



BCA Construction Quality Assessment System

CONQUAS® 2022

CONQUAS®

THE BCA CONSTRUCTION QUALITY ASSESSMENT SYSTEM

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1.0 INTRODUCTION

Construction Quality Assessment System (**CONQUAS**) 2022 is now the eleventh edition of the CONQUAS assessment scheme after more than 30 years of implementation.

The key changes are as follows:

(a) Internal Finishes (For Private Residential Projects only)

- i. Based on the distribution of defects from complaints raised during Defects Liability Period (DLP), the weightages for internal finishes were adjusted to ensure it commensurate with end users' expectation on quality

(b) Installation Methods Verification and Functional Tests (For Private Residential Projects only)

- i. Introduced Water Flow Test for dwelling unit corridor, footpath, exposed walkway in carpark, lift lobbies and basement carpark to address issues of ponding at common areas
- ii. Introduced 100% EN 14179-2 heat soak test for tempered glass (including laminated tempered glass) used at balcony, roof canopy and shower screen (Self-Testing) + 3-year warranty for all glasses to address issues of shattered glasses within dwelling units and common areas

(c) External Work Assessment (For Private Residential Projects only)

- i. Added assessment of suspended Swimming Pool for signs of water leakages

(d) Score Moderation Framework

- i. Expanded moderation scope to cover validated major latent defects, contravention of regulatory requirement/s or are classified as defects-ridden by URA for private residential projects

1.1 Objectives of CONQUAS

The Building and Construction Authority (BCA) developed the CONQUAS in conjunction with major public sector agencies and various leading industry professional bodies, organizations and firms to measure the quality level achieved in a completed building project.

CONQUAS was designed with three objectives:

- (a) To have a standard quality assessment system for new building projects.
- (b) To make quality assessment objective by:
 - measuring constructed works against workmanship standards and specification.
 - using a sampling approach to suitably represent the whole project.

- (c) To enable quality assessment to be carried out systematically within reasonable cost and time.

CONQUAS is an independent assessment. Unless specified in the building contract, project engineers or architects should not use CONQUAS to decide if the building or parts of the building project are acceptable.

1.2 Scope of CONQUAS

CONQUAS sets out the standards for the various aspects of construction work and award points for works that meet the standards. These points are then summed up to give a total quality score called the **CONQUAS Score** for the building project.

CONQUAS covers most aspects of general building architectural works and assessments shall be completed prior to application for TOP or CSC inspection, whichever comes first.

The assessment consists of **four components**:

- (1) **Internal Finishes,**
- (2) **Installation Methods Verification and Functional Tests,**
- (3) **External Finishes, and**
- (4) **Bonus Points**

Each component is further divided into different items for assessment. However, the assessment excludes works such as piling, heavy foundation and sub-structure works which are heavily equipment-based, buried or covered and usually called under separate contracts or sub-contracts. Design, choice of materials and end users' aesthetic preferences are also excluded from the assessment.

The building is assessed primarily on **workmanship standards** achieved through factory and site inspection. For projects using Design for Manufacturing and Assembly (DfMA) technologies, assessments will be done throughout the construction process with the Installation Methods Verification and some of the Functional Tests carried out in the factory.

The assessment on the functional performance of selected services and installations help to safeguard the interest of building occupants in relation to safety, comfort and defects which surface only after some time.

To ensure the robustness of the CONQUAS score, major defects will be taken into consideration depending on when such major defects are detected, or adverse feedback on such major defects are received as follows:

- (a) Where major defects are detected during the assessment, such major defects will affect the scoring during the assessment;
- (b) Where adverse feedback on major defects are received from end-users during the period from the completion of the assessment to the issuance of the CONQUAS score, the CONQUAS score will be moderated before being issued;
- (c) Where adverse feedback on major defects are received from end-users within 3 years from the date of issuance of the CONQUAS score, the CONQUAS score will be further moderated within the 3-year period.

In addition, the 3-tier CONQUAS Scheme (see Table A) was introduced to help developers/contractors further raise the quality of their new private residential developments. This involves a higher sampling rate assessment where more samples will be covered and more areas for improvement identified. The 3-tier CONQUAS Scheme will apply to all CONQUAS applications for new *private residential developments.

The 3-tier CONQUAS Scheme is applicable where:

- (a) developers or main contractors, in the past 3 years,
 - i. with no CONQUAS track record for *private residential development, or
 - ii. has at least one *private residential development with CONQUAS score below the threshold CONQUAS score⁴ or
 - iii. has at least one *private residential development with major defects affecting ≥ 20 units or 5% of all units, whichever is lower

(Upon the expiry of the 3-year period, BCA retains the discretion to impose Tier 3 CONQUAS assessment if BCA assesses that the major defects have not been reasonably addressed.)

(b) all other developers or main contractors

i. to be decided after the initial CONQUAS score³ is generated

**Note: Includes private mixed developments with residential component.*

Table A – 3-Tier CONQUAS Scheme

S/N	Applicants	Tier 1	Tier 2a	Tier 2b	Tier 3
		25% sampling (25% of the units will be checked, and sampling will be conducted within units)	50% sampling ¹ (50% of the units will be checked, and sampling will be conducted within units)	100% sampling (all units will be checked, and sampling will be conducted within units)	100% checks ² (all locations within all units will be checked)
a)	Developers or main contractors				
	i. with no CONQUAS track record for *private residential development in the past 3 years, or	-	During CONQUAS application	When the initial CONQUAS score ³ is below the threshold CONQUAS score ⁴ set by BCA	-
	ii. has at least one *private residential development in the past 3 years with CONQUAS Score below the threshold CONQUAS score ⁴ , or	-			-
	iii. has at least one *private residential development in the past 3 years with major defects ⁵ affecting ≥ 20 units or 5% of all units, whichever is lower Upon the expiry of the 3-year period, BCA retains the discretion to impose Tier 3 CONQUAS assessment if BCA assesses that the major defects ⁵ have not been reasonably addressed.	-	-	-	During CONQUAS application

**Note: Includes private mixed developments with residential component.*

¹ Additional samples will be taken on: architectural internal finishes samples, wet areas water tightness tests for toilets/bathrooms, window water tightness tests.

² 100% checks refer to the same regime of inspection as QM. Projects will be required to meet a higher score set at the bottom 40th percentile of industry average CONQUAS score of all private residential developments completed in the preceding year.

³ The initial CONQUAS score will be derived after 20% (for tier 2a) and 50% (for tier 2b) of the required architectural internal finishes samples are completed.

⁴ The threshold CONQUAS score is set at the bottom 10th percentile of industry average CONQUAS score for private residential projects in the preceding year.

⁵ Major defects refer to defects that would generally not be acceptable to end-users as specified under section 3.4 in this manual.

1.3 Derivation of CONQUAS

The minimum standards were derived **from discussions with the major public sector agencies, developers, consultants and contractors** based on the general specifications used in their projects.

To match the expectations from the end users, feedback through complaints, homeowners' survey findings and defects listings were also considered in refining the weightages and assessment standards.

In developing CONQUAS, studies and numerous trials were conducted to fine-tune its new test techniques and assessment standards. Moderation of the scoring system was carried out along with trials to ensure accuracy, consistency and alignment with end users' expectations.

1.4 CONQUAS Assessor

BCA CONQUAS assessors undergo a rigorous training programme. They are required to attend BCA's in-house CONQUAS training and calibration programme to ensure competency and consistency in the assessment.

2.0 CONQUAS

2.1 Components to be assessed

The CONQUAS assessment is divided into four main components –

- (a) Internal Finishes,
- (b) Installation Methods Verification and Functional Tests,
- (c) External Finishes, and
- (d) Bonus Points.

(a) Internal Finishes

Internal finishes deal mainly with the finishes and components. This is the part where the quality and standard of workmanship are most visible. The assessment covers:

- (i) architectural finishes, which includes floors, internal walls, ceiling, doors, windows and components. Components include permanent internal fixtures (such as wardrobe, kitchen cabinet, vanity top, mirror, bathtub, water closet, shower screen, basin etc.), and permanent external fixtures (such signage, railings, unit number plates, lift fittings, letter box, lightings, metal gate, etc.).
- (ii) basic M&E fittings, which includes taps and mixers, WC, floor traps, electrical switches, trunkings, fan coil unit, air-con diffuser, light fittings, CCTV camera, shower head, etc. At the lift lobby, lift display and call-button panels are checked as M&E basic fittings.

