modular 'en-suit' back-to-back appliances shall incorporate a compartment to accommodate the services to individual appliance.

Appliance connections for external services shall be so positioned that: -

(a) an appliance can be connected and disconnected with the appliance in position. Alternatively for 'en-suite' appliances approved flexible connections are acceptable to enable an appliance to be connected and disconnected in the withdrawn position;

(b) the services can be grouped together and installed clear of the space under the appliances to facilitate cleaning.

B1.14 INSTALLATION OF ELECTRIC ELEMENTS

Appliances operating with water, such as Bain Marie and steamer, shall be supplied and installed with immersion type heating elements of sufficient wattage to bear and maintain the water contained in the appliances at a temperature of 98°C. The heating elements shall be fitted with water-tight bushings extending through the bottom or side of the appliances. Terminals shall be protected by removable caps. Each element shall be fitted with a thermostat control with a pilot light indicator.

Appliances requiring dry heat, such as plate warmers, shall be fitted with strip or ring heaters of sufficient wattage to provide the desired heat. Unless otherwise specified, these heaters shall be installed directly below the bottom shelf. They are to be mounted in suitable channels and are to be inter-connected with insulated nickel wire. Each appliance shall be provided with one or more thermostatic controls with a pilot light indicator.

All wiring shall be properly protected in enclosures.

B1.15 EARTH AND EQUIPOTENTIAL BONDING OF APPLIANCES

All electric appliances shall be provided with an earth terminal. This terminal shall provide an effective electrical connection with all exposed metal parts of the unit and shall be effectively connected with the consumer's earth terminal via the earth-continuity conductor of the final circuit for the appliances.

All fixed appliances shall be provided with a terminal or means for the connection of an external equipotential conductor. This terminal shall maintain an effective electrical connection with all fixed exposed metal parts of the appliances and shall allow the connection of a conductor having nominal cross sectional area up to 6 mm^2. It shall be located in a position convenient for the connection of the earth conductor after installation of the appliances.

Snap-on type connectors shall not be used to connect conductors that are associated with bonding and earthing of an appliance. Any connector used shall allow all earthing and bonding to be made easily.

B1.16 JOINTS AND FITTINGS IN DIRECT CONTACT WITH HEATED ELEMENTS

All joints and fittings in direct contact with materials subject to direct burner flame or heater elements shall be brazed or welded.

Copper that is subjected to direct heat shall be of a thickness not less than 1.2 mm. This requirement does not apply to heat exchanger fins that shall be of a thickness not less than 0.8 mm.

Where copper is used for water heating appliances the internal surfaces in contact with water shall be heavily tinned or nickel-plated.

B1.17 GENERAL SAFETY, HYGIENIC, OPERATIONAL REQUIREMENTS FOR ELECTRICAL APPLIANCES

The appliances including its components parts, shall be soundly constructed so that in normal use it will operate without causing danger to the user or damage to the surroundings. All mechanical moving parts and cutting surfaces shall be adequately protected with guards. Any guard, whether it is for mechanical moving parts or otherwise, accessible to the user which if opened or displaced would expose the user to danger or injury shall require a special tool to release it and be interlocked so that the machine cannot be operated unless the guard is in proper position. A warning notice shall be securely fixed to the appliance in a prominent position for the attention of the operator.

Appliances shall be designed and constructed allowing it to be maintained in a hygienic condition without difficulty. Working surfaces and food compartments shall be smooth and be free of crevices.

Handles, knobs, hinges, catches and fittings shall be so constructed and fixed that they will not become loose, deform or break in normal use or harbour grease or food debris.

The method of construction of ‘en-suite’ appliances shall permit individual component to be withdrawn and re-installed without difficulty.

The equipment shall be provided with a terminal for the connection of an external equipotential conductor.

The electric motors of the equipment shall have the appropriate motor protection in accordance with the General Electrical Specification and all other relevant specifications as detailed in Section A2.1.2.

B1.18 DESIGN OF EQUIPMENT, FIXTURES AND APPLIANCES

The Contractor shall be responsible for the design of the catering equipment, fixtures and appliances to meet the performance and functional requirements. In addition, the design shall meet the:

(a) Hygiene requirements in Public Health and Municipal Service Ordinance, Chapter 132 and Provision of Municipal Service (Reorganisation) Ordinance, Chapter 552, Laws of the Hong Kong Special Administrative Region;

(b) Safety and occupational health requirements in Occupational Safety and Health Ordinance, Chapter 509, Laws of the Hong Kong Special Administrative Region;

(c) Statutory environmental requirements on air, noise, water and waste disposal. The Contractor shall allow all the facilities and features in the equipment design to meet with the environmental statutory requirements on its own unless otherwise stated.

Where there are more than one catering equipment, fixtures and appliances provided in one area, the Contractor shall co-ordinate with relevant parties and design the most appropriate layout and arrangement of equipment, fixtures and appliances and submit to the Architect for approval. The design shall take full consideration on the operational flow and requirements, and the use of the equipment, fixtures and appliances for catering and cooking. The difference between the preparation of Chinese meals and Western meals shall be fully considered in the design. All design shall meet with the currently enforcing statutory licensing requirements.

PART C – GENERAL TECHNICAL REQUIREMENTS (MATERIAL AND EQUIPMENT)

SECTION C1

CONTROLS

C1.1 MANUALLY OPERATED CONTROL FOR FUEL ISOLATION

Fuel consuming appliance shall be provided with one or more manually operated control to enable all fuel consuming components to be isolated from the fuel supply. The number and locations of manual controls shall suit the appliance operation requirements and site conditions, and shall be to the acceptance of the Architect.

C1.2 AUTOMATIC CONTROL FOR FUEL CONSERVATION

Wherever practicable fuel consuming appliances shall incorporate automatic control devices to conserve fuel by reducing latent heat losses and eliminating unnecessary heating when the cooking process is interrupted or completed.

C1.3 TIME CONTROL

Whenever the electrical heating elements or gas burners of the grills, ovens, solid top hot plates, boiling tops, etc. are specified to be under timer control, an adjustable timer shall be provided and be capable of being reset manually either forward or backwards at any time after the initial setting. The timer shall clearly indicate the time expire period of operation or time remaining. Time setting range shall be in accordance with the maximum cooking process time of individual appliance and as specified.

C1.4 AUTOMATIC PROTECTIVE DEVICES FOR SAFETY REASONS

Appliances shall incorporate adequate automatic protective devices to ensure that safe conditions are maintained under any circumstances, including but not limited to when the normal automatic temperature or pressure controls fail or the power supplied to the appliances is interrupted.

C1.5 MINIMUM REQUIREMENT OF PROTECTIVE DEVICES

C1.5.1 Water Heating Appliances

(a) Non pressure type

Non-pressure type water heating appliance shall be provided with at least:

(i) A vent to atmosphere of adequate dimension so that no part of the boiler can exceed atmospheric pressure when operated continuously at maximum heat input;

(ii) A low water level protective device if no automatic water level control is incorporated in the appliances.

(b) Pressure type

Water heating appliances of pressure type, including water boilers, steam generators, pressure jacketed boiling pans, and etc. shall be fitted with at least: -

(i) A pressure safety valve;

(ii) A vacuum release valve;

(iii) A pressure gauge;

(iv) A low water level cut-out (except live steam heated boiling pans);

(v) A water gauge marked with maximum and minimum water level (except boiling pans).

C1.5.2 Fryers, Deep and Shallow Type

Gas or electric fryers shall incorporate at least the followings:

(a) A high temperature limit thermostatic cut out of the manual reset type. A tool shall be required to gain access to the reset mechanism;

(b) A device to isolate the gas or electricity supply to the burners or heating elements when the tilting pan is displaced from the normal operating position;

(c) A permanent mark to indicate the maximum oil level and adequate capacity above this level for surge boiling conditions.

