

**QUERIES ANSWERED BY ARM JOINT  
COMMITTEE**

**16th March 2021**

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*Bill of Quantities is abbreviated throughout as BQ*

## ARM 3

### SECTION D - Excavation and Earthwork: Excavation

#### Query 3 - D.1

#### Topic - Working space

#### QUERY

**Section D Excavation and Earthwork: Excavation - Category 1, Zone 2 Working Space.**

**Measurement Rule 6 in Section D states: 'Working space shall be measured along the face of Formwork, Rendering, Tanking or Protective Walls, but only where the face of excavation is < 0.60 m distant.' The unit of measurement is m<sup>2</sup>, but the costing considerations are surely volumetric?**

**Should the width be measured from the face of the work to a maximum of 0.60m? If so, why is that not stated in the Rules?**

**Should a BQ not state the volume of working space which will be deemed to be included for in the price of the item which is currently measured in m<sup>2</sup>?**

**In other words, as the item measured in m<sup>2</sup> in a BQ can represent any volume from 0m<sup>3</sup> to the maximum m<sup>3</sup> within the depth range from 0 to 3.00m and any volume from 0 m<sup>3</sup> to the maximum m<sup>3</sup> in the 2.00 m depth ranges, how can a contractor determine what volume of working space and associated disposal and backfill he should provide for in his price?**

**Can this Rule be stated more clearly to give greater certainty to this work item?**

#### ANSWER

The measurement of working space as superficial was adopted in recognition that the volume-based approach used in previous methods of measurement was meaningless. The method of working adopted by the Contractor ultimately determines the volume of working space required. Whether the width of working space was previously measured as 250 or 600 was irrelevant to contractors as a measure of the volume ultimately required.

The approach now adopted recognises that the width is dependent on the methodology adopted by the Contractor. It provides the estimator with a nominal area of trench face and he can then decide on what clearance his site personnel require to work safely and efficiently. Based on that assessment, the appropriate rates can be applied to the superficial quantity. The estimator probably had to do the same exercise before but was forced to guess at the proportions of 250 and 600 wide w/s included in the total volume in the BOQ so that he could work back to the volume he wished to price was.

The current measurement rule avoids the QS deciding what working Space is notionally 250 and 600 wide and saves the estimator the trouble of guessing what the measurer decided. It also avoids any implication that 250 or 600 of working space is sufficient to allow safe working, transferring the responsibility for its assessment to the tenderer who, if successful in being appointed as Contractor, will in most cases be the PSCS and thus directly involved in ensuring safe working during construction.

## ARM 3

### SECTION P - Special Glazing

#### Glazing/ curtain walling

#### Query 3 - P.1

**Topic: Doors as 'extra over' items**

#### QUERY

**When measuring the area of glazing/curtain walling, is the following procedure correct: -**

- **measure the total area of glazing/curtain walling (in this instance the front façade of a building)**
- **from the above glazing/curtain walling deduct out the area of doors in this façade**
- **measure the doors as extra over item**

**In summary, ARM 3 seems to be silent as to whether or not openings in glazing should be deducted out or simply measured through.**

#### ANSWER

As the 'opening sections' are required to be measured as 'Extra over' according to the Rules, the area of the doors is not deducted from the overall area of curtain walling.

Otherwise, the doors item would not have anything measured to be 'extra over'.

## ARM 4

### SECTION A - General Rules

#### Query 4 - A.1

**Topic: Deemed to be included**

#### QUERY

**With respect to work that is *'deemed to be included'* by ARM4, advice received is that the BQ is only a Pricing Doc and that the Drawings and Specification take precedence over the BQ descriptions and quantities.**

**I do not believe the above is correct. In my view, if any sort of reference is made in the BQ, a Contractor tends to be 'bullied' into the item being included in the Contract Sum? What are the Committee's thoughts on this?**

#### ANSWER

Deemed to be included' in ARM 4 means that the cost of such work shall be included in the relevant BQ items.

The work 'deemed to be included' must be called for in sufficient detail on the Works Requirements (Drawings / Specifications) to make clear what is to be provided by the Contractor.

The Works Requirements take precedence over the BQ with respect to what is to be constructed / provided on a project but the BQ takes precedence with respect to what the Tender / Contract Sum includes for.

## ARM 4

### SECTION A - General Rules

#### Query 4 - A.2

#### **Topic: Conflict between Drawings / Specification and the BQ content**

#### QUERY

**If required work is on a drawing & / or the specification but not included in the BQ, is the tender price required to include for the work missing from the BQ.**

#### ANSWER

The BQ should provide for the work on the drawings and / or in the specification. There is no requirement to price work called for on the drawings and / or in the Specification that is not included in the BQ unless such work falls within the scope of work that is 'Deemed to be Included' by the ARM Rules.

Good practice is to bring such a discrepancy to the attention of the Quantity Surveyor before the closing date for receipt of tender queries.