The quality standards for Internal Finishes are given in Appendix 1

(b) Installation Methods Verification and Functional Tests

- (i) Installation methods verification on the following 4 trades will be carried out during the initial construction stage of the project:
 - a) Waterproofing works to bathrooms/toilets
 - b) Stone/tiling installation works
 - c) Timber flooring installation
 - d) Window installation

The entire process for the above-mentioned trades will be verified by BCA against the submitted approved method statements and compared against BCA's good industry practice guides.

For projects that adopt prefabricated prefinished volumetric construction (PPVC), the verification of the above installation methods will be carried out in the factory.

a), b), c) and d) will be waived if the PPVC manufacturer/factory is Manufacturer Accreditation Scheme (MAS) accredited and a) will be waived if the waterproofing specialist is SCI accredited

- (ii) Functional tests check on window water-tightness, wet area water-tightness and adhesion of internal wall tiles will be carried out. For projects that adopt PPVC, a maximum of 30% of the total window water-tightness test samples and 20% of the total wet area water tightness test samples will be carried out in the factory.

(c) External Finishes

- (i) The assessment will cover the roofs, external walls and external works at the completion stage of the building.

(d) Bonus Points

- (i) Certified QM/CONQUAS Personnel

CONQUAS bonus point is awarded for projects that employ certified QM/CONQUAS personnel. This is to facilitate quality achievement and encourage deployment of competent certified personnel on site.

- (ii) Design/Material Choices

Bonus points are given to projects using better buildable designs which facilitate higher quality achievement.

- (iii) Quality Mark (QM) Projects

Bonus points are given to the project according to the quality rating achieved under the QM tiered rating scheme.

2.2 The Weightages

In CONQUAS, the weightages for Internal Finishes, Installation Methods Verification and Functional Tests, External Finishes, and Bonus Points are allocated according to three categories of buildings as follows:

Components to be Assessed	Category of Development		
	Weightage (%)		
	Private Residential	Public Residential	Non-Residential
1. Internal Finishes	60	55	50
2. Installation Methods Verification and Functional Tests	20	25	30
3. External Finishes	20	20	20
Sub Total			
CONQUAS Score	100	100	100
4. Bonus Points	8	7	7
Total			
CONQUAS Score	108	107	107

Note : (i) For private mixed development with residential component, the project will follow the weightage under the private residential category.

The total CONQUAS score of a building is the sum of points awarded to the four components in each category of building.

2.3 Sampling

As it is impractical to assess all elements in a building, CONQUAS uses a sampling system for the assessment. The sampling system, which is based on the gross floor area of the building, will ensure that the assessment adequately represents the entire building.

3.0 THE ASSESSMENT

3.1 Assessment Approach

In general, the Assessor should select the actual locations to be assessed prior to each assessment. Selection of samples shall be based on drawings and location plans. The samples shall be distributed as uniformly as possible throughout the construction stages.

The scoring will be done on the works that are inspected for the first time. Rectification and correction carried out after the assessment will not be re-scored. The objective of this practice is to encourage contractors *"doing things right the first time"*.

When an assessed item does not comply with the corresponding CONQUAS standards, it is considered failed and an "X" will be noted in the assessment form. Likewise, a "✓" is given for an item meeting the standards. A "blank" will indicate that the item is not applicable. The score is computed based on the number of "✓" over the total number of items assessed.

3.2 Assessment

Assessment is typically carried out upon completion of the building and before handing over of the project to the owner. Only the verification of the installation methods and functional tests would be carried out during the initial stage and progressive stages of the construction progress.

The assessment consists of the following items:

Assessment Items	Category of Development		
	Weightage (%)		
	Private Residential	Public Residential	Non-Residential
Internal Finishes	60	55	50
Floor	12.0	14.5	13.5
Internal Wall	8.0	9.3	13.6
Ceiling	4.0	9.4	5.1
Door	11.0	6.8	5.1
Window	8.0	6.7	5.1
Component	12.0	5.5	5.1

M&E basic Fittings	5.0	2.8	2.5
Installation Methods Verification and Functional Tests	20	25	30
Field Window Water-Tightness Test (WTT) (BCA Test)	7	11.5	14
*Field Window Water-Tightness Test (WTT) (Self-Testing)	*Pre-requisite	*Pre-requisite	*Pre-requisite
Wet Area Water-Tightness Test (BCA Test)	5	6.5	8
*Wet Area Water-Tightness Test (Self-Testing)	*Pre-requisite	*Pre-requisite	*Pre-requisite
Pull-Off-Test for Internal Wall Tiles	2	5	6
#Installation Method Verification	2	2	2
Water Flow Test for dwelling unit corridors, lift lobbies, footpaths, exposed walkways in carpark and basement carpark	2	NA	NA
100% EN 14179-2 Heat Soak Test for tempered glass (including laminated tempered glass) used at balcony, roof canopy and shower screen (Self-Testing ¹) + 3-year warranty ¹ for all glasses	2	NA	NA
External Finishes	20	20	20
Roof	5	5	5
External Wall	5	5	7.5
External Works	10	10	7.5
Sub Total CONQUAS Score	100	100	100
Bonus Points	8	7	7
Total CONQUAS Score	108	107	107

Note: # These checks may be covered under QM assessment and PPVC projects under the MAS certification audits. These checks may be waived by BCA, if the PPVC system is already certified under MAS. Assessment for internal wet area waterproofing works will be waived and points allocated if the appointed contractor for such works is accredited under the Singapore Concrete Institute (SCI) Accreditation Scheme for Waterproofing Specialist Contractors. The accredited waterproofing contractor must produce a valid SCI certificate that covers the entire contractual period of the installation works for the project.

Score will be prorated accordingly if any of the 4 trades are not applicable to the project.

** Project Qualified Person to declare the results of the self-testing carried out by the project.*

¹ To be declared by the Project Qualified Person with supporting documents on test results and warranty

Weightages for internal finishes and M&E fittings assessment of **Private Residential** projects are allocated at the defect level based on the guidelines set out below:

Element	Element Weightage	Defect Category	Defect Weightage
Floor	12.0 points	Finishing	3.6
		Alignment & Evenness	2.1
		Crack & Damages	3.6
		Hollowness	1.5
		Jointing	1.2
Internal Wall	8.0 points	Finishing	2.0
		Alignment & Evenness	1.0
		Crack & Damages	3.6
		Hollowness	0.8
		Jointing	0.6
Ceiling	4.0 points	Finishing	0.8
		Alignment & Evenness	0.8
		Crack & Damages	1.2
		Roughness	1.0
		Jointing	0.2
Door	11.0 points	Joint & Gap	1.0
		Alignment & Evenness	1.0
		Material & Damages	2.8
		Functionality	3.4
		Accessories Defects	2.8
Window	8.0 points	Joint & Gap	0.8
		Alignment & Evenness	0.8
		Material & Damages	2.0
		Functionality	3.2
		Accessories Defects	1.2
Component	12.0 points	Joint & Gap	1.2
		Alignment & Evenness	2.4
		Material & Damages	4.8
		Functionality	1.8
		Accessories Defects	1.8
M&E Fitting	5.0 points	Joint & Gap	0.5
		Alignment & Evenness	0.5
		Material & Damages	1.5
		Functionality	2.0
		Accessories Defects	0.5

Weightages for internal finishes and M&E fittings assessment of **Public Residential** projects are allocated at the defect level based on the guidelines set out below:

Element	Element Weightage	Defect Category	Defect Weightage
Floor	14.5 points	Finishing	4.4
		Alignment & Evenness	2.5
		Crack & Damages	4.4
		Hollowness	1.8
		Jointing	1.4
Internal Wall	9.3 points	Finishing	2.4
		Alignment & Evenness	1.1
		Crack & Damages	4.2
		Hollowness	0.9
		Jointing	0.7
Ceiling	9.4 points	Finishing	1.9
		Alignment & Evenness	1.9
		Crack & Damages	2.8
		Roughness	2.3
		Jointing	0.5
Door	6.8 points	Joint & Gap	0.7
		Alignment & Evenness	0.7
		Material & Damages	1.7
		Functionality	2
		Accessories Defects	1.7
Window	6.7 points	Joint & Gap	0.7
		Alignment & Evenness	0.7
		Material & Damages	1.7
		Functionality	2.6
		Accessories Defects	1
Component	5.5 points	Joint & Gap	0.6
		Alignment & Evenness	1.1
		Material & Damages	2.2
		Functionality	0.8
		Accessories Defects	0.8
M&E Fitting	2.8 points	Joint & Gap	0.3
		Alignment & Evenness	0.3
		Material & Damages	0.8
		Functionality	1.1
		Accessories Defects	0.3