C1.5.3 Electrical Power Operated Appliances

Appliances such as mixer, mincer, peeler, chipper, slicer, meat saw, dishwasher, etc., and any appliances that have power driven moving parts or high pressure steam/hot water jets which could be exposed when operating or cleaning the appliances, shall incorporate devices to prevent automatic restarting after a stoppage due to drop in electrical voltage, steam pressure or failure of fuel supply. Overheat safety cut-out shall be provided for electric water heater.

C1.5.4 Gas Appliances - Flame Failure Protection

Main burners in an enclosed or semi-enclosed space shall be provided with an ignition device and flame failure protection devices. It shall not be possible for gas to pass to the main burner until a pilot flame has been established, and the gas to the main burner and pilot burner if fitted, shall automatically cut-off if the pilot flame or other means of igniting the main burner fail.

Main burners not in an enclosed or semi-enclosed space shall incorporate automatic controls to cut off the gas to the main burner should the pilot flame or other means of igniting the main burner fail.

C1.6 SPECIAL CONTROLS FOR GAS APPLIANCES

Controls, such as timers and thermostats, provided to regulate the cooking process should not control the gas supply to pilot burners. The manual ON/OFF control and automatic safety cut-out device (if fitted) of a main burner shall also control its associated pilot burner.

Automatic ignition, when specified, shall be of continuous spark fail-safe type by piezo-electrostatic or as approved by the Architect.

C1.7 CONTROLS FOR STEAM OPERATED APPLIANCES

All steam-heated appliances shall be suitable for the stated working pressures. The Contractor shall supply and install pressure reducing valve sets for those appliances requiring to be operated at lower pressures, each incorporating a direct acting reducing valve with screwed bronze body and bronze excess pressure relief valve. The reducing valve shall be preceded by a Y-type strainer and high and low pressure gauges with isolating valves shall be fitted at the up-and-down-stream of the pressure reducing set. Each pressure reducing set shall be capable of maintaining the required pressure under no-flow conditions.

A bronze stop valve with integral seat, screwed BSP shall be supplied and installed in the steam connection to each item of equipment, and a steam trap set shall be supplied and installed in the condensate discharge connection.

Adjustable thermostatic controls shall be included.

Steam traps serving boiling pans and steam heating coils shall be of the ball-float pattern and shall discharge into the common condensate system. Each compartment of the wet steaming ovens and each of the high-speed ovens shall be drained by a trap of the balanced pressure thermostatic type discharging over the floor gully provided. Ball-float trap shall be preceded by a strainer and followed by a combined sight/check valve, pipe union and stop valve. Strainers shall not be fitted to balanced pressure traps.

SECTION C2

MATERIALS AND FINISHES

C2.1 GENERAL

Materials used in appliances shall comply with the relevant approved international standards and shall be appropriate to the duty and conditions arising in the part of the appliances in which they are used. All metal components shall be corrosion resistant or be treated to resist corrosion.

C2.2 MATERIALS IN CONTACT WITH FOOD OR WATER

Materials that make contact, or are liable to make contact with food shall not cause contamination. All food containers shall be made of high-grade stainless steel and shall have smooth surface and be free of crevices.

C2.3 EXTERNAL SURFACES

The external surfaces of appliances shall be of vitreous enamel finishes or manufactured with high-grade stainless steel. The appliances shall have pleasant appearance and all surfaces shall be smooth with no sharp edges and pointed protrusions that would be liable to cause injury to the user or damage to clothing.

C2.4 TRAYS, SHELVES AND BASKETS

Trays, shelves and baskets shall be of stainless steel. The compartments shall have smooth surfaces, well rounded corners for ease of cleaning and shall be free from scrap traps.

C2.5 STAINLESS STEEL

Stainless steel shall be austenitic 18-8 type No. 1.4301 complying with BS EN 10088-1: 2005, or type No. 1.4401 complying with BS EN 10088-1: 2005 having a content of 17-19.5% chromium, 8-10.5% nickel and a maximum of 0.07% carbon.

The stainless steel shall be free from scale and all surfaces shall be polished to type 4 commercial (satin) finish.

The thickness of stainless steel sheet shall be adequate to support the designed load with a good safety margin. The thickness of the stainless steel sheet shall be 1.5 mm for top surface, shelving, trays, baskets, sinks, etc; 1.2 mm for exposed front, rear and end sections and 0.85 mm for all internal panel sections. Doors shall be double sided, 1.2 mm thick outside and 0.85 mm thick inside and shall slide easily and silently and be readily removable without the use of tools.

C2.6 GALVANIZED IRON

Galvanized iron shall conform to BS EN 10143: 2006 - Continuously hot-dip metal coated steel sheet and strip – tolerances on dimensions and shape. It shall be galvanized on an 8% copper bearing alloy sheet with approved hot pure zinc galvanizing. Where galvanized iron has been welded, all seams shall be leaned and scale removed and finished with a prime coat of aluminium paint.

C2.7 WHITE METAL AND ALUMINIUM ALLOY CASTINGS

Where white metal is specified, a white metal (commercially known as nickel silver) casting is intended. Such metal shall be of corrosion resistant quality having not less than 30% nickel content.

Aluminium alloy casting shall have chemical compositions equal to ISO 3522: 2007 Al-Si8Cu3Fe or better.

All castings shall be rough ground, polished and buffed to a bright lustre, free from pits, cold runs, checks, burrs or other surface imperfections.

C2.8 VITREOUS ENAMEL FINISHES

Vitreous enamel finishes shall comply with BS 3831.

C2.9 ELECTRIC MOTORS FOR APPLIANCES

All motors shall be of totally enclosed type class F fan cooled, dust and moisture protected to IP54 or higher grading unless otherwise specified, and having two-hour duty cycle and ball bearings (except small timing motors which may have sleeve bearings). All motors shall have windings impregnated to resist moisture. Motors shall have ample power to operate machines for which they are designated under any loading conditions without overloading.

Starting switchgear and control shall be provided to match with the particular appliances.

All single-phase electrical plug-in appliances shall be equipped with three wire cords of sufficient length to match with the installation conditions. A three-wire cord shall be supplied together with the appliances.

All motors of 0.75 kW and over shall be equipped with overload protection.

All motors of 0.25 kW and under shall be furnished with a manual starting switch with thermal overload, unless these motors shall be used for devices requiring automatic operations, in which case switches shall be of magnetic type with manual reset.

All motors of 0.33 kW and above shall be furnished with magnetic push button station, complete with manual reset.

C2.10 THERMAL INSULATION MATERIALS

Thermal insulating materials shall be inert, non-hydroscopic, non-flammable and shall not give off noxious or toxic fumes. It shall be of any approved type as specified in the General A/C Specification and suitable for the service condition of the equipment.

C2.11 COMPONENTS, PIPES AND FITTINGS IN WATER SIDE SYSTEM

Components, pipes and fittings in water side system shall comply with the General Specification for Building issued by Architectural Services Department of the Hong Kong Special Administrative Region. The installation shall comply with Waterworks Ordinance.

C2.12 COMPONENTS, PIPES AND FITTINGS IN REFRIGERATION SYSTEM

Components, pipes and fittings in refrigeration system shall comply with the relevant sections of the General A/C Specification.

C2.13 COMPONENTS, PIPES AND FITTINGS IN FUEL GAS SYSTEM

Components, pipes and fittings in Town Gas System shall comply with the Codes of Practice published by the Gas Authority, the requirements of the Fire Services Department, Hong Kong Special Administrative Region and the Operating Procedures published by The Hong Kong and China Gas Co. Ltd.

Components, pipes and fittings in L.P. Gas system shall comply with the General Specification for Liquefied Petroleum Gas Installation in Government Buildings of the Hong Kong Special Administrative Region issued by the Building Services Branch, Architectural Services Department.

