

PRICE QUALITY METHOD

Framework

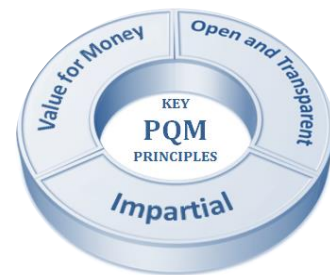
Effective for tenders called on and after 31 Jan 2018

1.0 GENESIS OF PQM

- 1.1 The Price-Quality Method (PQM) framework applies to all public sector construction tenders under the BCA Construction Workheads (CW01 & CW02) with an Estimated Procurement Value (EPV) of \$3million and above.
- 1.2 The aim of PQM is to provide a structured framework for non-price criteria to be assessed alongside price. In effect, PQM translates the qualitative attributes into quantitative scores which, when combined with the Price scores, will enable the most suitable firm that provides the best offer to be selected for award.

2.0 KEY PRINCIPLES OF PQM

2.1 Value for Money. Both Price and non-price (i.e. Quality and Productivity) attributes will be given weightages and scored based on the guideline¹ provided. The bid with the highest combined Price-Quality-Productivity score (i.e. PQM score) shall be awarded the project.



2.2 Open and Transparent.

- a. The PQM procedures will be as open and transparent as possible. The weightages among Price, Quality and Productivity components, the Quality and Productivity attributes, the number of points assigned to each attribute and the method of scoring will be made known upfront in the tender.
- b. Tenders using the framework should comply with the World Trade Organisation (WTO) regulations such as having non-discriminatory criteria.
- c. All tenderers can request in writing to seek feedback from the respective agency on their individual tender performance after the tender award.

¹ Please refer to section 3.1 for weightage configurations for PQM

3.0 MAIN FEATURES OF PQM

3.1 Weightages for PQM. The following range of weightages can be considered, depending on project requirements such as the complexity of the project, and the extent of design input required from the tenderers.

Component	Weightages for Building tenders ²	Weightages for Civil Engineering tenders ³
Price	40% - 60%	50% - 70%
Productivity	10%	10%
Quality	50% - 30%, correspondingly	40% - 20%, correspondingly


3.2 Tender Submissions. The agencies can adopt the one-envelope or the two-envelope system. A one-envelope system can be adopted for projects whereby the scoring of the specified quality attributes is based on quantified templates with no subjective judgment. An example of an objective scoring for quality attributes would be safety performance based on MOM's List of Contractors with Demerit Points. Otherwise a two-envelope system shall be adopted.

3.2.1 One-envelope System. Tenderers submit the Price, Quality and Productivity together in one envelope. The Price Quality and Productivity scores shall be computed at the same time.

3.2.2 Two-envelope System. Tenderers submit the Quality and Productivity envelope separately from the Price envelope. agencies would open and compute the Quality and Productivity score first, before opening the Price envelope and computing the combined scores. The tenderer with the best combined score will be awarded the contract.

4.0 SCORING METHODOLOGY

4.1 Price Component

4.1.1  "Price" Score Computation. The lowest tender price will be given the maximum Price-score (P-score). Agencies reserve the right not to consider any tender bid that is abnormally low. The Price scores of the other tenderers will be inversely proportional to the lowest tender price. The formula below shall be used to compute the P-score.

$$\text{Price Score (P-score)} = \frac{\text{Lowest tender price}}{\text{Tenderer's price}} \times \text{Price weightage}$$

² These refer to building projects classified under Contractors Registration System (CRS) Workhead CW01.

³ These refer to civil engineering projects classified under CRS Workhead CW02.

- 4.1.2 If price loading is applicable under Bonus Scheme of Construction Quality (BSCQ), the new price (loaded according to the Total Price Loading Factor) shall be used for computing the P-score.
- 4.1.3 When computing the P-score, the tenderer's price should not include provisional sums and value of nominated subcontracts.
- 4.1.4 Any alternative bid, by any of the firm, will be treated as a separate bid and be assessed accordingly, provided alternatives are allowed. Alternative bids are offers which functionally meet the specified technical specifications and/or terms and conditions differing from those set out in the Invitation to Tender.