Weightages for internal finishes and M&E fittings assessment of **Non-Residential** projects are allocated at the defect level based on the guidelines set out below:

Element	Element Weightage	Defect Category	Defect Weightage
Floor	13.5 points	Finishing	4
		Alignment & Evenness	2.4
		Crack & Damages	4
		Hollowness	1.7
		Jointing	1.4
Internal Wall	13.6 points	Finishing	3.4
		Alignment & Evenness	1.6
		Crack & Damages	6.1
		Hollowness	1.4
		Jointing	1.1
Ceiling	5.1 points	Finishing	1
		Alignment & Evenness	1
		Crack & Damages	1.5
		Roughness	1.3
		Jointing	0.3
Door	5.1 points	Joint & Gap	0.5
		Alignment & Evenness	0.5
		Material & Damages	1.3
		Functionality	1.5
		Accessories Defects	1.3
Window	5.1 points	Joint & Gap	0.5
		Alignment & Evenness	0.5
		Material & Damages	1.3
		Functionality	2
		Accessories Defects	0.8
Component	5.1 points	Joint & Gap	0.5
		Alignment & Evenness	1
		Material & Damages	2
		Functionality	0.8
		Accessories Defects	0.8
M&E Fitting	2.5 points	Joint & Gap	0.25
		Alignment & Evenness	0.25
		Material & Damages	0.75
		Functionality	1
		Accessories Defects	0.25

The assessment is based on the sampling guidelines table as set out below:

Sampling Guidelines Table					
	Items	GFA per Sample	Min Sample	Max Sample	Remarks
1	Internal Finishes	500 m ²	50	150	For Non-Residential Project & Public Mixed Development Project with Non-Residential GFA exceeding 50%
1a	Internal Finishes	70 m ²	90	800	For all Private Residential Project & Mixed Development Project with Residential component. For Public Mixed Development Project with Residential GFA exceeding 50%
1a(i)	Internal Finishes (Tier 2a)	-	90	1,440	50% Sampling (50% coverage for all units): Max Principal samples: 640 Max Service samples: 640 Max Circulation samples: 160
1a(ii)	Internal Finishes (Tier 2b)	-	90	2,160	100% Sampling (100% coverage for all units): Max Principal samples: 1000 Max Service samples: 1000 Max Circulation samples: 160
1b	Internal Finishes	70 m ²	90	600	For Public Residential Project
2	External Wall	-	100%	-	100% of the blocks or units
3	External Work	-	1	-	1 for each type of external work
4	Roof	-	50%	-	Minimum 50% of the blocks or units
5a	Field Window Water-tightness Test (WTT)	-	20	100	Conducted by BCA. A sample is defined as 2m length of joint. 5% of total number of window panels or 5% of total curtain wall area, whichever is applicable For PPVC project, maximum 30% of the test samples will be from factory

5b(i)	Field Window Water-tightness Test (WTT) (Tier 2a)	-	40	200	<p>50% Sampling</p> <p>10% of total number of window panels or 10% of total curtain wall area, whichever is applicable</p> <p>For PPVC project, maximum 30% of the test samples will be from factory</p> <p>For all Private Residential Project & Mixed Development Project with Residential component</p>
5b(ii)	Field Window Water-tightness Test (WTT) (Tier 2b & Tier 3)	-	40	200	<p>100% Sampling</p> <p>20% of total number of window panels or 20% of total curtain wall area, whichever is applicable</p> <p>For PPVC project, maximum 30% of the test samples will be from factory</p> <p>For all Private Residential Project & Mixed Development Project with Residential component</p>
5c	Field Window Water-tightness Self-Test (WTT)	-	25%	-	Self-Testing with declaration by project Qualified Person
6a	<p>Wet Area Water-tightness Test:</p> <ul style="list-style-type: none"> Non-Residential Projects Residential Projects 	-	20	100	<p>Conducted by BCA:</p> <p>Non-Residential Projects:</p> <ul style="list-style-type: none"> 20% of all bathrooms and/or toilets (by location) <p>Residential projects:</p> <ul style="list-style-type: none"> 30% of all bathrooms and/or toilets (by location) all will be tested if less than the minimum sample (for all projects) <p>For PPVC project, maximum 20% of the test samples will be from factory</p>
7b(i)	Wet Area Water-tightness Test (Tier 2a)	-	100	600	<p>50% Sampling (50% of all bathrooms and/or toilets):</p> <p>Based on number of bathrooms and/or toilets</p> <p>For PPVC project, maximum 20% of the test samples will be from factory</p> <p>For all Private Residential Project & Mixed Development Project with Residential component</p>

7b(ii)	Wet Area Water-tightness Test (Tier 2b)	-	120	1000	<p>100% Sampling (100% coverage for all units): Based on number of bathrooms and/or toilets</p> <p>For PPVC project, maximum 20% of the test samples will be from factory</p> <p>For all Private Residential Project & Mixed Development Project with Residential component</p> <p>All will be tested if less than the minimum sample</p>
7c	Wet Area Water-tightness Self-Test		100%		<ul style="list-style-type: none"> Self-Testing with declaration by project Qualified Person Including flat roof
8	Installation methods of following trades, (i) Waterproofing works (ii) Marble/tiling works (iii) Timber flooring works, and (iv) Window Installation works	-	-	-	Assessment based on approved Method Statement, where applicable
9	Pull-Off-Test for Internal Wall tiles	10,000 m ²	1 set	5 sets	5 tiles per set (by location)
10	Water Flow Test for dwelling unit corridor, lift lobbies, footpaths, exposed walkway in carpark and basement carpark	1,500m ²	10	70	<p>For all Private Residential Project & Mixed Development Project with Residential component</p> <p>Sample distribution between internal and external area at 70%:30%</p> <p>Maximum 10m length for unit corridor, footpath, exposed walkway, driveway in basement carpark per sample</p> <p>Not more than 3 carpark lots per sample in basement carpark</p> <p>Each lift lobby = 1 sample</p>
11	100% EN 14179-2 Heat Soak Test for tempered glass used at balcony, roof canopy and shower screen (Self-Testing) + 3-year warranty for all glasses	-	100%	-	<p>For all Private Residential Project & Mixed Development Project with Residential component</p> <ul style="list-style-type: none"> Self-Testing with declaration by project Qualified Person The 3-year warranty for all glasses to start from date of DLP commencement

A location for **internal finishes** assessment is a functional space of a building such as a room, hall, toilet, kitchen, yard, corridor or lobby. Locations are further categorized into three types:

Principal locations are major functional places such as halls and rooms.

Circulation locations include lift lobbies, corridors and staircases.

Service locations are utility areas such as toilets, kitchens, balconies and yards.

The computed number of locations will be distributed according to "Principal", "Circulation" and "Service" based on the percentages set out in the two categories of buildings as below:

Locations	Building Categories	
	Residential*	Non-Residential
Principal	40%	60%
Service	40%	15%
Circulation	20%	25%

**Note: For private residential under the 3-Tier CONQUAS scheme, please refer to the above sampling guidelines table.*

Scoring of internal finishes is based on the defects groups as shown in Appendix 4 'Defects Grouping Guide for Assessment of Internal Finishes'.

In general, any item which is not available in a project will not be considered for scoring. For such case, the architectural score will be pro-rated accordingly. However, any available item that is not offered for assessment will be considered as failed and no points awarded.

An item under assessment will be considered failed if it does not meet the standards. In addition, any item found to be defective functionally such as evidence of water seepage in the window, wall, slab, ceiling or roof, is considered to have failed the assessment. Likewise, for a particular defect that is found excessive in an item (say excessive cracks on a wall).

For the assessment of **roof**, a minimum 50% of the total number of buildings will be assessed. For the assessment of **external walls**, 100% of the total number of buildings will be assessed. For a building, the external wall will be divided into 4 walls for assessment.