C2.14 COMPONENTS, PIPES AND FITTINGS IN STEAM SYSTEM

Components, pipes and fittings in steam system shall comply with the British Standards published by the British Standards Institution or approved equivalent together with any amendments made thereto.

C2.15 COMPONENTS, CABLES AND FITTINGS IN ELECTRICAL SYSTEM

Components, cables and fittings in electrical system shall comply with the General Electrical Specification.

Identification of conductors and cables on LV power circuits shall be in accordance with New Cable Colour Code for Fixed Electrical Installations: Installation Guidelines published by the Electrical and Mechanical Services Department. Colour tracers may be used, in addition, to distinguish cables one from another.

C2.16 EXHAUST HOODS, FANS AND DUCTWORKS

Exhaust hoods, fans and ductworks shall comply with the relevant sections of General A/C Specification.

SECTION C3

SERVICES AND SERVICES CONNECTIONS

C3.1 FUEL GAS SUPPLY

The gas pipe including stop cocks, gas cocks, flexible hoses and all necessary accessories for a complete installation shall be supplied and installed for the connection of appliances to gas supply point.

C3.2 ELECTRICITY SUPPLY

The electrical supply will be 380/220 Volt, 50 Hz. Equipment not designed for the above voltage shall be provided with a transformer of adequate capacity in compliance with the current IEC 60076 for the appliances.

The electrical load of single-phase appliances shall not exceed 10 kW and three phase appliances shall be balanced as far as practicable. A sufficient length of PVC insulated single core cable enclosed in PVC covered or metal flexible conduit shall be supplied and installed for connection of fixed appliances to power supply point. The flexible conduit shall be flame retardant and shall not evolve any corrosive or poison fume when burnt.

C3.3 WATER SUPPLY

Appliances that require main water supply shall conform to the requirements of the Water Supplies Department.

C3.4 STEAM SUPPLY

All steam pipes including insulation, fitting and pressure reducing devices shall be supplied and installed for the connection of steam supply point to the appliances requiring steam.

Steam trap equipment complete with accessories shall be supplied and installed for condensing steam drain to the condensate system.

SECTION C4

SINKS AND FIXTURES

C4.1 TAPS, VALVES, FITTINGS, ETC.

Brass/bronze taps shall be provided for sinks. The taps shall be chromium-plated and provided with ball check to prevent cross flow of hot and cold water. Exposed piping and fittings forming part of the tap assembly shall also be chromium-plated.

Draw-off taps for hot liquids shall be of all metal bodies with insulated handles. Valves, taps and cocks shall be of smooth bore type and capable of being cleaned easily.

C4.2 STAINLESS STEEL PIPES AND TUBING

Whenever stainless steel pipe or tubing is specified, it shall be seamless or welded of gauge specified and of true roundness. Seamless tubing shall be thoroughly and properly annealed, pickled, ground smooth and finished to match adjacent work. Welded tubing shall be thoroughly heated and then drawn true to size and roundness and ground as required. All tubing, where exposed to view, shall be given a final grind of polishing after installation.

C4.3 STRUCTURAL STEEL SECTIONS

All angles, bends, channels or other structural sections used for framing shall be uniform and ductile in quality, free of hard spots, runs, checks, cracks or other surface defects. Where such sections are specified as galvanized or tinned, they shall be done by hot dipped process with all fluxes removed. In the case of galvanized, the finished surface shall be smooth and free from cold runs, blisters and uncoated or scaly patches.

C4.4 HANDLES, BRACKETS, LOCKING DEVICES AND HARDWARE

Wherever appliance is provided with handles, knobs, hinges, brackets or other miscellaneous hardware, they shall be of either heavy satin finish chromium-plated brass or stainless steel, or other alloys as specified.

All drawers, enclosed cabinets and storage bins shall be provided with heavy-duty chromium-plated cylinder type locking devices.

C4.5 FASTENERS

All welds, bolts, screws, springs, washers and nuts shall be of steel, brass or stainless steel, and each fitting shall be of the same metal type. Where dissimilar metals are fastened, screws, bolts and nuts shall be such as to ensure suitable fastening and prevent bulging of metals being fastened.

C4.6 BOLTS AND SCREWS CONSTRUCTION

All exposed surfaces on appliances shall wherever possible be free of bolts, screws and rivet heads. Where bolts are used to fasten trim to panelling and body of warmers, cabinets, counters, etc. and in particular to fasten tops of counters, dish tables, etc., to top of framing, such bolts and screws shall be of concealed type. If the threads of bolts and screws wherever inside the fixtures are either visible or possible to come into contact with the hands or wiping cloth, such bolts and screw thread square to be capped with suitable lock washer and chromium-plated brass or bronze acorn nuts. Where screw threads are not visible or readily accessible, they may be capped with standard lock washer and steel nuts to prevent rusting or corroding. When bolts or screws are welded to the underside of trim or top, the reverse side of weld shall be neatly finished and uniform with adjoining trim or top surfaces. Depression at these points will not be acceptable.

C4.7 LEGS

All legs shall be constructed of not less than 38 mm outside diameter 2.0 mm thick stainless steel tubing, cold drawn annealed and pickled, and shall be spaced not more than 1800 mm from centre to centre. All legs shall be of uniform finish.

C4.8 LEG CROSS BRACING

All leg cross bracing, where required, shall be constructed of not less than 25 mm outside diameter stainless steel tubing, cold drawn, annealed and pickled. All cross bracing shall run horizontal and level between all legs, 200 mm above floor or any such height to suit the installation condition, as approved by the Architect. All joints shall be completely welded around entire circumference of the tubing to form a complete seal. All welds shall be ground and polished smooth to match adjacent work.

C4.9 LEG MOUNTINGS

Where units are mounted on legs, under-bracing shall be supplied and installed. Legs in all cases shall be provided with sanitary type stainless steel channel braces along full length of respective tops. Channel shall measure approx. 100 mm in width including flanges and 25 mm high. Ends of channel shall be rounded and fully enclosed by welded stamping, matching cross section of channel. Channel shall be projection welded to underside of stainless steel units at intervals of not more than 250 mm and at ends not more than 250 mm from centre to centre. Crevices between channel and underside of unit shall be fully closed and sealed off with filler. Channel braces to receive supporting legs shall be concentric with legs.

C4.10 GUSSETS

Legs shall be held firmly in position by reinforced leg sockets or gussets welded to the underside of channel braces. Gussets shall have stainless steel socket and stainless steel base plate. The stainless steel base plate shall be welded to top.

C4.11 UNDER-BRACING

All stainless steel counters, tables, drain boards and dish table tops shall be braced below with inverted "U" type channels of approx. 100 mm wide and 25 mm high spaced not more than 750 mm on centres and run the whole length of the fixtures.

C4.12 CONSTRUCTION OF FEET

Bottom of legs shall be sealed for sanitation purpose and height of the legs shall be adjustable for levelling. The legs shall be fitted at bottom with sanitary type stainless steel bullet-shaped feet, fully enclosed and with a slightly rounded bottom to protect the floor. Top of each foot shall be fitted with a male threaded stem to fit into the end of the pipe legs and provided with a total adjustment of 40 mm. Bottom of each pipe leg shall be finished off smoothly and overlap the stem to provide sanitary fitting and prevent the accumulation of grease or other debris at this point.

All feet are to have one-piece die-stamped closed bottoms to ensure sanitation.

C4.13 UNDER-SHELVING

Where flat under-shelving is specified, under-shelves shall be constructed of 1.2 mm polished stainless steel. All shelving sides shall be turned down to form a channel shape of size approximately 12 x 38 x 12 mm and with corners cut out to fit contour of leg. Shelving shall be bolted to leg with stainless steel round head bolts. Under-shelving shall be reinforced with 25 x 100 x 25 mm, 2.0 mm thick stainless steel welded channels.