4.2 Productivity Component

- 4.2.1 Attributes under the Productivity component (10%) will include:
- a) Constructability Score (CS) Index⁴ (4% to 8%)
 - b) Technology Adoption (Construction) (TA(C)) Index (1%)
 - c) Workforce Development (Construction) (WD(C)) Index⁵ (1%)
 - d) (Optional) Other Productivity attributes specified by agencies (up to 4%⁶)
- 4.2.2 The indices are published on the BCA website and updated on a quarterly basis⁷.
- 4.2.3 Other Productivity Attributes specified by agencies. Agencies may decide the attributes and scoring method that are relevant to assess the impact of tenderers' proposal on project productivity. For example, agencies could evaluate the technical proposal of the tenderers in terms of their potential productivity gains. For projects where the minimum Constructability Score requirement is applicable, up to 4% could be assigned to project-specific productivity attributes. The total of CS Index and other productivity attributes specified by agencies should make up a total of 8%. For projects that are not subject to the minimum Constructability Score requirements, the CS Index attribute will not be applicable. For such cases, :


⁴ The CS Index of each Contractor is derived by BCA based on their C-Scores (Constructability Score) of the latest 5 completed projects in the last 3 years.

⁵ TA(C) and WD(C) indices are calculated from the amount of funding disbursed under the Building Information Modelling (BIM) fund, Mechanisation Credit (Mech C) scheme, Productivity Innovation Project (PIP) scheme and the Workforce Training and Upgrading scheme respectively under the Construction Productivity & Capability Fund (CPCF).

⁶ The weightage for this attribute to be carved out from the CS Index attribute, i.e. the total of CS Index and Other productivity attributes specified by agencies would make up a total of 8%. If CS index is not applicable, up to 8% could be assigned to project-specific productivity attributes or be discarded totally.

⁷ Please visit http://www.bca.gov.sg/procurement/productivity_indices.html for the publication of indices in Jan, Apr, Jul and Oct. The latest available indices at the tender closing date should be used for tender evaluation. For example, if a tender closes on 2 Jan 2018, the indices to be used for tender evaluation shall be the indices published on 1 Jan 2018. If a tender closes on 31 May 2018, the indices to be used shall be the indices published on 1 Apr 2018.

- a. Up to 8% could be assigned to project-specific productivity attributes (i.e. total PQM score will be between 93 to 100 points); or
- b. The full 8% could be discarded. Score will be based only on the remaining Productivity attributes (i.e. the productivity score weightage shall only be 2%, with the total PQM score at 92 points).

4.2.4  **“Productivity” Score Computation.** To compute the Productivity-score (PD-score) for a tenderer, the points for each of the Productivity attributes are added up. Please refer to Annex A for examples.

$$\text{Productivity-score (PD-score)} = \text{Scores from [CS Index + TA(C) Index + WD(C) Index + Other productivity attributes (if any)]}$$

- a. Score from CS Index Score will be pegged to the tenderer that has the highest CS Index among all tenderers.

$$\text{CS Index Score} = \frac{\text{Tenderer's CS Index}}{\text{Highest Tenderer's CS Index}} \times \text{Weightage}$$

- a) The tenderer with the highest CS Index will obtain full points
- b) Tenderers with no CS Index will be given the average points across all conforming tenderers
- c) For cases where less than two (i.e. only one or none) of the tenderers have CS Index, the CS Index attribute will be discarded.⁸

- b. Score from TA(C) Index (1%). Score will be pegged to the tenderer that has the highest TA(C) Index among all tenderers.

$$\text{TA(C)Index Score} = \frac{\text{Tenderer's TA(C) Index}}{\text{Highest Tenderer's TA(C) Index}} \times \text{Weightage (1\%)}$$

- a) The tenderer with the highest TA(C) Index will obtain full points
- b) Tenderers with no TA(C) Index will be scored zero point

- c. Score from WD(C) Index (1%). Score will be pegged to the tenderer that has the highest WD(C) Index among all tenderers.

$$\text{WD(C)Index Score} = \frac{\text{Tenderer's WD(C) Index}}{\text{Highest Tenderer's WD(C) Index}} \times \text{Weightage (1\%)}$$

⁸ In such cases, the PD-score will be based only on the remaining Productivity attributes.