The External Works assessment consists of the following locations:

- (a) Link-way / Shelter - 10m length section per sample and minimum 2 samples
- (b) Apron & Drain - 10m length section per sample and minimum 2 samples

- (c) Roadwork & Carpark - 10m length section per sample and minimum 1 sample
- (d) Footpaths & Turfing - 10m length section per sample and minimum 2 samples
- (e) Playground - 1 location
- (f) Court - 1 location
- (g) Fencing & Gate - 10m length section per sample and minimum 1 sample
- (h) Swimming Pool - 10m length section per sample and minimum 1 sample
- (i) Club House - 1 location
- (j) Guard House - 1 location
- (k) Electrical Substation - 1 location
- (l) Suspended Swimming Pool – 1 location

Each item in the **External Works** will be assessed separately and all the locations listed above must be assessed where applicable.

Under the material & functional tests, self-test items like field window water-tightness test for 25% of windows and 100% wet area water-tightness test (including flat roof) are set as pre-requisites and based on declaration by the project Qualified Person (QP).

3.3 Bonus Points

(a) Design/Material Choices

Bonus points are given to projects using better buildable designs which facilitate higher quality achievement.

Requirement	Bonus Point
Use of advance precast concrete system (*APCS) elements supplied by SCI Accredited Precasters	0.5
Use of prefabricated MEP plant modules	0.5
Use of Prefabricated Bathroom Unit (PBU) at least 65% of toilets) {The PBU system has to be accredited under the PBU Manufacturer Accreditation Scheme (MAS)}	1.0
Use of Prefabricated Prefinished Volumetric Construction (PPVC) (at least 65% of coverage) {The PPVC system has to be accredited under the PPVC Manufacturer Accreditation Scheme (MAS)}	2.0
Use of Mass Engineered Timber (e.g. Cross Laminated Timber, Glued Laminated Timber, etc.) (at least 65% of coverage) {A building is deemed constructed using engineered timber if both the floor (including roof) and wall are constructed using engineered timber.}	1.0
Use of productive materials, which facilitate higher quality achievement (at least 65% of coverage) – 0.3 points each e.g. i. Engineered wood/ Stone flooring ii. Vinyl flooring iii. Other productive material	Max. 1.0

* [APCS](#) refers to a precast construction method that applies the 3S principles of Standardisation, Simplicity and Single Integrated elements. For areas to be considered as APCS, (i) slabs shall be of precast; and (ii) adopt at least 4 out of 6 features, with coverage of at least 65%.
(refer to <https://www1.bca.gov.sg/buildsg/productivity/design-for-manufacturing-and-assembly-dfma/advanced-precast-concrete-system>).

(b) Certified QM/CONQUAS Personnel

CONQUAS bonus point is awarded for projects that employ certified QM/CONQUAS personnel. This is to facilitate quality achievement and encourage deployment of competent certified personnel on site.

Requirement	Bonus Point
Certified CONQUAS Supervisor	0.15
Certified QM Supervisor	0.3
<ul style="list-style-type: none"> <i>A supervisor can only be deployed on one project at any time</i> <i>Supervisor must be deployed fulltime during the project duration</i> 	
Certified CONQUAS Manager	0.4
Certified QM Manager	0.6
<ul style="list-style-type: none"> <i>A manager can be deployed for maximum of 2 projects at any time</i> 	
Maximum	1.0

Note:

1. QM/CONQUAS Personnel must be certified and deployed minimally for the period between commencement of the superstructure works and completion of the project.
2. Both employer and employee must declare the personnel was deployed for the minimum duration as specified.
3. The QM/CONQUAS manager/supervisor shall demonstrate commitment and satisfactory performance during the project duration pertaining to quality and CONQUAS assessment issues. It is the responsibility of the certified personnel to ensure the project personnel attend all allocated CONQUAS training, assessments are completed, and submission of documents done timely. They should conduct themselves in a professional manner when dealing with feedback on defects related to workmanship quality, failing which, CONQUAS bonus points will not be awarded.
4. Where required, additional documents and records shall be furnished for verification.

(c) Quality Mark (QM) Projects

Bonus points are given to the project according to the quality rating achieved under the QM tiered rating scheme.

Requirement	Bonus Point*
<u>QM STAR</u>	1.0
<u>QM EXCELLENT</u>	0.5

3.4 Major Defects

Major defects are largely classified as defects that would either: (i) affect the safety and/or liveability of end-users and hence, are generally not be acceptable to end-users; or (ii) affect the safety of end-users and/or the functionality of the architectural, mechanical and/or electrical components in the building. Examples are as follows:

- a) Any missing/ broken accessories for the architectural items assessed;
- b) Any cracked/ chipped/ broken windowpanes, shower screens, mirrors and any glass items;
- c) Any visually visible cracked tiles/ stones, timber doors & flooring, ceiling boards and cracks on painted walls, etc.;
- d) Functionally deficient doors, windows, wardrobes and cabinets, tap, water closet, switches, etc.;
- e) Fan coil unit leaking, water seepage through walls or windows, etc.;
- f) Misaligned door frame – only for cases where verticality tolerance > 3mm per door frame height.

When a major defect is identified during the assessment by BCA, it is considered failed and two "X" instead of one will be noted in the assessment form.

Declaration by the project QP shall be required on the satisfactory rectification of these major defects before the issue of the CONQUAS score.

3.5 Score Moderation Framework

(a) Adverse Feedback and High Incidence of Major Defects

This is to allow for moderation of the CONQUAS score (which is computed on the completion of assessment) where valid adverse feedback on major defects, including latent defects, are received from end-users. The CONQUAS score may also be moderated where projects are found to have contravened regulatory requirement/s and/or are classified as defects-ridden by URA (for private residential projects).

(b) Restricted Samples Given for Assessment

To ensure that the sampling system adequately represent the quality of the whole project, CONQUAS score will be adjusted based on the areas provided for assessment, as follows:

Average *Areas Offered for Assessment	CONQUAS Point Deduction
<u>90 ~ 95%</u>	2 points
<u>75 ~ 90%</u>	4 points
<u>50 ~ 75%</u>	6 points
<u>Less than 50%</u>	10 points

Note: *Based on number of units for residential projects and blocks/floors for other projects

A project may not be issued the CONQUAS score if less than 90% of the required internal finish samples were assessed.

3.6 Computation of CONQUAS Score

Below are two examples of how a project's CONQUAS score will be computed:

Scenario 1:

Project Type	-	Commercial (Non-Residential)
Structural System	-	70% coverage for APCS
Roofing System	-	Flat Roof
Nos of Toilet	-	10 nos (100% Prefabricated Bathrooms accredited under the PPVC MAS and supplied by an Accredited Precaster)
Fulltime Certified Personnel	-	2 CONQUAS supervisors, 1 CONQUAS Manager

Step 1: Main Assessment Score

Assessment Items	Weightage (%)	Score	Remarks
Internal Finishes	50	41.1	
Floor	13.5	10.8	
Internal Wall	13.6	10.5	
Ceiling	5.1	4.4	
Door	5.1	4.5	
Window	5.1	4.6	
Component	5.1	4.3	
M&E basic Fittings	2.5	2	
Installation Methods Verification and Functional Tests	30	29	
Field Window Water-Tightness Test (WTT) (BCA Test)	14	14	
*Field Window Water-Tightness Test (WTT) (Self-Testing)	Pre-requisite	submitted	
Wet Area Water-Tightness Test (BCA Test)	8	8	
*Wet Area Water-Tightness Test (Self-Testing)	Pre-requisite	submitted	
Pull-Off-Test for Internal Wall Tiles	6	5	

Installation Method Verification	2	2	No tiling, no timber flooring, prorated for waterproofing, and windows installation methods.
External Finishes	20	13	
Roof	5	3	
External Wall	7.5	5	
External Works	7.5	5	
Sub Total			
CONQUAS Score	100	83.1	

Step 2: Computation of Bonus Points

Requirement	Bonus Point	Score
Use of advance precast concrete system (APCS) elements supplied by SCI Accredited Precasters	0.5	0.5
Use of prefabricated MEP plant room	0.5	0
Use of Prefabricated Bathroom Unit (at least 65% of toilets)	1.0	1.0
Use of Prefabricated Prefinished Volumetric Construction (PPVC) (at least 60% of coverage) {The PPVC system has to be accredited under the PPVC Manufacturer Accreditation Scheme (MAS)}	2.0	0