#### QUERY

**In a BQ, if the Bill has a quantity of 20 of a particular item and the relevant drawing shows a requirement for 30, which is to be included for in the tender price?**

#### ANSWER

If the BQ is stated as measured in accordance with ARM 4, including its Supplements, **and** the Employer has retained the quantities risk, the quantities in the BQ are what should be priced.

The BQ should reflect what is on the drawings and in the specification but, if it does not, inconsistencies should be brought to the attention of the party designated to receive queries during the tender period with a view to ensuring a fair tender competition and minimising post-contract contention.

## ARM 4

### SECTION A - General Rules

#### Query 4 - A.3

Topic: Bulk and composite descriptions in BQs / Pricing Documents

#### QUERY

Clarity is sought on the inclusion of bulked or large, extensive BQ descriptions that are compiled and issued for pricing to be priced by the insertion of one singular rate. This often involves a 'copy and paste' insertion of large sections of a Specification into the description in a BQ.

An example below shows a sample of a BQ description encountered. We hold the view that there are items of work grouped together that should be measured separately in accordance with ARM 4.

The view of the Committee on this practice is requested.

*Example of a BQ Item for construction of a floor that was quantified in square metres.*

**FINE CONCRETE LEVELLING SCREED TO RECEIVE DRY SHAKE TOPPING** Ground Floor where brick is not used, Circulation Core Flooring on ground and upper floors.

**Substrate:** Rigid insulation above existing ground bearing concrete slab. **Preparation:** Clean and remove all dust from rigid insulation surface. Secure 6-10mm closed cell polyethylene filler board to finish screed level around all perimeters (can be tacked into walls below floor level to ensure no visible damage to finished blocks).

**Concrete Screed:** 75-100mm thick fine concrete screed CEM 1, minimum cement content of 350kg/m<sup>3</sup>, 10mm aggregate,

140mm minimum or S3 slump.

**Screed Type:** Unbonded c35 fine concrete screed.

**Reinforcement for crack control:** Stealth polypropylene fibres and a single layer of BRC A193 spaced on 25mm spacers.

2 No 1m long sawn 12mm wide rib dowel bars to all corners.

**Nominal thickness:** 100 mm. **Thickness (minimum):** 75 mm. **Mix proportions:** 350kg/m<sup>3</sup> cement content. **Cement:** OPC to

manufacturer's recommendations. **Aggregates:** Sand: To BS882, grading limit to table 1 of BS 8204 (2002 edition).

**Standards as clause 305.** Coarse aggregate single size: 10mm. **Proportions:** To manufacturer's recommendations. **Shrinkage Additive:** Grace ADVA floor 250 in accordance with manufacturer's instructions. **Datum levels:** TBC.

**Flatness/ Surface regularity:** Maximum permissible deviation when measured as clause 140. SR2: 5 mm

Normal standard. **Finish: Method:** Aluminium straight edge to receive applied finishes.

**To receive:** Dry shake topping as clause 131. **Soundness:** Test to BS 8204: Part 1, Category B.

**Other requirements:** Day work joints have to be vertical fixed at FFL. **Flatness/ Surface regularity:**

Maximum permissible deviation when measured as clause 135: - S R 2: 5 mm Normal standard + or - 15mm. **Finish to receive:** Dry shake as M10/131. All as per Clause M10 121 of Architect's specification.

All in accordance with

Architect's and Engineer's drawings and specifications.

Our reading of the requirements of ARM 4 Rules for 'detailed descriptions' is the work listed is covered within ARM 4 categories A through T for a very practical reason – namely that the trades, materials, method of application, plant and labour required to execute the range of required work differ substantially.



**The ARM 4 Rules state that ‘no more than 1 requirement from each of category 1, 2 and 3 columns can be applied to one description’. Consequently, the above works should properly be measured in separate BQ items for:**

**Concrete screed - m2 or m2 stating depth**

**Insulation - m2**

**Reinforcement mesh - m2**

**Reinforcement bars - nr**

**Reinforcement crack control - m**

**Perimeter isolation board - m**

**Surface treatment to screed - m2**

**Surface finishes - m2**

**The relevant BQ item is not noted or marked as being a ‘composite item’ and, in any case, such a broad scope of works cannot constitute, or be regarded as, a composite item even if the term had been included in the BQ description.**

**We understand that Drawings may be produced for ‘composite items’, which are manufactured off site. Such work may be included in a BQ as a single item. That item may incorporate a number of individual fabricated components that would otherwise fall to be measured separately. The drawings, however, would fully describe the various components of the particular item, such as joinery and the like items.**

**Our belief is that where a Bill description, as above, conflicts with the Rules set out for measuring separate construction elements that relate to separate trades, that the drawn information will take priority and that the BQ measure and rates should be adjusted in accordance with the requirements on the drawing or of actual executed work. i.e., measured and priced separately.**