- a) The tenderer with the highest WD(C) Index will obtain full points
- b) Tenderers with no WD(C) Index will be scored zero point

4.3 Quality Component

4.3.1 Attributes under the Quality component could include:

- a) Relevant track records of tenderer or specific competencies that enhances the tenderer's suitability for the project;
- b) Performance in past or ongoing projects in areas such as timeliness, safety and quality. To recognise contractors which have provided quality work in past projects, it is mandatory that past appraisal performance (based on C41 reports and/or agencies' in-house performance assessment system) accounts for at least 15% of the overall quality points⁹;
- c) To give due emphasis to site safety, it is also mandatory that safety performance accounts for at least 15% of the overall Quality points;
- d) Project Specific Proposals including work methods and resources assigned to the project; and
- e) Awards or other attributes, if any.

4.3.2 Agencies shall decide which attributes are relevant for a particular project and assign the maximum points for each quality attribute.

4.3.3 Agencies shall set out the scoring method for the specific Quality attribute selected. The scoring method can adopt any of the following approaches.

a. Benchmark performance method

A benchmark performance level may be determined for a particular attribute. The benchmark performance level for this attribute can be set at 50% to 100% of the Quality points depending on how the agency wishes to treat tenderers that do better or worse than the benchmark level:

- i) For example, the benchmark performance can be set at 70% of the Quality points, and tenderers which fare worse or better can score lower or higher according to their relative performance. Alternatively, firms which fare worse can be given no points.

⁹ Contractors can view their individual performance score under the electronic Builders and Contractors Registration System (eBACS).

- ii) The benchmark performance can be set at 100% of the quality points and tenderers which do worse can score less or no points.

Illustration

For assessing quality performance based on CONQUAS scores, the benchmark performance level is set at 3 projects achieving CONQUAS score 80 points or above within the past 3 years.

If method ii) above is chosen, and the maximum points for this attribute is 10 points, tenderers having 3 or more projects achieving CONQUAS score 80 points or above within the past 3 years will all get 10 points, while those which do not meet the requirement may get less points or no points.

b. Ranking method


For some attributes such as the project specific proposal, it may be difficult to set a benchmark performance level. For such attributes, agencies can rank the tenderers according to the relative merits of their proposals and allocate Quality points based on the ranking.

c. Banding method

Banding method is similar to benchmark performance method but the scoring is based on bands rather than with reference to a fixed benchmark. When using this method, agencies will have to decide the range and allocated score for each band depending on how the agency wishes to treat tenderers that fall into each band.

d. Raw score method

For quality attributes such as the project specific proposal in which there will be subjective assessment involved and the scoring is based on a list of sub-attributes which describes how points will be assigned to each area of the proposal, agencies could give any score from 0 to the maximum score assigned for the sub-attribute to the tenderer based on the extent to which the tenderer has met the specific evaluation criterion. If any specific evaluation criterion involves subjective assessment, e.g. project specific proposals, a two-envelope system shall be adopted.

- 4.3.4  Quality Score Computation. The tenderer with the highest total raw quality points will be given maximum Quality score. The Quality score of the other tenderers will be calculated proportionally to the highest total Quality points. The formula below shall be used to compute the Quality-score (Q-score).

$$\text{Quality score (Q- score)} = \frac{\text{Tenderer's total Quality Points}}{\text{Highest total Quality Points}} \times \text{Quality Weightage}$$

4.3.5 Optional Requirements. Agencies may choose to adopt **at most one** of the following optional requirements:

- a. Set a specific Quality attribute as a minimum qualifying criterion, which must be stipulated upfront in the tender documents so that potential tenderers which do not meet this criterion need not tender. This is to minimise the wastages in the firms' tendering efforts. If any agency intends to specify track record as a minimum qualifying criterion, it should not be overly onerous such that it limits the number of eligible tenderers unnecessarily.
- b. Set a minimum total Quality points for firms to meet. Firms which do not meet the minimum total Quality points will be 'disqualified' and their Price scores will not be computed. If the two-envelope system is used, the Price envelopes from the non-conforming tenders should not be opened.

5.0 INFORMATION REQUIRED IN TENDER DOCUMENTS

5.1 The following items must be clearly made known at tender stage:

- a) Price-Productivity-Quality weightage
- b) Quality and Productivity attributes applicable and their assigned maximum points
- c) Scoring method for each attribute e.g. benchmark performance method or ranking method, etc. Benchmarks used in the benchmark performance method must be made known, together with how tenderers which perform better or worse than the benchmark will be scored.
- d) (if applicable) Any minimum qualifying criterion for a specific quality attribute, which, if not met, would disqualify the tenderer.
- e) (if applicable) Any minimum total quality points below which tenderers will not be further considered.