<p>Use of Mass Engineered Timber (e.g. Cross Laminated Timber, Glued Laminated Timber, etc.) (at least 65% of coverage)</p> <p>{A building is deemed to be constructed using engineered timber if both the floor (including roof) and wall are constructed using engineered timber.}</p>	1.0	0
<p>Use of productive materials, which facilitate higher quality achievement (at least 65% of coverage) – 0.3 points each e.g.</p> <p>i. Engineered wood/ Stone flooring ii. Vinyl flooring iii. Other productive material</p>	Max. 1.0	0

Certified Personnel Deployed	Bonus Point
Certified CONQUAS Supervisor x1	0.15 x 2
Certified CONQUAS Manager x1	0.60
Total	0.9

Step 3: Computation of CONQUAS Score

Area of Works/Component	Project Score
Main assessment score	83.1
Bonus	2.4
CONQUAS Score	85.5

Scenario 2:

Project Type	-	Private Residential
Roofing System	-	Flat Roof
Structural System	-	PPVC system (70% coverage) accredited under the PPVC MAS and supplied by a SCI Accredited Precaster
Toilets	-	70% Prefabricated Bathrooms accredited under the PPVC MAS and supplied by an Accredited Precaster (including bathrooms within PPVC modules)
QM rating	-	QM Merit
Fulltime Certified Personnel	-	1 CONQUAS supervisor, 1 QM supervisor, 1 QM Manager

Step 1: Main Assessment Score

Assessment Items	Weightage (%)	Score	Remarks
Internal Finishes	60	56.6	
Floor	12.0	11.8	
Internal Wall	8.0	7.8	
Ceiling	4.0	3.8	
Door	11.0	10.1	
Window	8.0	7.4	
Component	12.0	11.0	
M&E basic Fittings	5.0	4.7	
Installation Methods Verification and Functional Tests	20	20	
Field Window Water-Tightness Test (WTT) (BCA Test)	7	7	

*Field Window Water-Tightness Test (WTT) (Self-Testing)	*Pre-requisite	submitted	
Wet Area Water-Tightness Test (BCA Test)	5	5	
*Wet Area Water-Tightness Test (Self-Testing)	*Pre-requisite	submitted	
Pull-Off-Test for Internal Wall Tiles	2	2	
Installation Method Verification	2	2	.
Water Flow Test for unit corridor, lift lobbies, footpaths, exposed walkways in carpark and basement carpark	2	2	
100% EN 14179-2 Heat Soak Test for tempered glass (including laminated tempered glass) + 3-yr warranty for all glasses	2	2	
External Finishes	20	15.5	
Roof	5	3	
External Wall	5	4.5	
External Works	10	8	
Sub Total	100	92.1	
CONQUAS Score			

Step 2: Computation of Bonus Points

Requirement	Bonus Point	Score
Use of advance precast concrete system (APCS) elements supplied by SCI Accredited Precasters	0.5	0
Use of prefabricated MEP plant room	0.5	0
Use of Prefabricated Bathroom Unit (at least 65% of toilets)	1.0	1.0

<p>Use of Prefabricated Prefinished Volumetric Construction (PPVC) (at least 60% of coverage)</p> <p>{The PPVC system has to be accredited under the PPVC Manufacturer Accreditation Scheme (MAS)}</p>	2.0	2.0
<p>Use of Mass Engineered Timber (e.g. Cross Laminated Timber, Glued Laminated Timber, etc.) (at least 65% of coverage)</p> <p>{A building is deemed to be constructed using engineered timber if both the floor (including roof) and wall are constructed using engineered timber.}</p>	1.0	0
<p>Use of productive materials, which facilitate higher quality achievement (at least 65% of coverage) – 0.3 points each</p> <p>e.g.</p> <p>i. Engineered wood/ Stone flooring</p> <p>ii. Vinyl flooring</p> <p>iii. Other productive material</p>	Max. 1.0	0

Certified Personnel Deployed	Bonus Point
Certified CONQUAS Supervisor x1	0.15
Certified QM Supervisor x1	0.30
Certified QM Manager x1	0.60
Total	1.05

Requirement	Bonus Point
<u>QM STAR</u>	-
<u>QM EXCELLENT</u>	-
<u>QM MERIT</u>	0

Step 3: Computation of CONQUAS Score

Area of Works/Component	Project Score
Main assessment score	92.1
Bonus	4.0
CONQUAS Score	96.1

Note: Project will be published as CONQUAS★

3.7 Publication of CONQUAS Scores

The overall CONQUAS scores of projects are published and accessible for viewing on the IQUAS (Information on Construction Quality) Portal at BCA's website. Projects scoring 95 CONQUAS points or higher will only be shown as "CONQUAS★". Higher CONQUAS scores generally reflect better workmanship. However, scores beyond 95 points are often achieved at significant cost and effort disproportionate to the incremental achievement in quality. The "CONQUAS★" rating facilitates setting realistic quality benchmarks balanced with productivity and cost considerations.

Appendix 1

QUALITY STANDARDS FOR INTERNAL FINISHES WORKS

Architectural Finishes

	Item*	Standards
1	Floors	
1a	General Requirements	<ol style="list-style-type: none"> 1) Finishing <ul style="list-style-type: none"> No stain marks Consistent colour tone Floor divider provided where required 2) Alignments & Evenness <ul style="list-style-type: none"> Evenness of surface (not more than 3mm per 1.2m) Falls in wet areas should be in right direction No ponding in falls for wet area For staircases, the variance in lengths of threads and risers must not exceed 5 mm; nosing must be straight Skirting size and joint aligned with floor if of same material 3) Crack & Damages <ul style="list-style-type: none"> No visible damage / defects 4) Hollowness / Delamination <ul style="list-style-type: none"> No hollow sound when tapped with a hard object No sign of delamination 5) Jointing <ul style="list-style-type: none"> Consistent skirting thickness No visible gap between wall & skirting
1b	Screed finish	<ol style="list-style-type: none"> 1) Surfaces should not be unduly rough or patchy 2) No visible trowel marks 3) Expansion joints should be provided at interval as stated by architect
1c	Tiled finish	<ol style="list-style-type: none"> 1) Consistent colour and neat pointing 2) No hollow sound when tapped with a hard object. 3) Joints are aligned and consistent with skirting and wall tiles 4) Consistent joint size 5) Lippage between 2 tiles should not be more than 0.5 mm 6) Expansion joints should be provided at interval as stated by architect

* An item is deemed to have failed if any one of the standards is not met

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	Item*	Standards
1d	Timber floor	<ol style="list-style-type: none"> 1) No warpage 2) Timber strips to rest firmly on joists or screed 3) No visible gaps in between timber strips 4) Edges of the floor to be properly sealed
1e	Carpet	<ol style="list-style-type: none"> 1) Stretched and even surface 2) Joint should not be visible 3) Proper anchoring at all edges
1f	Raised Floor	<ol style="list-style-type: none"> 1) No loose floor panels 2) No protrusion / potential of tripping over floor panels 3) No jolting or rocking panel
1g	Mass Engineered Timber (MET)	<ol style="list-style-type: none"> 1) Surface finish grade as per project's specifications 2) Visual finish surface to be planed and sanded 3) Knot size tolerance: <ol style="list-style-type: none"> a. Domestic grade - Not more than 20 mm diameter b. Industrial and Standard grade - Not more than 50 mm diameter 4) Voids to be filled if specified 5) No damages e.g. dents 6) Crack tolerance: <ol style="list-style-type: none"> a. Domestic grade - Not more than 200 mm long and 2 mm width b. Industrial and Standard grade - Not more than 400 mm long and 4 mm width 7) Hollowness: <ol style="list-style-type: none"> a) Not applicable for exposed MET elements b) Not applicable for ceramic/stone/screed floor finishes laid directly on MET elements c) No hollowness for ceramic/stone floor finishes laid on screed over MET elements