Removable type shelving shall be of the same material, rolled down on all sides, with corners notched to contour of leg, with resulting notches ground and polished smooth. Under-shelving shall be constructed in sections of not more than 1000 mm and where butted against adjoining shelf section, shelving sides shall be turned down to form channel shape approximately 38 mm x 12 mm. Supporting channel shall be furnished on underside of each shelf section and shall be of size 25 x 100 x 25 mm and of stainless steel.

Where slotted under-shelving is specified, it shall consist of a series of stainless steel panels or sections, slotted and with sides of slots turned down to form cross channels. Slots shall be approximately 32 mm wide and channels approximately 75 mm wide. Panels shall have all edges rounded and polished, ground smooth to assure easy cleaning. Panel shall be removable. Panels shall be not more than 750 mm wide in any direction. Slots shall run from front to rear in all cases. Adequate reinforcement shall be provided beneath panels.

C4.14 DRAWERS

Drawer fronts shall be of not less than 1.2 mm thick stainless steel, double pan type, with resulting corners welded, ground and polished smooth. Drawers shall set into an enclosed 1.2 mm stainless steel vermin-proof housing closed on all sides and bottom, stainless steel channel shaped slides, four ball bearing rollers, two rear, auto stops and release catches. Drawer face shall be provided with recessed stainless steel pull handle welded to face.

Drawers shall be provided with suspension and stop to prevent drawers from pulling out completely and shall support heavy load without deflection. Drawers shall, however, be easily removed without the use of tools.

Refrigerated drawers shall be provided with a full-perimeter soft gasket, which shall be durable for operation in low temperature condition down to 0^{o}C.

C4.15 WATER INLETS LOCATION

Water inlets shall be located in all cases above positive water level to prevent siphoning of liquids into the water system.

C4.16 CONSTRUCTION OF PIPE CHASES

Where it is necessary for plumbing and supply piping to be passed through the base, this piping shall be enclosed in a suitable pipe chase with easily removable access panels. These access panels shall not be held in place with screws or latches, but shall be formed in a pan shape, removable without tools or hinges.

The foregoing only applies to fixtures where an access is required from the front of the fixture, as in the case of sinks. Pipe chases at the end of fixtures containing bottom and intermediate shelves need not be enclosed. Shelves in these fixtures shall be turned up a minimum of 75 mm at the edge of the pipe chase.

In detailing fixtures, the Contractor shall consult the building Contractor to ensure that due allowance is made for traps or other controls, particularly those under lower shelves that site on masonry bases.

Where plumbing and supply piping pass through shelves on open base tables, shelves shall be neatly punched or die-stamped for the piping. The Contractor shall note the locations of such pipe chases or stamped pipe openings, on the plan and/or detailed drawings. They shall be of sufficient size to accommodate all necessary risers so that additional holes need not be cut on site.

C4.17 SLIDING DOORS AND HINGED DOORS

Sliding doors for cabinets, counters etc. shall be made of not less than 1.2 mm polished stainless steel exterior and not less than 0.85 mm stainless steel interior. Doors shall be equipped with die-stamped recessed stainless steel pull handles. Doors shall be of double pan construction, filled with suitable sound attenuating material of 12 mm thick, with all corners welded, ground and polished smooth to uniform finish. Doors shall be designed to permit removal for cleaning or adjustment without use of tools. Bolts and screws shall be kept to a minimum and be of corrosion resistant metal. Upper suspension stainless steel rollers shall be heavy-duty type and ground to minimize wear and noise. Precaution shall be taken in all cases to avoid friction or rubbing between doors, door suspension and upper sliding framework, including hardware. Double doors shall be provided with double overhead tracks and carriers for maximum clear door opening. Units shall be provided with trackless bottom with concealed guide for overhead roller doors. Guides shall be equipped with limit stops to prevent telescoping of doors.

Hinged doors for cabinets, counters, etc. shall be made of polished stainless steel exterior and stainless steel pan-shaped interior, filled with suitable sound attenuating material not less than 12 mm thick, with all corners welded, ground and polished smooth. Doors shall be flush mounted and fitted with stainless steel concealed hospital type offset butt hinges with concealed fasteners. Door handles shall be of stainless steel and flush mounted. Locks and full magnetic door seal shall be provided if specified.

C4.18 WELDING

All welding shall be done by electric fusion, metal-arc method. Stainless steels shall be welded by inert gas, e.g. argon. Carbon-arc or gas welding will not be permitted. All welding shall be done in a thorough manner, with welding rod of same composition as sheets or parts welded. Welds shall be complete welds, strong and ductile, with excess metal ground off and joints finished smooth to match adjoining surface. Welds shall be free of mechanical imperfections such as gas holes, pits, runs, cracks, etc. and shall have same colour as the adjoining surfaces. All joints on tops of fixtures, tables drain boards, exposed shelving, sinks, etc. shall be welded. All tops, which are constructed of more than one piece of sheet metal, shall be continuously butt-welded together with welds ground smooth and polished. Butt welds made by spot welding and filling in the voids with solder and finishing by grinding will not be acceptable.

All welded joints shall be homogeneous with the sheet metal itself. Where sheet sizes necessitate a joint, such joint shall be welded. Tops of fixtures shall be fabricated in factory with welded joints to reduce field joints to a minimum. Where fixtures join, tops of such fixtures shall be continuous with welded joints. All joints made in the field shall be closely butted, pulled together in field, field welded, ground and polished smooth in accordance with Section C4.20 of this General Specification. Tops of fixtures, with welded factory joints, shall be of maximum length to permit bringing of fixtures to their final positions, and to reduce field joints to an absolute minimum. Wherever welds occur on surfaces not finished by grinding and polishing as specified, such welds and the accompanying discoloration shall be suitably coated in factory by means of metallic base paint to prevent the possibility of progressive corrosion to such joints.

C4.19 SOLDERING AND BRAZING

Soldering where required shall be done with solder consisting of 75% pure tin and 25% lead. Stainless steel requiring soldering shall be first thoroughly cleaned of surface oxides and shall then be applied with a suitable stainless steel soldering flux. After the soldering has been completed, excess or remaining flux shall be passivated clean and the entire soldered joint cleaned with liquid alkaline or neutralizing agent to prevent any attachment on stainless steel by soldering flux.

Particular and special care shall be given to neutralizing all excess soldering flux. In no case shall soldering be relied upon for stability of seams of joints. The soldering shall serve only as a filler to prevent leakage. Soldering shall not at any time be considered as replacing welding or brazing. Solder shall not be used in or on containers or food handling equipment coming in contact with foods.

Brazing shall only be applied to the jointing of brass and bronze connecting fittings, particularly in the case of steam coils. All steam coils requiring dip tinning shall be fist brazed with surplus flux removed, so that metal is exposed and then dipped. Low temperature melting silver base hard solder will be considered as an equivalent of brazing.

Brazing or hard silver solder shall not in any event replace a welding operation. Stainless steel to stainless steel joints shall be made by brazing or hard silver soldering using hard solder.

C4.20 GRINDING, POLISHING AND FINISHING

All welded exposed joints shall be suitably ground flush with adjoining material neatly finished to harmonize therewith. Wherever material has been sunken or depressed by welded operation, such depressions shall be suitably hammered and preened flush to adjoining surface, and if necessary, again ground to eliminate low spots. All ground surfaces shall then be polished or buffed to match adjoining surfaces, consistent with good workmanship. Care shall be exercised in all grinding operations to avoid excessive heating of metal and metal discolouration. In all cases grain of rough grinding shall be removed by successive polishing operation. Texture of final polishing operation shall be uniform and smooth, consistent with reasonable care and good workmanship. General finish of all equipment shall be of high grade.

Butt joint and contact joint shall be close fitting and shall not require solder as filler. In no case shall any soldering operation be done where dependence is placed solely on soldering for strength and stability of joint or fixture itself.