## **ANSWER**

The ARM Standing Committee is of the view that the description submitted with the query does not comply with the requirements of ARM 4. To comply with ARM 4, each of the following components of the ‘bulked description’ should have been listed separately in the BQ where the BQ is presented as having been measured in accordance with the Rules of ARM 4. Elements within the ‘bulked description’ should be separate BQ items, described and measured as follows: -

1. The insulation should be measured in m2 under in accordance with the requirements of the Woodwork Section J, pages Page 84 – 85. The ‘detailed description’ provided should comply with the requirements of the General Rules (Section A) including such information as the depth, type of insulation, finish to it (i.e., facing material if any), thickness, fixing and jointing details (if any), base to be fixed to, etc.
2. The screed should be measured in m2 in accordance with the requirements for In- Situ Finishes in Section O pages 116 – 117, giving the nature of, and any preparatory work to be provided to, the base together with the kind and quality of materials in the screed, the composition of the mix and method of application, number of coats and thickness plus the nature of surface treatment and special curing of finished works. The BOQ descriptions provided should comply with the requirements on ARM 4 pages 118 - 119 as to the finish being to floors, whether the particular description is for work in areas less or equal to, or wider than, 300mm and whether the screed is to be finished to falls and cross falls.
3. The polypropylene fibre crack control reinforcement should be included in the screed description, assuming it is incorporated in the mixing process. If not incorporated in the description of the screed, it could be measured in a separate item provided the BBQ makes clear what Rules have been adopted for its measurement – refer to Section A, General Rules, last paragraph of Rule 1.
4. Reinforcing bars should be measured in Tonnes in accordance with the requirements of Section F Pages 40 – 41.
5. The fabric mesh should be measured in m2 in accordance with the requirements for Reinforcement in Section F Page 40 and with the description giving the kind and quality of the materials, the laps, and the EN or BS

reference, whether the material is required to be vertical or horizontal in the completed work and with voids dealt with appropriately.in arriving at the quantity.

6. The spacers and chairs, assuming they are not at the Contractor's discretion, should be measured in tonnes in accordance with the requirements of Section F Pages 40 – 41.
7. The dowel bars should, if only dowel bars are involved, be measured in tonnes in accordance with Section F Page 40. The description provided is unclear about the extent and use of dowel bars and, prior to deciding on the BOQ presentation and measurement methodology for the work requiring the dowels, it would be necessary to clarify the nature and extent of that particular work, including any requirement for building dowels into other structural elements. The ARM 4 document allows discretion on how this work should be measured, subject to the Rules adopted being made clear in the completed BQ. Options include 'designed joints' (Section F, pages 38 – 39), 'special connections' (Section F, pages 40 – 41) or 'isolated items' (Section L, pages 92 – 93), all of them having their own required units of measurement. Regardless of the Rule adopted, the work should be included in the BQ by way of a dedicated item (or items if appropriate), measured and quantified in accordance with the methodology decided on and made clear in the BQ.

There is no provision in ARM 4 for insulated reinforced floor screeds of the type referred to in the Query to be measured as a composite item.

Please note that the above clarification is based on the Rules of ARM 4 being used to prepare the BQ. The use of ARM 4 Supplement 1 would vary some of the requirements set out in the response.

## ARM 4

### SECTION A

#### General Rules

#### Query 4 - A.4

**Topic: Composite descriptions**

#### QUERY

A Contractor is encountering difficulties on a project. He has expressed concern that items in the Pricing Document are not measured in accordance with the Rules of ARM4. One example given is as follows.

**A covered walkway item is measured as a ‘composite item’. The work required includes construction of a 30m walkway connecting an existing building to a new one. The walkway requires ground beams, a concrete ground slab, structural steel posts, an aluminium roof, cement board soffit and rainwater goods. All of the work was included in the BQ in a single item.**

The primary concern of the member is whether there is any recourse, and to whom, where the BQ is not measured in accordance with ARM 4.

#### ANSWER

The Rules of ARM 4 are clear on what work may properly constitute ‘composite items’ in a BQ.

The covered walkway described in the Query is not a ‘composite item’. The item included in the Bill of Quantities does not comply with ARM 4. The work required to provide the walkway should be measured in detail in accordance with the Rules of the relevant Sections of ARM that set out the requirements for the measurement of the various elements of the walkway.

The Committee cannot advise on the recourse where a BQ Bill is not measured in accordance with ARM 4. This is outside the Committee’s terms of reference.

## **ARM 4**

### **SECTION A - General Rules**

#### **Query 4 - A.5**

**Topic: Composite descriptions based on qualifying ARM Rules**

#### **QUERY**

**Can a BQ include something as a ‘composite item’ if a note is inserted in the BQ stating that ‘notwithstanding the rules of ARM the following has been measured as a composite item’?**

#### **ANSWER**

No, such an approach would not be in compliance with the Rules of ARM 4.