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	Item*	Standards
2	Internal Walls	
2a	General	<ol style="list-style-type: none"> Finishing <ul style="list-style-type: none"> No stain marks Consistent colour tone No rough / patchy surface Alignments & Evenness <ul style="list-style-type: none"> Evenness of surface (not more than 3mm per 1.2m) Verticality of wall (not more than 3mm per m) Walls meet at right angles (not more than 4mm over 300mm) Edges (wall to wall) to appear straight and aligned Crack & Damages <ul style="list-style-type: none"> No visible damage / defects Hollowness / Delamination <ul style="list-style-type: none"> No hollow sound when tapped with a hard object No sign of delamination Jointing <ul style="list-style-type: none"> Straightness of corners and joints
2b	Plaster Finish	<ol style="list-style-type: none"> Surface evenness (not more than 3mm over 1.2m) No hollow sound when tapped with a hard object. Surfaces should not be unduly rough or patchy esp no brush / trowel marks
2c	Tiled Finish	<ol style="list-style-type: none"> Tile joints aligned and with consistent joint size No hollow sound when tapped with a hard object Consistent colour and neat pointing Lippage between 2 tiles should not be more than 0.5mm
2d	Cladding	<ol style="list-style-type: none"> Proper anchorage for panels Joints aligned and with consistent joint size Sealant material compatible with cladding Consistent spacing and within allowable tolerance
2e	Architectural Coating	<ol style="list-style-type: none"> Substrate - see plaster finish Finished texture and colour to be uniform

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	Item*	Standards
2f	Painting	<ol style="list-style-type: none"> 1) Substrate - see plaster finish 2) Surfaces are evenly painted 3) Good opacity, no patchiness resulted from touch up works 4) Free from peeling, blister and chalkiness 5) No discolouration and fading
2g	Pre-cast concrete planks	<ol style="list-style-type: none"> 1) Alignment with adjacent planks not more than 3mm 2) Plane tolerance (3mm / 1.2m)
2h	Wall Paper	<ol style="list-style-type: none"> 1) Stretched and even surface 2) Joint should not be visible 3) Proper anchoring at all edges 4) Edges should be neatly laid and finished
2i	Glass Blocks	<ol style="list-style-type: none"> 1) Pointing should be satisfactory 2) Joint should be even 3) Glass blocks should be properly aligned
2j	Wood / Timber Panels	<ol style="list-style-type: none"> 1) Timber panels to rest firmly on joist or screed 2) No visible gaps between panels 3) Edges should be properly aligned and sealed 4) No warpage 5) No cracks
2k	Fair-Face Concrete	<ol style="list-style-type: none"> 1) Consistent distribution of blowholes for the same sample/ surrounding area 2) All blowhole sizes to be equal or less than 8mm 3) Consistent tonality for the same sample/ surrounding area 4) No exposed aggregate 5) No cracks and damages

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	Item*	Standards
2I	MET	<ol style="list-style-type: none"> 1) Surface finish grade as per project's specifications 2) Visual finish surface to be planed and sanded 3) Knot size tolerance: <ol style="list-style-type: none"> a) Domestic grade - Not more than 20 mm diameter b) Industrial and Standard grade - Not more than 50 mm diameter 4) Voids to be filled if specified 5) No damages e.g. dents 6) Crack tolerance: <ol style="list-style-type: none"> a) Domestic grade - Not more than 200 mm long and 2 mm width b) Industrial and Standard grade - Not more than 400 mm long and 4 mm width 7) Hollowness not applicable for exposed MET elements

* An item is deemed to have failed if any one of the standards is not met

	Item*	Standards
3	Ceilings	
3a	General Requirements	<ol style="list-style-type: none"> 1) Finishing <ul style="list-style-type: none"> • No stain marks • Consistent colour tone • No patchy surface 2) Alignment & Evenness <ul style="list-style-type: none"> • Overall surface should be smooth, even, not wavy • Straightness of corners 3) Crack & Damages <ul style="list-style-type: none"> • No visible damage e.g spalling, leaks, cracks, etc 4) Roughness <ul style="list-style-type: none"> • No rough surface 5) Jointing Consistent, aligned and neat
3b	Skim Coats / Boarded Ceiling	<ol style="list-style-type: none"> 1) Not patchy, with no pin holes and with no trowel marks 2) Formwork joints are grounded smooth 3) Paintwork with good opacity and with no brush marks 4) Access door joints should be sharp and in consistent width
3c	False ceiling / Grid System	<ol style="list-style-type: none"> 1) Alignment of rails should be visually straight 2) Surface should be overall level and even 3) Chipped surfaces or corners should not be seen
3d	MET	<ol style="list-style-type: none"> 1) Surface finish grade as per project's specifications 2) Visual finish surface to be planed and sanded 3) Knot size tolerance: <ol style="list-style-type: none"> a) Domestic grade - Not more than 20 mm diameter b) Industrial and Standard grade - Not more than 50 mm diameter 4) Voids to be filled if specified 5) No damages e.g. dents 6) Crack tolerance: <ol style="list-style-type: none"> a) Domestic grade - Not more than 200 mm long and 2 mm width b) Industrial and Standard grade - Not more than 400 mm long and 4 mm width

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	Item*	Standards
4	Doors	
4a	General Requirements	<p>1) Joints & Gap</p> <ul style="list-style-type: none"> No visible gaps between door frame and wall Consistent & neat joints Consistent gap between door leaf and frame and not more than 5mm No visible gaps within door leaf and door frame Consistent and no visible gaps for mitre joints <p>2) Alignment & Evenness</p> <ul style="list-style-type: none"> Alignment/level with walls Door frame and leaf to flush Door and frame corners maintained at right angles No rattling sound when door is closed <p>3) Material & Damages</p> <ul style="list-style-type: none"> No stain marks and any visible damage No sags, warps on door leaf Fire stop provided where necessary Door joints and nail holes filled up, properly sanded down and with good paint finish (including on top and bottom of door leaf and consistent in colour) Glazing clean and evenly sealed with gasket No sign of corrosion for metal frame Consistent colour tone <p>4) Functionality</p> <ul style="list-style-type: none"> Ease in opening, closing and locking No squeaky sound during swinging the leaf <p>5) Accessories Defects</p> <ul style="list-style-type: none"> Lock sets with good fit and no stains No sign of corrosion in ironmongery No missing or defective accessories <p>Note 1: Civil defence shelter door will be considered as part of wall finishes</p> <p>Note 2: Metal gate will be assessed as component</p>

* An item is deemed to have failed if any one of the standards is not met

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	Item*	Standards
5	Windows	
5a	General Requirements	<ol style="list-style-type: none"> 1) Joints & Gap <ul style="list-style-type: none"> • No visible gap between window frame and wall • Consistent gap between window leaf and frame and not more than 5mm (timber window only) • No visible gaps within window leaf and frame • No visible gaps between window leaf and frame • Neat joint between window and wall internally and externally • Consistent and no visible gaps at mitre joints 2) Alignment & Evenness <ul style="list-style-type: none"> • Alignment / level with wall openings • Window leaf and frame corners maintained at right angles 3) Material & Damages <ul style="list-style-type: none"> • No stain marks and any visible damage / defects • Louvre windows with glass panels of correct lengths • Glazing clean, evenly sealed with putty or gasket for aluminium windows 4) Functionality <ul style="list-style-type: none"> • Ease in opening, closing and locking • No sign of rainwater leakage • No squeaky sound during swinging the leaf 5) Accessories Defects <ul style="list-style-type: none"> • Lock sets with good fit and aligned • No sign of corrosion • No missing or defective accessories • Countersunk screws levelled and flushed. No over-tightened screws • Stainless steel screws at hinges for swing window

* An item is deemed to have failed if any one of the standards is not met

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	Item*	Standards
6	Components	<ol style="list-style-type: none"> 1) Internal fixtures such as wardrobe, kitchen cabinet, vanity top, mirror, bathtub, water closet, shower screen and basin 2) External fixtures such signage, emergency lightings, railings, unit number plates, lift fittings, letter box, lightings, metal gate etc
6a	General Requirements	<ol style="list-style-type: none"> 1) Joints & Gap <ul style="list-style-type: none"> • Consistent joint width & neat joint • No visible gap • Welding joints grounded or flushed 2) Alignment & Evenness <ul style="list-style-type: none"> • Level and in alignment 3) Material & Damages <ul style="list-style-type: none"> • No stain marks • No visible damage / defects • Consistent in colour tone 4) Functionality <ul style="list-style-type: none"> • Functional, secured and safe 5) Accessories Defects <ul style="list-style-type: none"> • No missing accessories • No sign of corrosion • No visible damages / defects