Wherever bends occur, they shall be free of undue extrusion and shall not be flaky, scaly or cracked in appearance and where marks are found on uniform surface or material, all such marks shall be removed by suitable grinding, polishing and finishing. Wherever sheared edges occur, they shall be free of burrs, fins, or irregular projections and shall be finished over such sheared edges. Where mitres or bull nose corners occur, they shall be neatly finished with under edge material neatly ground to uniform condition and in no case will overlapping materials be acceptable.

Where a welding operation occurs on stainless steel, the possibility of corrosion shall be entirely eliminated. Ways shall be used to eliminate the possibility of carbide precipitation. Each joint of welding shall be suitably finished in a bright finish to eliminate possibility of progressive corrosion. Underside of each weld shall be suitably ground or coated to prevent possibility of oxidization and progressive corrosion. Welding done by any process that eliminates or reduces carbide precipitation in connection with bolts and screws need not be so treated.

Wherever galvanized or tinned angle or channel construction is specified for welded framing, welding shall be done before hot galvanized. If galvanized structural sections are used for such a welded framework, welded joints shall be suitably treated by means of metallic coating to cover up all surfaces marred by welding and grinding operations. All iron or galvanized pipes or other parts shall be cleaned and Duco finished in the factory with not less than two coats of Duco Grey or other approved products having equivalent general appearance, performance and functions.

Equipment shall be neatly finished without any scarf, or other manufacturing foreign matter. All external metal surfaces shall be smooth with no sharp angles, and shall be stoved enamel coated, properly painted, or finished. Where stainless steel is specified, exposed surfaces shall be given a finish equal to No. 4 (satin) or product having equivalent general appearance, performance and functions. When manufacturing process and welding disturb the original finish, it shall be carefully reground and polished and restored to match the rest of the surface.

Where specified, all cabinets, doors shelves, whether inside or outside of cabinet and wherever exposed, are to be No. 4 finish. This applies to inside finish of any cabinet having doors or otherwise. Any inside surface exposed to view when sliding or swinging door is opened shall be regarded as an exposed surface. Underside of shelf need not be No. 4 finish but such finish shall be at least equal to No. 80 ground finish. Indication of die markings not blending with final finish will not be acceptable.

C4.21 CONSTRUCTION OF SINKS

All sinks, except hand basins, shall be fabricated of not less than 1.6 mm polished stainless steel and of the size and design as specified. The backs, bottom and front shall be formed of one continuous shell with the ends welded into place. Partitions for compartment sinks shall be of the same materials, electrically welded in place. The partitions shall be of double thickness with a half round top edge.

All corners both vertical and horizontal shall be rounded on a minimum 15 mm radius electrically welded, ground smooth and polished. Solder in filleted corners will not be acceptable.

Across the back of all sinks, there shall be a 150 mm minimum high splashback extended backward 25 mm across the top. Ends shall be enclosed. Two tap holes for hot and cold water taps on approximately 200 mm centres shall be provided over the centre line of partitions between compartments, 50 mm approximately from the top of the splash. Drain boards shall be pitched toward sink compartments. The front and open sides of the sink unit shall have raised rims formed from one continuous sheet with round arris having a minimum of 3 mm in radius.

The bottom of each compartment shall have four radial die-stamped grooves pitched to the drain and shall be provided with a heavy-duty standpipe drain plug with removable stainless steel strainer. Connected overflow for drain valve shall be supplied and installed. The drain point shall be suitably located so that the standpipe will not hinder any washing work.

Body shall be mounted on not less than 38 mm diameter tubular stainless steel legs fitted with stainless steel adjustable feet. Legs shall be fitted with die-formed, enclosed, sanitary closed gussets. Open type or two sided gussets will not be accepted. These gussets shall be welded to the underside of the sink.

Sink insets shall be of one-piece deep drawn construction of at least 1.6 mm thick stainless steel with all corners rounded on not less than 15 mm radius. Sinks shall be welded integral with counter tops with no gap in between.

All sinks shall be provided with drains and connected overflows. Connected overflow shall be furnished with stainless steel perforated plates constructed so that constant water level is at least 25 mm below dividing partitions. All sinks shall be 360 mm deep as a minimum.

C4.22 CONSTRUCTION OF HAND BASINS

All hand basins, separated from the sinks, shall be constructed with at least 1.2 mm thick stainless steel, sanitary, ground and smooth, with backsplash. Basin shall be furnished with swivel spout mixing tap and cast brass grid drain plug with tailpiece and completed with anti-siphon trap. Detergent dispensers and paper dispensers for all hand basin units shall be supplied and installed. Dispensers shall be mounted on wall at a convenient level suitable for use.

C4.23 CONSTRUCTION OF METAL TABLE TOPS

Metal tabletops shall be constructed of single piece of stainless steel sheet not less than 1.6 mm thick, ground smooth, and polished. Large metal tabletops shall be constructed of not less than 2.0 mm thick stainless steel where specified. All working tops on closed base fixtures shall be reinforced on the underside with a framework of at least 40 mm iron channel sections of galvanised steel of same thickness as top. All open base tables shall be reinforced with 40 mm x 40 mm x 3 mm stainless steel angles or alternatively inverted 'U' channels 100 mm wide with 25 mm turn downs of the same thickness as top. Reinforcing sections shall be spaced not more than 750 mm apart.

Cross-angle members or inverted 'U' channels shall be placed at each pair of legs. One angle runner or 'U' channel, running lengthwise, shall be provided on tops up to 750 mm; two provided on all tops over 750 mm. All tops shall be reinforced so that there shall not be any noticeable deflection and all reinforcements shall be stud welded to the underside of the top. No rivets or bolts shall be used through the top.

Field joints shall be provided in the top where necessary and they shall be located for practical construction and consistent with sizes convenient for shipping and accessibility into the building.

All metal tops shall be turned down approximately 50 mm in a box section except where adjacent to walls or other places of equipment. The wall side shall be turned up 150 mm and back 25 mm. Ends of this splash shall be closed.

Where tables meet with dish-washing machine or pot washing machine, their sides shall be turned down and a flange shall be provided, arranged so as to permit the bolting of 5 mm neoprene gasket between the flanges and turn down of table forming water tight joint across top edges of tables.

Underside of tables shall be provided with suitable sound attenuating materials. Sound attenuating materials shall be waterproof. Dish table and sink table shall be provided with sound attenuating materials.

C4.24 CONSTRUCTION OF ENCLOSED BASES

All enclosed bases or cabinet bodies shall be of a least 1.6 mm stainless steel thick. They shall be enclosed on the ends and sides. The bases shall be reinforced at the top with a framework of 40 mm x 40 mm x 3 mm stainless steel angle or inverted 'U' channel sections with all corners of said framework mitred and welded. Bottom shall be reinforced with channels and gussets. Additional angles and channel cross members shall be provided to reinforce shelves and support tops. All free corners of enclosed bases or cabinet bodies shall be rounded on 15 mm radius and all corners against walls and other fixtures shall be square.

In the case of fixtures fitted against or between walls, the boxes shall be set in at least 25 mm from the wall line, but the tops shall extend back to the wall line. This shall permit adjustment to wall irregularities. A vertical trim strip of the same material as the body shall be provided at each end of the fixture to close the gap between the back edge of the body and the wall, or the end of the body shall extend 25 mm to the wall line.

These fixtures shall be constructed with 150 mm long legs as specified in Section C4.7.

C4.25 CONSTRUCTION OF SHELVES

All interior shelves in cabinet bodies and enclosed bases shall be constructed of not less than 1.6 mm thick stainless steel. The front shall be flanged down 50 mm and under 12 mm. The rear and ends shall be turned up approximately 50 mm against the interior of the body. Shelves shall be solid in un-heated bases and shall be perforated in heated bases. Perforations shall be 20 mm in diameter and spaced 100 mm on centres. All shelves shall be rigidly reinforced with angle and/or channel framework to prevent sagging.