## ARM 4

### SECTION B - Preliminaries

#### Query 4 - B.1

#### Topic: Profit and Overheads

#### QUERY

**Whilst it is noted that the cost of 'Profit & Overheads' is deemed included in the unit rates (See Section A General Rules, Rule 5 g), is there any requirement or justification to have priced Preliminaries for such items as plant, site management, site security etc., as contained in the National Building Specification (NBS) or other standard documents.**

#### ANSWER

'Profit and Overheads' differ from Preliminaries.

ARM provides for Preliminaries to be listed in the BQ as items for pricing, thus allowing identified ancillary costs that are not specific to individual items of work to be priced in an appropriate manner. This is intended to facilitate both the tendering of a project and its post contract management.

The pricing of individual Preliminaries items, as opposed to grouping items and pricing them in build, may sometimes be a tenderer obligation imposed by the Employer, particularly for Public Sector projects. Where this is the case, it is recommended that the requirement should be highlighted in the BQ.

## ARM 4

### SECTION B - Preliminaries

#### Query 4 - B.2

#### Topic: COVID 19 implications

#### QUERY

**Regarding COVID-19 and the pricing of additional costs pertaining to it in tenders. Some Pricing Documents provide a line item of 'COVID-19 costs' to price.**

**What is the view of the ARM Standing Committee on how this should be dealt with?**

#### ANSWER

The Committee's view is that the COVID 19 requirements are covered in ARM 4 in Section B, Rule 4.

Paragraph 4 items q) and r) on page 13 of ARM 4 Section B Rule 4 Preliminaries refers. Specifically, items q), Welfare facilities r) Safety Health and Welfare at Works provisions i, ii, iv, v, vi, ix, x and xi are deemed to provide for pricing the COVID 19 requirements alongside the normal Health and Safety requirements.

However, the Committee consider it advisable to include with each single item given for each of these matters a single line reference to 'complying with COVID 19 requirements'.

The format depends on how the QS chooses to structure the particular BQ.

Restrictions on undertaking any work activities because of COVID 19 hazards that affect how to carry out the Works are '*deemed to be included*' as per Section A Rule 6 descriptions – i.e. *labour and all costs in connection therewith*.

## ARM 4

### SECTION D - Excavation and Earthworks: Excavation

#### Query 4 - D.1

#### Topic: Ground Water

#### QUERY

**What is ground water for the purpose of preparing a Bill of Quantities? Would it be reasonable to say that when a Contractor installs drainage, they normally come across groundwater when installing drainage? When would a separate item, or items, be needed in a BQ for groundwater and associated work? Is the term a blanket description to include for all groundwater implications in groundworks / substructures descriptions?**

#### ANSWER

There are three types of water disposal referred to in Section D of ARM 4 - surface water, ground water and water in contaminated ground and Section R also refers to surface and ground water. 'Surface water' is water on the surface of the site and the excavations (see ARM 4, pg. 25, Measurement Scope 4). 'Disposal of surface water' must be given as a BQ item (or Items where appropriate) on all projects in each section of excavation work - See Work Sections D and R. Ground water is water naturally occurring in the ground. The upper surface of ground water is the water table level. Excavation and associated items relating to the presence of ground water are only to be measured where it is identified in site investigations or similar reports or where, in the absence of such information, the Works Requirements specify the presence of ground water and the level at which it is presumed to occur. The requirements of ARM 4 regarding ground water for Section D and R, are to state the relevant water level and date when established (pre-contract level) along with High/low water levels where work is near watercourses, etc. Items for 'extra over' for excavating below the pre-contract ground water level must be quantified and measured after each of the 'Excavation' items in Section D and the 'Excavating trenches' items in Section R. An item for 'Disposal of ground water' is required to accompany 'excavation below ground water level' items. ARM 4 provides for the actual ground water level encountered during the carrying out of the Works, and specific affected items, to be adjusted accordingly. However, this may vary depending on the 'ground conditions' risk allocation where ARM 4 Supplement 1 is being used in conjunction with a Public Works Contract. It is therefore critical that the ground water level forming the basis for the quantities in the BQ is stated in the BQ.

Blanket descriptions to include for the groundwater in groundworks / substructures descriptions do not comply with the Rules of ARM 4.

Items for the 'Disposal of ground water' are also inappropriate where the ground water level has not been stated in the BQ.

Note that Section E (Piling) also lists 'Information Required' with respect to ground water level.

## ARM 4

### SECTION D - Excavation and Earthworks: Excavation

#### Query 4 - D.2

**Topic: Excavating around existing services**

#### QUERY

**The ARM 4 Rules (page 22) require an ‘Extra on’ excavation around existing services to be measured, either parallel to (in lineal metre) or crossing (nr) excavation as appropriate. Should this item be measured as a lineal metre for a bundle of service or should each individual pipe / cable run be measured as a separate ‘existing service’? The same query arises where the existing services cross the excavations.**

#### ANSWER

Working around existing services parallel to excavations should be given in ‘m’ for **each** service. Similarly, excavating around services crossing excavations should be enumerated for each service.