* An item is deemed to have failed if any one of the standards is not met

Basic M&E Fittings

	Item*	Standards
1	General Requirements	<ol style="list-style-type: none"> Joints & Gap <ul style="list-style-type: none"> No visible gap Consistent joint width & neat Alignment & Evenness <ul style="list-style-type: none"> Aligned, leveled and straight Material & Damages <ul style="list-style-type: none"> No visible damage / defects No stain marks Securely fixed Consistent colour tone Functionality <ul style="list-style-type: none"> Functional and safe Accessories Defects <ul style="list-style-type: none"> No missing accessories No visible damage / defects
2	Plumbing & Sanitary Fittings	
2a	Gully & Floor Trap	<ol style="list-style-type: none"> No damage or chokage Must be securely fixed Trap's top lower than the surrounding floor level
2b	Pipes	<ol style="list-style-type: none"> Visually aligned horizontally, vertically and parallel to building surface Inclined pipes laid to proper gradients No leakage at joints Plumb < 10mm / storey height Brackets firmly secured & adequately spaced If painted, no drippings & with good opacity
2c	Fittings	<ol style="list-style-type: none"> Firmly secured & joints properly sealed & pointed No leakage at joints

* An item is deemed to have failed if any one of the standards is not met

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	Item*	Standards
		3) No chipping or cracks 4) No paint drops or mortar droppings 5) Fittings in working condition 6) Accessible for maintenance 7) Do not cause obstruction / pose as safety hazard (e.g. sprinkler head to point inward). 8) No sediments / particles found in water collected at terminal water fittings (remove aerator & showerhead). 9) All sensor covers properly sealed against water seepage 10) Materials used are of approved types
3	M&E Fittings	e.g. power point, telephone point, air-con diffuser, fan coil unit, lighting, smoke alarm, sprinkler heads, CCTV camera, etc.
3a	Installation	1) Fittings must be aligned and location as per approved drawings. 2) No stains 3) Neat patch-up for pointing / penetration
3b	Safety	1) No exposed wiring within reach
3c	Damages	1) No visible damage

* An item is deemed to have failed if any one of the standards is not met

Appendix 2

QUALITY STANDARDS FOR EXTERNAL FINISHES WORKS

Roof

	Item*	Standards
1	Construction	
1a	General Requirements	<ol style="list-style-type: none"> Stain / Painting <ul style="list-style-type: none"> No stain marks Good paint works Rough / Uneven / Falls <ul style="list-style-type: none"> Look smooth and with no tool marks Even and level esp no potential in tripping Good falls in right direction Crack / Chip / Damage <ul style="list-style-type: none"> No visible damages / defects Joint / Sealant / Alignment <ul style="list-style-type: none"> Consistent joint width, neat & aligned Chokage / Ponding <ul style="list-style-type: none"> No sign of chokage and ponding Construction <ul style="list-style-type: none"> No sign of leaking Proper dressing for any protrusion Neat & secured installation of fixtures
1b	Flat Roof	<ol style="list-style-type: none"> Ponding less than 3mm Surface to level to avoid tripping Proper dressing for any protrusion Openings to be sealed to prevent pest invasion Clean and no stain marks
1c	Pitched Roof	<ol style="list-style-type: none"> No leaking No rust or stains Good painting to roof structural members Roof tiles in alignment Openings to be sealed to prevent pest invasion Consistent colour tone Proper dressing for any protrusion

	Item*	Standards
1d	Waterproofing (exposed)	<ol style="list-style-type: none"> 1) Should be evenly installed, no sharp protrusion 2) Complete adhesion to base 3) Good laps at joints and proper vertical abutment details 4) No leaking and sign of damage to membrane/coating 5) Clean and no mortar stains 6) No paint defects
1e	Gutters	<ol style="list-style-type: none"> 1) No ponding and chokage 2) No cracks, chips and any other visible damages / defects 3) RWDP inlet should be lower than the surrounding gutter invert level 4) Gutter and RWDP inlet to be covered to prevent chokage where practical 5) Clean and no cement stains

* An item is deemed to have failed if any one of the standards is not met

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External Wall

	Item*	Standards
1	General Requirements	<ol style="list-style-type: none"> 1) Evenness / Roughness <ul style="list-style-type: none"> • Overall surface should be even, not wavy & not patchy 2) Staining / Painting <ul style="list-style-type: none"> • No visible stain marks • Good paint works 3) Cracking / Damages <ul style="list-style-type: none"> • No visible damage / defects 4) Jointing / Alignment <ul style="list-style-type: none"> • External features visually in alignment • Corners of wall maintained at right angles and straight • Consistent joint width, neat & aligned
2	Plaster Finish	<ol style="list-style-type: none"> 1) As above
3	Tiled Finish	<ol style="list-style-type: none"> 1) Tile joints aligned and between 2-4mm wide unless specified 2) Plumb tolerance and evenness of surface (3mm / 1.2m)
4	Claddings / Curtain Walls	<ol style="list-style-type: none"> 1) Gaps around openings to be properly sealed 2) Joints of regular widths as specified 3) Plumb tolerance as specified 4) Evenness of surface, no dents or scratches 5) Sealant material compatible with cladding
5	Facing Brickwork	<ol style="list-style-type: none"> 1) 10mm joint with pointing 2) Weepholes are provided as specified 3) No mortar droppings and other stains 4) No efflorescence

* An item is deemed to have failed if any one of the standards is not met

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	Item*	Standards
6	Architectural Coating	<ol style="list-style-type: none"> 1) Substrate - see plaster finish 2) Finished texture and colour to be uniform 3) No paint drips and other stains
7	Painting	<ol style="list-style-type: none"> 1) Substrate - see plaster finish 2) Surfaces are evenly painted; no patchiness due to touch up work 3) Good opacity, no discolouring and free from peeling
8	Fair-Faced Concrete	<ol style="list-style-type: none"> 1) No exposed aggregate 2) Consistent tonality when viewed as a whole
9	MET	<ol style="list-style-type: none"> 1) Crack tolerance: <ol style="list-style-type: none"> a) Domestic grade - Not more than 200 mm long and 2 mm width b) Industrial and Standard grade - Not more than 400 mm long and 4 mm width

* An item is deemed to have failed if any one of the standards is not met

External Works

	Item*	Standards
1	General Requirements (basis for assessment)	<ol style="list-style-type: none"> 1) No stain marks and visible damages / defects 2) Finishes must be even, level , align & consistent 3) Consistent joints width and neat 4) Paintworks with good opacity, no patchiness and brush marks 5) Constructed according to Contract Specifications 6) Fixtures installed must be safe, secured and functional 7) Standards defined under Part 1: Internal Finishes, Part 2: Roof and Part 3: External Wall shall apply for similar items 8) MET (Mass Engineered Timber) standards applied for MET finishes as in Part 1 Internal Finishes
1a	Link-Way / Shelter	<ol style="list-style-type: none"> 1) Floor as per Internal Finishes - Floor 2) Column as per Internal Finishes - Wall 3) Ceiling as per Internal Finishes – Ceiling 4) Other Finishes as per Internal Finishes – Components 5) M&E Fitting as per M&E Works – Part 5 Basic M&E Fittings
1b	Apron & Drain	<ol style="list-style-type: none"> 1) Drain <ul style="list-style-type: none"> • Free flowing and no ponding of water 2) Drain Cover <ul style="list-style-type: none"> • level and do not jolt or rock • Gaps between drain covers and side of drain between 5-10mm wide • Drain grating properly painted 3) Apron 1 <ul style="list-style-type: none"> • Bitumen joints with neat edges and sufficient length • No ponding 4) Apron 2 – as per Apron 1 5) Inspection Chamber <ul style="list-style-type: none"> • Inspection chambers are level with surrounding without depression and with tolerance of • Covers to be level with frames