PRICE QUALITY METHOD

Annex

Enclosed Annexes

- Annex A – Illustration of Scoring Methodology
- Annex B – Frequently Asked Questions (FAQs)

Annex A – Illustration of Scoring Methodology

Case Example 1 – Scoring of Typical PQM Tender

PQM Configuration: Price: Productivity: Quality = 60:10:30

Minimum Total Quality Score: 55 points

Scenario:

- Tenderer E with no CS Index
- Tenderer A with no TA(C) Index and WD(C) Index – *awarded zero for both attributes*
- Tenderer D with no TA(C) Index – *awarded zero for TA(C) Index attribute*

		Tenderer A	Tenderer B	Tenderer C	Tenderer D	Tenderer E
Quality	Q _{raw} (upon 100)	84.1	94.2	48.8*	64.9	83.8
	Q-score (30pts)	26.78	30.00	-	20.67	26.69
Productivity	Score for CS Index (8pts)	8.00	7.51	-	7.28	7.59**
	Score for TA(C) Index (1pts)	0	1.00	-	0	0.64
	Score for WD(C) Index (1pts)	0	1.00	-	0.71	0.54
	PD-score (10pts)	8.00	9.51	-	7.99	8.77
Price	Tender Sum (M\$)	12.5	13.0	11.7***	12.0	13.5
	P-score (60pts)	57.60	55.38	-	60.00	53.33
Total PQM score (Q-score + PD-score + P-score) (100pts)		92.38	94.89	-	88.66	88.79
Overall position		2	1	-	4	3

* Did not meet minimum total quality score; tender will not be evaluated further.

** Average of all conforming scores (for CS Index) is awarded to Tenderer E, which had no CS Index

*** The \$11.7m bid has been disqualified, the next lowest bid will be considered as the lowest bid

Case Example 2 – Scoring of Tender (insufficient tenderers with CS Index)

PQM Configuration: Price: Productivity: Quality = 60:10:30
Minimum Total Quality Score: 50 points

Scenario:

- Out of the five tenderers, one or none of the tenderers have a CS Index.

		Tenderer A	Tenderer B	Tenderer C	Tenderer D	Tenderer E
Quality	Q _{raw} (upon 100)	82.0	96.2	73.6	59.8	78.6
	Q-score (30pts)	25.57	30.00	22.95	18.65	24.51
Productivity	Score for CS Index (8%)	N/A*	N/A*	N/A*	N/A*	N/A*
	Score for TA(C) Index (1%)	0	1.00	0.75	0	0.64
	Score for WD(C) Index (1%)	0	1.00	0.63	0.71	0.54
	PD-score (10pts) (2pts)**	0	2.00	1.38	0.71	1.18
Price	Tender Sum (M\$)	12.5	13.0	11.7	12.0	13.5
	P-score (60pts)	56.16	54.00	60.00	58.50	52.00
Total PQM score (Q-score + PD-score + P-score) (100pts) (92pts)^		81.73	86.00	84.33	77.86	77.69
Overall position		3	1	2	4	5

* If one or none of the tenderers have CS Index, the CS Index will not be scored, and the attribute will be discarded.

** As a result, the total PQM score will be pegged to 92pts, instead of the original 100pts.

Annex B – Frequently Asked Questions (FAQs)

Productivity Attribute

Q1. What is the Constructability Score (CS) Index?

A1. The CS Index of each contractor is derived based on their C-Scores (Constructability Score) of the latest 5 completed projects in the last 3 years¹⁰. A contractor with a high CS Index will mean that the contractor has performed well in terms of adopting labour-saving construction methods and technologies in their projects. It is computed based on the following methodology:

$$\text{CS Index} = \frac{I_1 + I_2 + \dots + I_N}{N} \times 100$$

where

$$I_x = \left(\frac{\text{Contractor's Constructability Score achieved in Project x}}{\text{Legislated Minimum CS Score in Project x}} \right)$$

N = number of projects completed in the last 3 years (capped at 5 latest)

Q2. Is the CS Index attribute applicable to all projects?