## ARM 4

### SECTION D - Excavation and Earthworks: Excavation

#### Query 4 - D.3

**Topic: Handling and disposal of contaminated or hazardous material**

#### QUERY

**Under Section D – Excavation and Earthwork, the contaminated material is to be measured under the Rules requiring ‘Extra on excavation items for handling and disposal of contaminated or hazardous material’. Does this only cover the direct ‘extra over’ cost of additional consequential excavation work such as double handling, screening, etc. or does it also include for the disposal of the contaminated material as well? If not, should the actual disposal of the contaminated material be described and measured as ‘disposal of excavated material off site’ with a detailed description for the specific handling of the contaminated material itself as per ARM4 and the Supplement 1?**

#### ANSWER

The ARM Standing Committee is of the opinion that the ‘Extra Over’ item provided covers the additional inputs / costs arising from excavating, handling and disposing of the contaminated material.

There is not a requirement for a specific reference in the BQ as to how the material is disposed of (save in the information required section at the top of page 22) unless the Works Requirements set specific requirements for it, in which case the Rules on page 24 with respect to ‘specific handling’ come into play.

## ARM 4

### SECTION D - Excavation and Earthworks: Excavation

#### Query 4 - D.4

**Topic: Disposal of excavated material of differing types**

#### QUERY

**Are there Rules in ARM4 for measuring material that may qualify as a by-product under Article 27 of the European Communities (Waste Directive) Regulations 2011, S.I. No. 126 of 2011, rather than it being classed as a waste material? If not, how might this be done in a scenario where it may not be known if the material can be classified as ‘article 27’ until after the Contractor has started on site?**

**The materials in question are likely to be excess uncontaminated soil produced during the construction process. It is believed that if the material is classed as a by-product under Article 27 of the European Communities (Waste Directive) Regulations 2011, S.I. No. 126 of 2011 (instead of as waste), the spoil can be transferred to another site for re-use at a lower cost than disposing of it to landfill.**

#### ANSWER

It is assumed that the query relates to the Public Works Contract where the Employer is retaining the risk of ground conditions – refer to Schedule Part 1K in PW- CF1.

The Rules for the measurement and disposal of excavated material are set out ARM 4 Section D Page 24, Category 1 Item 3.

The two methods of disposal described in the query should be measured in accordance with these Rules.

Where pre-contract investigations cannot provide definite information about types and volumes of different soils, the disposal could be measured and included in the Pricing Document based on reasonable allowances made in the Works Requirements for these items. The quantities can, if necessary, then be adjusted post-contract subsequent to the issue of appropriate Change Orders.

## ARM 4

### SECTION E - Piles

#### Query 4 - E.1

#### Topic: Piling Ancillaries

#### QUERY

**A BQ for use on a Public Works project using PW-CF1 is being prepared. For the basement substructure design, the Engineers state that it is to be the Contractor's responsibility to design certain things after the Contract award, notwithstanding the general requirement for a PW-CF1 project to be fully designed before invitation of tenders.**

**For example, the Engineers have stated that there will be a requirement for supporting the basement secant pile walls during construction. It has been suggested that this may be achieved by using ground anchors. However, the Engineers advise that, as this is temporary works, it is to be a Contractor Design item and they cannot provide a design for it. We, as QS, have responded stating we need specification information for the work because ground anchors are a measurable item under ARM4. The Engineers replied that they do not want to provide further detail as the Contractor may select an alternative system such as basement propping.**

**Our query is whether such support items, such as ground anchors, should be measured in accordance with ARM to allow the Contractor to price something, albeit it is unlikely the Works Requirements will provide a specification/length for these, or can an elemental note or Preliminaries item be included that advises the tenderers that the basement will require support and that they should include for the costs associated with whatever system they choose to proceed with?**

**Our concern is the avoidance of a payment claim from the Contractor in respect of ground anchors (if they choose that method) based on the omission of relevant items from the BQ and failure to comply to the Rules of ARM 4.**

**Similarly, the Engineers do not want to specify cutting of surplus lengths on piles as they believe the Contractor will determine the extent of this on site, notwithstanding that this too is a measurable item under ARM4.**

#### ANSWER

It is assumed that the Employer is retaining the risk of 'ground conditions', per Schedule Part 1K in PW- CF1.

Ground anchors are not temporary works and should be designed by the Engineer and measured in accordance ARM 4 Category 1, Item 7, page 34.

Temporary works are not measurable. However, sufficient information must be provided in the Specification and by way of compliance with the 'Information Required', as called for by Section E of ARM, to allow the Contractor to adequately assess and price the temporary works.