The elevated shelves above free standing work tops shall be constructed of not less than 1.2 mm thick stainless steel. Long shelves shall be constructed with thicker stainless steel as approved by the Architect. The wall mounted elevated shelves shall be constructed of not less than 2.0 mm thick stainless steel. All edges shall be turned adjacent to walls or other fixtures where they shall be turned up 50 mm. All corners shall be welded and ground smooth. Shelves on wall line shall be mounted on not less than 2.0 mm thick stainless steel brackets. Brackets shall be spaced not more than 900 mm. Shelves over the top of free standing fixture shall be mounted on not less than 25 mm diameter stainless steel uprights or not less than 38mm diameter stainless steel tubular stands at the back edge of the fixture with cantilever stainless steel brackets on the top.

C4.26 CONSTRUCTION OF WOOD TOP TABLES

Where wood top tables are called for, tops shall be not less than 75 mm thick sectional, hard rock, kiln dried maple construction. This shall be constructed of a series of maple strips 32 mm wide and approximately 75 mm thick, bolted by a least 12 mm steel rods spaces approximately 500 mm apart, threaded and fitted with nuts and washers at each end. Bolts to be countersunk and end holes filled with maple plugs. Both top and bottom of tabletop shall be sanded down smooth and finished with two coats of hot paraffin. The top shall be tight, homogeneous and wrap free. Wood tops shall be mounted on 1.6 mm thick stainless steel channels running front to back as approved by the Architect.

Where wood baffles are called for, they shall be provided at the ends or backs of tops. Baffles shall be constructed as to terminate in fully cover intersections where baffle meets tabletop.

C4.27 SPLASHBACK

Stainless steel tables and counters adjacent to building walls, shall be furnished with not less than 150 mm high splashback returned 25 mm to wall with welded closed ends and be formed from one continuous sheet with tabletop or countertop with round arris having a minimum of 3 mm in radius.

PART D – INSPECTION, TESTING & COMMISSIONING

SECTION D1

GENERAL

All catering equipment installation shall be suitably commissioned and tested by the Contractor to the satisfaction and approval of the Architect. The Contractor shall employ qualified and experienced commissioning engineers approved by the Architect to carry out the testing and commissioning of catering equipment installation.

D1.1 STANDARD AND REQUIREMENTS

The Contractor shall follow relevant approved standards, procedures, guidelines in the testing and commissioning works. They shall include but not limited to:

(a) Statutory Obligations and other requirements, Specifications and Standards specified in Part A;

(b) Building Services Branch Testing and Commissioning Procedure for Catering equipment installation in Government Buildings Hong Kong Special Administrative Region and Building Services Branch Testing and Commissioning Procedure for Electrical Installation in Government Buildings Hong Kong Special Administrative Region;

(c) Detailed inspection, testing and commissioning methods and procedures approved by the Architect;

(d) Manufacturers' recommendation and specifications;

(e) Test requirements under various standards including British Standards, European Standards, ISO Standards and other international standards on catering equipment installation.

D1.2 COMMISSIONING ENGINEER

The Contractor shall appoint at least one competent and experienced commissioning engineer responsible for the overall planning, organizing, coordinating, supervising and monitoring of the testing and commissioning works and also certifying all results and reports from the testing and commissioning works. The Contractor shall submit, at the commencement of the Works, information detailing the qualification and experience of the commissioning engineer for the Architect's approval.

The commissioning engineer shall have minimum 3 years on-site experience in similar type and scale of testing and commissioning works.

The commissioning engineer shall be responsible for the submission of detailed testing and commissioning procedures and methodologies, co-ordinating the programme and sequence of testing and commissioning works, arranging for the testing and re-testing of the installations, supervising the testing and commissioning works, and certifying the results of all the tests.

D1.3 MASTER PROGRAMME OF TESTING AND COMMISSIONING WORKS

The Contractor shall submit a programme for testing and commissioning works at the commencement of the contract, within the first 3 months after the date of commencement of the Works. The programme shall indicate the tentative dates of all tests and commissioning works that will be carried out throughout the whole contract and all necessary submissions and approval relating to testing and commissioning. The Contractor shall ensure that the testing and commissioning programme matches the master programme for construction and that all testing and commissioning works are complete before the completion date of the Works.

A detailed checklist of all the equipment and installation of the Works to be commissioned and tested shall be submitted at the same time. The checklist will be used for progress monitoring and shall be updated from time to time as the Works progress towards completion.

The testing and commissioning programme submitted by the Contractor shall detail the type of testing and commissioning works required, the breakdown of the programme into area-by-area basis, the tests that are required during construction and before completion of the Works, the period of each test with float time allowed, and the proposed programme for the completion of builder's works. Critical path programme shall be submitted. The Contractor shall plan the programme so as to minimise the overlapping of different tests arranged simultaneously in different locations of the Site.

D1.4 INSPECTION, TESTING AND COMMISSIONING METHODS AND PROCEDURES

The Contractor shall submit detailed inspection, testing and commissioning methods and procedures together with report formats for reporting inspection, testing and commissioning results for the Architect's approval within 4 months after commencement of the Works, or at least 4 months before commencement of the tests required, whichever is earlier.

Submission for works to be tested and commissioned during the construction period shall be made in good times matching with the construction programme for approval. For tests that have to be done satisfactorily before subsequent construction work, such tests shall be completed to the approval of the Architect before new construction work is to be carried out.

The Contractor shall submit detailed inspection, testing and commissioning methods and procedures following the format in KE_TCP and EE_TCP, adding additional pages and details in accordance with the manufacturers'

recommendation and relevant standards, and adding testing and commissioning procedures for systems and equipment not covered in KE_TCP and EE_TCP. The detailed procedures shall be separated into two major parts covering the following: -

(a) Testing that is required to be carried out during the construction period.

(b) Testing and commissioning that are required for certifying the completion of the Works before the commencement of the Maintenance Period.

D1.5 EQUIPMENT, APPARATUS AND TOOLS

The Contractor shall provide, at no cost to the Employer, all necessary equipment, apparatus, tools and materials for carrying out the testing and commissioning works.

D1.6 LABOUR AND MATERIALS

The Contractor shall be responsible for provision of all labour and both consumable and non-consumable materials for carrying out testing and commissioning works at their expenses. Electricity supply, water, fuel, diesel, chemicals, LP gas, town gas, lubricants, and other fuel oil for carrying out the functional/performance tests and the commissioning shall be arranged and provided by the Contractor at no cost to the Employer. Where specified, Building Contractor may supply electricity and water.

The Contractor shall despatch competent and experienced commissioning engineers and technicians to carry out testing and commissioning.

The Contractor shall properly drain the water and exhaust the gases during and after the test as required. The Contractor shall provide and adopt measures to avoid damage to the building, installations, decorations and fixtures during the tests and shall make good such damages if so caused by his fault.

The Contractor shall allow labour, materials and fuel for carrying out overall acceptance test with the users and maintenance agents, and to provide training to the users and operators on the use and operation of the equipment.

D1.7 SUPPLY OF INSPECTION, MEASURING AND TESTING EQUIPMENT

The Contractor shall supply the calibrated inspection, measuring and testing equipment and instrument for testing and commissioning works in accordance with the requirements as specified in the Particular Specification.

D1.8 READINESS FOR TESTING AND COMMISSIONING

The Contractor shall check the completion of the works to be tested or commissioned, the associated builder's works and the associated building services installations to ensure that testing and commissioning can be proceeded in a safe and satisfactory manner without obstruction.

D1.9 TYPE-TEST CERTIFICATE

Type-test for equipment shall be carried out at the manufacturers' works or elsewhere appropriate in order to demonstrate their compliance with the Regulation or requirements. "Type-test" certificates together with the corresponding drawings, sketches, reports and any other necessary documents shall be submitted to the Architect for approval before delivery of the equipment.