	Item*	Standards
1c	Roadwork & Carpark	<ol style="list-style-type: none"> 1) Side Drain as per 1b Apron & Drain 2) Road Surface <ul style="list-style-type: none"> • No ponding • Road painting according to drawings; dimensional tolerance of 5mm • Gaps between aeration slabs properly filled up with sand • Aeration slabs stable and not broken 3) Kerbs – as per General Requirements 4) Road Sign <ul style="list-style-type: none"> • Provided according to specifications • Firm and secured at base – with footing if required • Metal parts below ground are corrosion treated 5) Lightings – as per 1c Road Sign
1d	Footpaths & Turfing	<ol style="list-style-type: none"> 1) Footpath as per Internal Finishes - Floor 2) Turfing <ul style="list-style-type: none"> • No depression or bald patches • Turfing done evenly, no dead grass or weeds 3) Lightings as per 1c Road Sign 4) Fencing & Railing <ul style="list-style-type: none"> • As per 1c Road Sign • Wire fencing is PVC covered • Footings provided for supports • Vertical tolerance (4mm / 1.2m) 5) Other Fixtures <ul style="list-style-type: none"> • as per Internal Finishes - Components
1e	Playground	<ol style="list-style-type: none"> 1) Floor as per Internal Finishes - Floor 2) Permanent Fixture1 as per Internal Finishes - Components 3) Permanent Fixture2 as per Internal Finishes - Components 4) Lightings as per 1c Road Sign 5) Signage as per Internal Finishes - Components

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	Item*	Standards
1f	Court	<ol style="list-style-type: none"> 1) Floor 1 as per Internal Finishes - Floor 2) Floor 2 as per Internal Finishes - Floor 3) Signage as per Internal Finishes - Components 4) M&E Fitting as per M&E Works – Part 5 Basic M&E Fittings 5) Permanent Fixture as per Internal Finishes - Components
1g	Fences & Gates	<ol style="list-style-type: none"> 1) Fence Left as per 1d – item 4) 2) Gate as per Internal Finishes - Components 3) Fence Right as per 1d – item 4) 4) M&E Fitting as per M&E Works – Part 5 Basic M&E Fittings 5) Signage as per Internal Finishes - Components
1h	Swimming Pool	<ol style="list-style-type: none"> 1) Side Drain as per Internal Finishes - Floor 2) Foot Path 1 as per Internal Finishes - Floor 3) Floor Path 2 as per Internal Finishes - Floor 4) M&E Fitting as per M&E Works – Part 5 Basic M&E Fittings 5) Other Fixture as per Internal Finishes - Components
1i	Club House	<ol style="list-style-type: none"> 1) External Wall 1 as Part 3 External Wall 2) External Wall 2 as Part 3 External Wall 3) External Wall 3 as Part 3 External Wall 4) External Wall 4 as Part 3 External Wall 5) Apron & Drain as per 1b

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	Item*	Standards
1j	Guard House	1) External Wall 1 as Part 3 External Wall 2) External Wall 2 as Part 3 External Wall 3) Apron & Drain as per 1b 4) Gantry as per Internal Finishes - Components 5) Other Fixture as per Internal Finishes - Components
1k	Electrical Substation	1) External Wall 1 as Part 3 External Wall 2) External Wall 2 as Part 3 External Wall 3) External Wall 3 as Part 3 External Wall 4) External Wall 4 as Part 3 External Wall 5) Apron & Drain as per 1b
1l	Suspended Swimming Pool	1) No water leakage

* An item is deemed to have failed if any one of the standards is not met

Appendix 3

QUALITY STANDARDS FOR MATERIAL & FUNCTIONAL TESTS

Material & Functional Tests

	Item*	Standards
1	Field Window Water-tightness Test	<ol style="list-style-type: none"> 1) No sign of leakage using BCA's Window Water-tightness Test method. Leakage is defined as <i>"any appearance of uncontrolled water, other than condensation, on the indoor face of any part of the wall & window"</i>. 2) BCA's Water-tightness Test parameters: Water intensity: 300mm/hr : 1 litre/min/m of joint Wind Pressure: 240 Pa Nozzle inclination: 90° to window 1 sample = 2m length of joint Spray duration: 10 minutes
2	Wet Area Water-tightness test (i.e. Bathrooms, toilets & flat roof)	<ol style="list-style-type: none"> 1) No sign of leakage after ponding wet areas over a minimum period of 24 hrs. 2) Ponding with final finish in-place
3	Internal wet area waterproofing process	<ol style="list-style-type: none"> 1) According to approved method statement, shop drawings and related BCA's Good Industry Practices guides
4	Tiling installation process	<ol style="list-style-type: none"> 1) According to approved method statement, shop drawings and related BCA's Good Industry Practices guides
5	Timber flooring installation process	<ol style="list-style-type: none"> 1) According to approved method statement, shop drawings and related BCA's Good Industry Practices guides
6	Windows installation waterproofing process	<ol style="list-style-type: none"> 1) According to approved method statement, shop drawings and related BCA's Good Industry Practices guides
7	Pull-off test (POT) for internal wall tiles	<ol style="list-style-type: none"> 1) Minimum tensile strength of 0.15 N / mm²
8	Water Flow Test for dwelling unit corridor, lift lobbies, footpaths, exposed walkway in carpark and basement carpark	<ol style="list-style-type: none"> 1) Ponding should not be more than 3mm 2) Water falls in the right direction

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9	100% EN 14179-2 Heat Soak Test for tempered glass (including laminated tempered glass) used at balcony, canopy and shower screen + 3-year warranty for all glasses	<p>3) No pipe chokage</p> <p>1) Test method based on EN 14179-2 as stated in SS 653:2020 Code of Practice for glazing in buildings</p> <p>2) The 3-year warranty for all glasses to start from DLP commencement</p>
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* An item is deemed to have failed if any one of the standards is not met.

For the assessment of the **field window water-tightness test**, the number of points shall be awarded based on the percentage of non-compliance as tabulated in the table below :

Points Awarded for BCA Field Test (100%)	Percentage of non-compliance
N	0%
$(15-x) * N/15$	$0\% < x < 15\%$
0	$\geq 15\%$

Note: No points shall be given if test is not carried out.

“N” is the maximum points for WTT test under the respective building categories

“x” is the percentage of samples failed.

For the assessment of the **wet area water-tightness test**, the number of points shall be awarded based on the percentage of non-compliance as tabulated in the table below :

Points Awarded for BCA Field Test (100%)	Percentage of non-compliance
N	0%
$(2-x) * N/2$	$0\% < x < 2\%$
0	$\geq 2\%$

Note: No points shall be given if test is not carried out.

“N” is the maximum points for wet area water tightness test under the respective building categories

“x” is the percentage of samples failed.

Appendix 4

Defects Grouping Guide for Assessment of Internal Finishes

Element	Defects Grouping	Defects Description
Floor	Finishing	Stains, Painting / Coating Defects, Tonality, Patchy & Roughness
Wall	Alignment & Evenness	Alignment, Unevenness, Squareness
	Crack & Damages	Crack, Chip, Dent, Scratches
	Hollowness / Delamination	
	Jointing	Joints, Pointing
Ceiling	Finishing	Stains, Painting / Coating Defects, Patchy
	Alignment & Evenness	
	Crack & Damages	Crack, Chip, Dent, Scratches
	Roughness	
	Jointing	Joints, Pointing
Door	Joints & Gap	Joints, Gap etc. too big, Inconsistent, Improper Seal
Window	Alignment & Evenness	
Component	Material & Damages	Crack, Chip, Dent, Scratches, Defects, Finishing, Tonality
M&E Fittings	Functionality	Movement, Functionality, cannot be opened or closed properly, Loose
	Accessories Defects	Missing items, Improper Fixing, Stains, Corrosion, Other damages

Appendix 5

BUILDING GROUPING GUIDE

Private Residential	Public Residential	Non Residential
<p><u>In General</u> : All types of residential building built by private developers</p> <p>e.g.</p> <p>Condominium</p> <p>Apartments</p> <p>Bungalow</p> <p>Semi-Detached</p> <p>Terrace House</p> <p>Cluster Residential</p> <p>Mixed Development with residential component more than 50% by GFA</p>	<p>HDB Public Residential building</p>	<p><u>In General</u> : All types of building constructed mainly for non-residential use</p> <p>e.g.</p> <p>Bank</p> <p>Office Building</p> <p>Shopping Complex</p> <p>Hotel</p> <p>Supermarket</p> <p>Airport</p> <p>Hospital</p> <p>University</p> <p>Regional Library</p> <p>Conference Hall</p> <p>Arts and Cultural Centre</p> <p>Mixed Development with more than 50% non-residential area by GFA</p>

Note: The above is only meant to be a general guide in determining the Category of project. The actual grouping might vary depending on the project details in the application. For instance, a private *mixed development building project, i.e., one with commercial and residential components in the development, is categorized as Private Residential.*