Secant piling should be measured in accordance with ARM 4 Section E (see Page 28, Category 4 Item 3) and F.

Cutting off surplus lengths, removal of obstructions, testing and other items required to be measured as 'Piling Ancillaries' would be measured as Provisional Quantities on projects where one of the Public Works Conditions (PWC) of Contract **is not in use.**

Provisional Quantities or Sums cannot be included in PWC Pricing Documents.

For a PWC based project the contingencies queried could be measured and included in the Pricing Document on the basis of assessed allowances included in the Works Requirements, i.e., Engineers Drawings and Specifications, for these items and then adjusted post contract subsequent to the issue of appropriate Change Orders.

It should be noted that the Pricing Document must follow the Works Requirements in all cases and not attempt to either cover deficiencies or expand on it.

## ARM 4

### SECTION F Concrete Work: Formwork

#### Query 4 - F.1

**Topic: Formwork to beams**

#### QUERY

**The question is in relation to formwork to cast in-situ concrete beams.**

**The ARM requires the measurement of formwork on the basis of girth to be supported (two sides and a bottom).**

**What happens when the beam is built on top of blockwork? Is the entire girth to be measured or is the work measured in linear metres for works up to 500mm high and in sq. metres for works over 500mm high?**

**A definitive answer to this question is requested as it is cropping up again and again and different people have different views.**

#### ANSWER

In the Formwork Section of ARM 3, Rule 1 in the Measurement Rules column on page 42 states that

*'Formwork shall be measured to surfaces of the finished structure which require to be temporarily supported during the placing of the concrete'.*

Formwork to beams is to be measured in sq metres and, if there is a supporting wall under a beam, which the Query includes reference to, the width of soffit sitting on the wall will be deducted when the area is being calculated because that width does not need to be 'temporarily supported'.

There is no requirement in ARM 4, or preceding versions, to measure beam formwork in linear meters.

## ARM 4

### SECTION F Concrete Work: Formwork

#### Query 4 - F.2

**Topic: Formwork over 4.00m high**

#### QUERY

**Measurement Rules (Page 42 item 2) states ‘Where formwork over 4.00m high is required it shall be measured from the nearest structural floor’.**

**With a concrete overhang at fourth floor level of a five-storey building above an atrium, should the soffit height of the formwork to the overhang be measured from the ground floor or the third floor?**

#### ANSWER

The ARM general requirement is that Bills of Quantities shall fully describe and accurately represent the quantity and quality of the work to be carried out (Rule A4).

The ARM Standing Committee believe that, in the situation described, the BQ description should include reference to the soffit to be formed being over an atrium. Where the vertical height from the supporting surface to the soffit to be supported is over 4m, the height of the formwork above the '*nearest structural floor*' should be measured from the structural floor level vertically below the soffit of the atrium cover slab.

This approach will facilitate tenderers' assessment of the work being measured in the BQ item, particularly when assessed in conjunction with the drawings of the specific slab that are provided to tenderers, and will allow them to assess the tender rate they wish to include for the construction methodology that they envisage using.

## ARM 4

### **SECTION F Concrete Work: Precast Concrete/ Composite Construction/Stone Faced Concrete Panels**

#### **Query 4 - F.3**

**Topic: Precast concrete walls**

#### **QUERY**

**Guidance is sought on the measurement of pre-cast concrete walls.**

**Walls are not listed in the pre-cast concrete section of ARM4. Can the Committee advise whether walls should be measured as Composite Items (and therefore measured in m2) or dealt with as Like Items (after a list of beams, columns, etc.) and therefore measured by number with a detailed description provided?**

**If neither of the above, how should they be measured?**

**We wish to ensure the work is correctly included in the BQ and the presentation is not later challenged by the Contractor.**

#### **ANSWER**

There are presently no specific rules in ARM 4 for the measurement of precast concrete walls.

However, ARM 4, Section F, Concrete Work: Precast Concrete /Composite Construction /Stone Faced Concrete Panels, pages 46 and 47 provides options.

Precast concrete panels could be measured as 'Composite construction' Category 1, 4 in m2, with more detail given to define the precise nature of the work as required by General Rules 1 Introduction on page 7 of ARM 4

Alternatively, the precast concrete panels could be enumerated as 'Like items' in Category 1,12, with more detail given to define the precise nature of the work, as required by General Rules 1 Introduction on page 7 of ARM 4.

There is also an opportunity to measure the units in lineal metres where work is of a continuous nature, see Measurement Rules 3.

Regardless of which approach is taken, Sundries, Fixings, and Designed joints should be measured as appropriate and identified in Category 1, 13,14 and 15. Furthermore, attention is drawn to the '*INFORMATION REQUIRED*' at the top of page 4 of ARM 4.