D1.10 NOTICE OF INSPECTION, TESTING AND COMMISSIONING WORKS

The Contractor is required to provide advanced notice for inspection, testing and commissioning works as follows:

(a) Off-site Inspection and Testing

An advanced notice of at least one week before commencement of the inspection or test shall be provided.

(b) On-site Inspection, Testing and Commissioning

An advanced notice of at least 4 days before commencement of inspection, testing or commissioning of any part or parts of the installation shall be provided.

The Contractor shall plan the testing and commissioning programme to enable the Architect or his representatives to witness all the tests. Unless otherwise approved by the Architect, testing and commissioning works carried out by the Contractor in the absence of the Architect or the Architect's representatives shall not be accepted as the approved contract test record.

D1.11 DOCUMENTATION AND DELIVERABLES

The Contractor shall record all commissioning information and testing results at the witness of the Architect or his representatives. Testing and commissioning shall be properly checked and certified by Contractor's commissioning engineer and signed by the Architect or his representative who has witnessed the testing or commissioning before submission to the Architect. The Contractor shall submit full testing and commissioning report to the Architect within 14 days after completion of testing and commissioning of the installation.

Immediately after each test, the commissioning engineer shall sign the test/data record sheet, and obtain the endorsement of the Architect's representative who has witnessed the test on site, irrespective of whether the test is successful or not, and submit a copy of the test/data record sheet to the Architect. For testing that is required during the construction period, the Contractor shall also submit a formal testing and commissioning report endorsed by the commissioning engineer within 14 days after the completion of the whole test for any part of the installation.

Three copies of the results of tests for all appliances and certificate of tests for pressure type appliances and certificates for gas appliances signed by authorised or competent person shall be submitted before the hand-over inspection and shall be included in the related operation and maintenance manuals.

Approval documents of domestic gas appliances by the Gas Authority in accordance with the Code of Practice GU05 "Approval of Domestic Gas Appliances" published by the Gas Authority, the HKSAR shall also be included in the related operation and maintenance manuals.

SECTION D2

ADJUSTMENTS, COMMISSIONING, FUNCTIONAL AND PERFORMANCE TESTS

(a) The Contractor shall commission the installation and carry out complete functional and performance tests for all equipment and systems, make all necessary adjustments, including setting all controls and checking the operation of all protective and safety devices in accordance with the manufacturers' instructions, the requirements of the statutory rules and regulations and to the satisfaction of the Architect before the installations will be accepted. The Contractor shall submit detailed procedures and a programme for testing and commissioning to the Architect for approval at least 4 weeks before commencement of testing and commissioning or within six months after commencement of the Contract, whichever is earlier.

(b) The detailed testing and commissioning procedures shall follow the KE_TCP with additional details and tests to be proposed by the Contractor to the approval of the Architect and in accordance with the manufacturer's recommendation, relevant standards and statutory regulations.

Testing and commissioning shall include, but not limited to: -

(i) Factory tests to be witnessed where required;

(ii) Visual inspection and checking;

(iii) Safety and quality tests;

(iv) Commissioning, tuning and adjustment;

(v) Functional tests;

(vi) Performance tests.

Visual inspection and checking shall include verification of the made/ models of the installed equipment are the approved ones. The Contractor shall submit relevant documents including delivery orders and payment vouchers to substantiate the equipment installed on site being the approved models unless the identification of the manufacturer and model name can be verified easily on site.

The Contractor shall prepare and submit a detailed plan on the programme of the testing and commissioning works right at the commencement of the Contract, so as to ensure that all of such works can be completed within the Contract period. The testing and commissioning programme submitted shall detail the types of testing and commissioning works required, with detailed breaking down of the work items, the tests that are required during construction and at the time before the completion of the Works, the period of tests with float time allowed, the programme for the completion of various builder's works, and any other activity details to enable the Architect to visualize fully all the schedules for the testing and commissioning work.

(c) Complete functional tests and performance tests shall be carried out for all appliances provided under the Contract, either by the manufacturers during production or by the Contractor on site. The Contractor shall provide the results of all functional tests and performance tests for all non-standard production appliances.

(d) Functional tests and performance tests shall be carried out by competent and experienced engineers and technicians and shall be in accordance with KE_TC, relevant specifications or other approved international recognised standards, statutory rules and regulations and supply companies' requirements applicable to the corresponding appliances.

(e) Performance tests shall include but not limited to: -

(i) Heating up/cooling down time test;

(ii) Thermal efficiency test;

(iii) Temperature maintenance test;

(iv) Test on the proper operation of all functional control devices;

(v) Tests on the proper operation of all protective and safety devices;

(vi) Tests on the accuracy and proper operation of meters, gauges and other indication devices;

(vii) Pressure tests on pressure type components incorporated in an appliance, which operate above atmospheric pressure;

(viii) Leakage test on water circuits, steam circuits, refrigeration circuits, fuel gas circuits, fuel oil circuits, etc.;

(ix) Insulation and earth continuity tests for electrical circuits.

(f) Functional tests shall include demonstration and tests to prove the functioning of the equipment and installation in fulfilling the design intent and operational requirements. This shall include the tests on all switches and control.

(g) Certificate of Test for Pressure Type Appliances:

A certificate of test issued by a competent person shall be provided for each pressure type boiler, steam generator and vessels incorporated in an appliance which operates above atmospheric pressure, in accordance with the Boilers and Pressure Vessels Ordinance, Chapter 56, Laws of the Hong Kong Special Administrative Region.

(h) Certificate of Test of Gas Appliances:

When it is so required by the Gas Authority, the Contractor shall provide certificate for gas appliances.

SECTION D3

COMMISSIONING TO ACHIEVE OPTIMUM PERFORMANCE

After testing and commissioning of installation, the Contractor shall despatch competent and experienced engineers and technicians to carry out further commissioning of all equipment at completion of Works and in Maintenance Period when the equipment are put into operation in accordance with the manufacturer's instructions and KE_TC. The Contractor shall carry out necessary fine-tuning, adjustment and commissioning to suit the catering operation to achieve optimum performance.

SECTION D4

STATUTORY INSPECTION, TEST AND CERTIFICATION

The Contractor shall allow the costs for arranging all statutory inspections, tests and certification on the acceptance of the equipment and installation. The statutory inspection and test shall be arranged before completion of the Works.

PART E – INSPECTION, ATTENDANCE, OPERATION AND MAINATENANCE DURING MAINTENANCE PERIOD

SECTION E1

GENERAL MAINTENANCE REQUIREMENTS

(a) The Contractor shall furnish maintenance, free of further charge, for the complete catering equipment installation for the whole Maintenance Period. This free maintenance shall include the following services: -

(i) Emergency Services;

(ii) Breakdown Services;

(iii) Routine Services including Preventive Maintenance Services;

(iv) Annual and final inspections, tests and maintenance services;

(v) All the services and requirements as specified.

(b) The maintenance of the catering equipment installation shall be carried out by competent personnel provided by the Contractor in accordance with this General Specification and manufacturer's instructions and manuals.

(c) All inspections, tests, maintenance services and repairs shall be carried out generally in accordance with the manufacturers' recommendations/ instructions and to the satisfaction of the Architect. The maintenance service is to maintain the catering equipment installation in a good and functional working condition. All spare parts and tools required in the Maintenance Period shall be provided. The Contractor shall despatch competent and experienced engineers and technicians equipped with the appropriate testing instruments, tools, equipment, etc. to inspect, service, test, adjust and maintain the catering equipment installation in a satisfactory operating condition. The Contractor shall allow for carrying out such inspection, service, testing, adjustment and maintenance at any time, within or outside normal office hours and general or public holidays.