A2. The CS Index attribute is only applicable to building developments that are subject to minimum Constructability Score requirements. For projects where the CS Index attribute is not applicable, the CS index score will be either be discarded or agency can use the available weightage (up to 8%) to evaluate project-specific productivity attributes. (see Para 4.2.3)

For such attributes, GPEs have the flexibility to select the productivity attributes based on individual projects' requirement. GPEs can also choose to discard the 8% originally set aside for CS index if GPEs assess that specifying project specific productivity attributes is not necessary for the project concerned.

Under the Code of Practice on Buildability, the requirement of minimum Constructability Score is only applicable to building works with GFA 5,000m² or more, and building works consisting of repairs, alterations and/or A&A works to an existing building if the building works involve construction of new floors and/or reconstruction of existing floors for which their total GFA is 5,000 m² or more. The list of development types and exempted developments can be found in Para 7.2 and the First Schedule of the Code of Practice on Buildability respectively.

[COP on Buildability: <http://www.bca.gov.sg/BuildableDesign/cop2017.html>]

¹⁰ If a contractor has less than 5 completed projects in the last 3 years, the CS Index will be based on the available number of projects completed in the last 3 years.

Q3. How should the CS Index of JV firms be computed if one of the JV firms does not have CS index?

A3. For the purpose of computation, each firm within the JV shall be treated as a single entity.

Step 1: Firm(s) with no CS index will be given the average points across all conforming tenderers, including its JV partner with CS index.

Step 2: Calculate the CS index for JV firms by taking a simple average of the CS-index of the JV firms.

S/n	Conforming tenderers		Raw CS Index	Step 1	Step 2
1.	Tenderer A	Single tenderer	125	125	125
2.	Tenderer B	Single tenderer	110	110	110
3.	Tenderer C	Single tenderer	111	111	111
4.	Tenderer D-1	JV	No score	113.5	116.75 [[113.5+120] / 2]
	Tenderer D-2		120	120	
5.	Tenderer E-1	JV	100	100	107.5 [[100+115] / 2]
	Tenderer E-2		115	115	

Q4. What are the Technology Adoption Index and Workforce Development Index?

The Technology Adoption (Construction) Index (TA(C) Index) and Workforce Development (Construction) Index (WD(C) Index) are used to gauge the firms' pro-activeness in investment towards productivity improvement.

The TA(C) Index encompasses three Construction Productivity & Capability Fund (CPCF) schemes relevant for builders under technology adoption, namely the Building Information Modelling (BIM) fund, the Mechanisation Credit (Mech C) scheme and the Productivity Improvement Projects (PIP) scheme.

The WD(C) Index constitutes disbursement rates for Workforce Training and Upgrading (WTU) scheme and manpower development programmes (sponsorship and scholarship)¹¹.

The formulas for computation of the indices are given below.

¹¹ The scholarship and sponsorship programmes include the BCA-Industry Built Environment Post-graduate Sponsorship (Part-time) BCA-Industry Built Environment Undergraduate Scholarship/Sponsorship (Full-time), BCA-Industry Built Environment Undergraduate Sponsorship (Part-time), BCA-Industry Built Environment Diploma Scholarship/Sponsorship, BCA-Industry Built Environment Diploma Sponsorship (Part-time), BCA Built Environment ITE Scholarship and Built Environment Building Specialist Sponsorship.

Indices	Computation
TA(C) Index	$\left(\frac{\text{Amount of MechC Funding Disbursed to Firm}}{\text{Maximum Grant for Each Firm}} \times 30 \right)$ + (Percentile Score of PIP Funding Disbursed x 30) + (Percentile Score of BIM Funding Disbursed x 40)
WD(C) Index	(Percentile Score of WTU Funding Disbursed x 50) + (Percentile Score of Sponsorship and Scholarship Funding Committed x 50)

Others

Q5. Can tenderers know how they fare in their tender?

- A4. To provide greater transparency on tenderers' performance so that tenderers can improve the quality of their future bids, tenderers which wish to seek feedback on their tender performance after tender award can write to the agency that calls the tender for clarifications. We seek contractors' understanding that such feedback from agencies should be taken positively for improving future tender performance.



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PRICE QUALITY METHOD FRAMEWORK (PQM)
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