With respect to the concluding statement about a Contractor challenge, the Standing Committee only offer their opinion on the application of ARM 4 Rules and can offer no assurance about the making or resolution of challenges that may arise pre or post a Contract award.

## ARM 4

### SECTION L: Metalwork Non- Structural

#### Query 4 - L.1

**Topic: Aluminium windows and scope of work included in ‘composite item’**

#### QUERY

**A tender document being priced contains the following ‘catch-all’ composite description, but it is not described as such.**

Aluminium Window Units; APA or equivalent; system performance to comply with BS 6375-1 as per clause 25-50-95/205; double glazed window units to comply with BS EN 1279; whole window u-value: 1.4 w/m<sup>2</sup>k; solar factor to standard of BS EN 410 as per clause 25-50-95/224; window system fixed in position as per manufacturers written specification, instructions and conditions of guarantee; windows to have a satin powder coated finish to RAL 7004; include for all electrical actuators, window stats, control panels, remote controls, ironmongery, aluminium support angles/flat plates to window/door (as per suppliers design), non-slip aluminium threshold finishing strips, flashings, window fixing straps, restrictors, weathering, ventilation grilles, trickle vents, films, etched glass markings, fixings, beadings, jointing, sealants, mastic pointing, testing, finishes, actuators, EPDM, gaskets, thermal breaks and accessories as required; complete all as per Architect’s drawings, details & specification 25-50-95/125

**Can you give your opinion on the above?**

**From a tenderer’s perspective, the aluminium support angles are coming from a different manufacturer than the one that will provide the windows. Therefore, the angles cannot be taken in the composite item and it is contended that the angles should have been measured separately because they do not fall withing the scope of the composite item for the window and therefore are not ‘deemed to be included’.**

**Similarly, the description below is also provided:**

Profiled Sheet Cladding System to Roof Plant Room Wall; cladding system performance as per clause 25-80-68/205; include for - vapour control layer; cold-formed galvanised steel section spacers; 150mm insulation between purlins; breather membrane; bitumen bonded kraft paper, external sheets; support rails/framing/purlins; all fasteners, sealing of joints, butyl rubber sealant tape, trims to reveals and edges, 3mm thick aluminium powder-coated L-shaped reveal liners, and all flashings; complete all as per the works requirements, Architect’s drawings and specification 25-80-68/150

**We contend that the above work should have been broken down into:**

- 1. Cladding**
- 2. Vapour control layer**
- 3. Cold formed sections/purlins**
- 4. Insulation**
- 5. Breather membrane**
- 6. Cladding rails**
- 7. Liners**
- 8. Flashings**

**The Committee’s view on the above would be appreciated.**

#### ANSWER

It is the view of the ARM Standing Committee, albeit on the basis of the limited information provided with the query, that the window description appears to comply with the requirements of ARM 4. How the various elements and components of a composite item are sourced is of no consequence.

Regarding the description of the profiled sheet cladding, it is the Committee’s view that it does not comply with the requirements of ARM 4 due to: -



- The descriptive requirements of Section I Roofing, Cladding and Waterproofing: Rigid Sheet Coverings and Decking on Page 72 “Information Required”, have not been fully detailed.
- Support rails, framings and purlins have been included in the description. Even if referred to in the overall description separate measurable items are of course required in accordance with Section K Structural Steelwork.
- Trims to reveals and edges, reveal liners and all flashings have also been included in the description. These should be measured separately in m in accordance Section I Roofing, Cladding and Waterproofing: Rigid Sheet Coverings and Decking on Page 72 Category 1, 5-23.

## ARM 4

### SECTION I - Roofing, Cladding and Waterproofing: Mastic Asphalt, Waterproof and Gas Proof Non-Metal Flexible Sheet Covering

#### Query 4 - I.1

**Topic: Measurement of metal roof coverings and particularly parapet details**

#### QUERY

**Measurement Rules 2. ‘*Work shall be measured on the exposed face*’.**

**Where a flat roof meets with a parapet and the horizontal insulation on the flat roof goes in to meet the steelwork or concrete wall / upstand – is the insulation measured from where it meets the steelwork? Is the Paralon sheet roof covering measured from where it meets the vertical insulation in the upstand / parapet.**

**Again, are items / areas measured by measuring the base or substrate that they are to be fixed on to?**

**Alternatively, is it the outer face of the material that is measured once it has been fixed?**

**What happens when the flat roof insulation and the flat roof sheet covering are a composite item – described in the one description – and a single quantity given in a BQ?**

**Is there an entitlement to claim for additional insulation if the area is measured based on the sheet roof covering dimensions and area?**

#### ANSWER

Paralon is the specified finish called up on the sketch attached to the query. It is a ‘non-metal flexible sheet covering’ and the appropriate Rules are on pages 65 – 69 of ARM4. MR 2 on page 67 requires that the ‘*Work shall be measured on the exposed surface*’. The ‘exposed surface’ refers to the finished surface of the material being applied, i.e., the surface exposed to the weather.