(d) All labour and materials necessary including cleaning materials, lubricants, tools, instruments, replacement of parts, etc., and transportation required for carrying out routine and emergency inspections, tests, repairs, replacements and maintenance services shall be included in the Contract. Any renewals or repairs necessitated by reason of negligence or misuse of the equipment or by reason of any other cause beyond the Contractor's control (with the exception of ordinary wear and tear) shall be carried out at a reasonable and justifiable additional cost with prior notice to and agreement of the Architect.

(e) The Contractor shall be responsible for all repairs necessary to maintain the catering equipment installation in a safe, reliable and fully operative condition with satisfactory performance. The Contractor must ensure that the Contractor's servicing staff shall carry out the necessary repairs by utilising manufacturer's original replacement parts. The Contractor shall ensure minimum interruption to the operation of the catering equipment installation during each inspection, testing, repair or maintenance service.

(f) The Contractor shall allow for carrying out emergency, breakdown and routine services at any time within or outside normal office hours and general or public holidays whenever necessary. The Contractor shall submit a list with at least two names, telephone and pager numbers and addresses of the Contractor's English-speaking and Cantonese-speaking representatives to who services calls shall be directed.

(g) The Contractor shall allow all necessary expendable materials such as cleaning fluid, oil, grease, jointing materials, abrasive anti-corrosive, touch up paints, etc., required for the maintenance work.

(h) The Contractor shall, at the Contractor's own expenses, make all suitable arrangements to avoid damage to property or installations provided by others during the course of the Works. The Contractor shall be responsible for all losses and claims for injury or damage to any person or property arises out of or in consequence of the execution of the maintenance work. The Contractor shall, as and when instructed by the Architect, repair or replace at the Contractor's own cost any part of the installation proved to be defective by reason of Contractor's negligence, faulty design, inadequate routine maintenance and supervision, workmanship or materials. No claim whatsoever shall be made by the Contractor for such repair or replacement if it is within the scope of the Contractor's responsibility.

(i) During the Maintenance Period, the Contractor shall supply and install without charge to Government replacements for all equipment and parts which in the opinion of the Architect become unserviceable where such un-serviceability is due to faulty materials, workmanship, design, installation or inadequate performance, rating and size of the work provided by the Contractor.

(j) After each emergency, breakdown and routine inspection, testing and maintenance service, the Contractor shall furnish to the Architect a report complete with the following details: -

(i) Date and time of inspection, testing and maintenance service;

(ii) Details of the persons carrying out the task;

(iii) Details of inspection and maintenance service;

(iv) Results of all tests performed;

(v) Any factors significantly affecting the service and test results;

(vi) Any follow-up actions as required.

(k) The Contractor shall carry out the final inspection, testing and maintenance of the catering equipment installation at the end of the Maintenance Period to certify that the equipment and installation are in a good and functional working condition, and are kept in a fully maintainable status. In the final inspection, testing and maintenance, all routine services including replacement of consumables shall be carried out.

SECTION E2

EMERGENCY SERVICES

(a) Emergency services shall be rendered as and when required during the Maintenance Period, so as to minimize the outage period of the faulty equipment and to ensure that any hazard of gas leakage, electricity leakage, explosion, fire hazard is mitigated as to ensure the best safety. Notification to the Contractor of the required emergency services will normally be by telephone from the Architect's representative, or the user.

(b) The Contractor shall make suitable arrangements whereby competent personnel can be despatched for emergency works at any time during the day or night including general or public holidays, under all circumstances, and attending to such calls in the shortest possible time and using the quickest means of transport. In general a response time of less than one hour will be expected unless prior special arrangement is made and approved for very remote locations.

(c) Following response to an emergency call, the Contractor shall on the next working day submit a written "Emergency Service Report" to the Architect.

SECTION E3

BREAKDOWN SERVICES

(a) The Contractor shall make suitable arrangement whereby competent personnel shall be despatched for repair works as soon as possible within 24 hours.

(b) Following response to a breakdown call the Contractor shall submit a "Breakdown Services Report" to the Architect within 7 days after attending to any such call.

SECTION E4

ROUTINE SERVICES - GENERAL

(a) The Contractor shall carry out the routine services at the 6th month and the 12th month of the Maintenance Period, or at an interval shorter than 6 months as recommended by the manufacturer. The routine services shall include preventive maintenance.

(b) Before routine maintenance is carried out on site, the Contractor shall obtain the Architects' agreement on the programme of routine maintenance, such as date and time taken.

(c) After the routine maintenance, the Contractor shall furnish to the Architect the "Routine Service Report" within 14 days.

(d) The routing services shall be carried out in accordance with the manufacturer's instructions where applicable and in compliance with all relevant safety regulations and shall include all works specified in Section E.5.

SECTION E5

ROUTINE SERVICES - WORKS INCLUDED

(a) Gas/Oil Heated Appliances

(i) To check and where necessary correct for adequate provision of combustion and ventilation air for each item of appliance.

(ii) To clean all combustion spaces up to the appliance outlet and all internal boiler flue passages;

(iii) To clean and adjust all burner equipment including checking and adjusting burner gas pressure;

(iv) To check and where necessary correct for satisfactory operation of the gas pilot and ignition device;

(v) To check and where necessary correct the conditions of all exposed flue systems and terminals including the functioning of draught diverters to ensure safe and proper combustion. Where flue pipes have minor defects, these shall be repaired by welding and finished with heat resisting aluminium paint;

(vi) To check and where necessary correct all gas valves, cocks and taps to ensure that they are gas tight and easy to operate, in proper condition;

(vii) To check and where necessary correct all pressure and temperature operated valves, flame failure and all other control devices to ensure that they are in proper working condition and are adjusted to give correct control of operation;

(viii) To check and where necessary correct any water cock that forms an integral part of a gas appliance;

(ix) To check and where necessary correct the general performance of the appliance;

(x) To ensure that the appliance, on completion of its inspection and maintenance, is not leaking water or gas and is in proper working condition and to the satisfaction of the user.

(b) Refrigerated Appliance

(i) To check condition of compressor and condenser fan and replace defective and worn-out parts;

(ii) To clean condenser and remove dirt and dust between fins;

(iii) To check and refill refrigerant where necessary;

(iv) To check controls for proper operation;

(v) To check and correct the general performance of the appliances where necessary;

(vi) To ensure the appliance is in proper working condition on completion of its routine servicing, and to the satisfaction of the users.

(c) Electric Appliances

(i) To carry out insulation and earth test to ensure the safe operation;

(ii) To check all functional controls are in proper operation;

(iii) To ensure all protective and safety devices are working and set properly;

(iv) To check components with moving parts and replace defective and worn out parts;

(v) To check and correct the general performance of the appliances where necessary;

(vi) To ensure the appliance is in proper working condition on completion of its routine servicing, and to the satisfaction of the users.

ANNEX I

LIST OF TECHNICAL STANDARDS AND QUALITY STANDARDS QUOTED IN THIS GENERAL SPECIFICATION

The following is a list of the technical standards and quality standards quoted in this General Specification. The technical standards and quality standards indicate the basic requirements. The Contractor may offer products, materials and equipment complying with alternative internationally recognized equivalent standards acceptable to the Architect and demonstrated to be equivalent in terms of construction, functions, performance, general appearance and standard of quality to the relevant standards or other standards specified in this General Specification to the Architect for approval.

Standard	**Description**
BS EN 631-1	Materials and articles in contact with foodstuffs. Catering containers. Specification for dimensions of containers
BS EN 10088-1: 2005	Stainless steels. List of stainless steels
BS EN 10143: 2006	Continuously hot-dip metal coated steel sheet and strip. Tolerances on dimensions and shape
BS 3831	Specification for Vitreous Enamel Finishes for Domestic and Catering Appliances
IEC 60076	Power transformers
ISO 3522: 2007	Aluminium and aluminium alloys -- Castings -- Chemical composition and mechanical properties
ISO 9001: 2008	Quality management systems – Requirements