Where different types of work are amalgamated into a single BQ item despite their measurement being subject to Rules in different Workgroups within ARM4 or they are subject to Rules requiring different measurement procedures or units to be used, the requirement is that the methodology used to arrive at the BQ items is clearly stated so that parties pricing the work have the opportunity to price the implications of the measurement system used to arrive at the quantities stated.

## ARM 4

### SECTION I - Roofing, Cladding and Waterproofing: Rigid Sheet Coverings and Decking

Query: 4 - I.2

Topic: Measurement of wall cladding

#### QUERY

With External Wall Cladding, is the area to be measured: -

1. TO TOP OF PARAPET
2. TO TOP OF CLADDING PANEL
3. TO BOTTOM OF CAPPING

The ARM measurement rule requires that '*Work shall be measured on the exposed face*'.

The Committee's advice would be much appreciated.

**In my opinion the measurement should be to the top of the cladding panel, i.e. the area of cladding that is exposed before it receives the metal capping.**

#### ANSWER

The view of the ARM Standing Committee is that option 2 in the Query is correct.

ARM General Rule 5 page 7 in the second paragraph states '*Work shall be measured net as fixed in position, etc.*' For the situation outlined in the query, this means measured to the top of the cladding panel.

The Measurement Rule 1 in Section I page 73 of ARM '*Work shall be measured on exposed face*' means that it shall be measured along the outer face of the cladding. It does not mean that the cladding behind the parapet downstand should not be measured."

## ARM 4

### SECTION K: - Structural Steelwork

#### Query 4 - K.1

**Topic: Interpretation of steelwork measurement requirements**

#### QUERY

**We are a steel construction and steel fabricator based outside the Republic, unfamiliar with practices in the Country and seeking assistance in understanding the measurement process and terminology of ARM 4. We would be very much obliged for any information.**

**ARM 4 states (see highlighted areas in attached excerpt):**

**Page 8, par. 6: ‘Unless otherwise specifically required by these Rules, the following shall be deemed to be included with all terms: [...] f. All cutting.’**

**Page 87: ‘Measurement Rules: All steelwork shall be measured by Serial Size weight without allowance for rolling margin, welds, bolts, nuts, washers, protective treatments nor with any deduction for holes, cut ends or notches.**

**Clarification of the following is sought:**

- 1. Are the *Agreed Rules of Measurement 4* legally binding in Ireland or must both parties to a Contract contractually agree on complying with them?**
- 2. What is meant by ‘Serial Size Weight’ and ‘Cut Ends’?**
- 3. How much of the material used in fabricating steelwork may be billed to the purchaser? Does the term ‘deemed to be included’ mean that a fabricator is entitled to be reimbursed for any material wasted during production, such as holes, cut ends, and tapers?**

#### ANSWER

**Question 1.** Are the *Agreed Rules of Measurement 4* (2009) legally binding in Ireland or must both parties contractually agree on complying with them?

**Answer 1.** ARM 4 is not binding unless specifically incorporated in the specific Contract or can reasonably be implied to have been accepted by the parties.

ARM 4 provides a uniform basis for measuring building work and embodies the essentials of good practice. Where disputes as to measure arise on contracts for work carried out in Ireland that are subject to Irish Law, it is more than likely that even if a contract is silent on the method of measurement employed, the parties may be deemed by a Court/Arbitrator to have accepted that, according to custom in the Irish Construction Industry, measurement according to the Rules of ARM 4 applied for building works (including structural steel) as a matter of good practice. For example, if a document was provided for pricing which refers to ARM 4 as being the basis for measurement, it is likely to be binding on the party pricing unless the quotation qualified that position. However, in contracts for supply only of materials the Rules may have little relevance unless specifically referred to in the contract for supply.

**Question 2.** What is meant by ‘*Serial Size Weight*’ and ‘*Cut Ends*?’

**Answer 2.** *Serial Size Weights* are the mass per metre for standard steel sections as defined by:-

British, European and International standards and are used in calculating the net quantities to be included in the tender document. Steel members are measured as ‘*the required length by the mass/m*’ with no allowance for waste, rolling margin, welds, nuts bolts, washers or the protective treatment.

Where ends of members are cut to shape - e.g. two horizontal beams intersecting at an angle of less than 90 degrees may result in a portion of the end intersecting with the other member being cut to fit, the quantity should be calculated by measuring the longest edge required.

**Question 3.** How much of the material may be billed to the client? Does the term “deemed to be included” mean that we are entitled to be reimbursed for any material wasted during production, such as holes, cut ends and tapers?

**Answer 3.** The purchaser makes payment for the net weight of steel he has requested. Therefore, material that is wasted as a natural part of the production process is deemed to be included within the tendered rate per tonne of steel. So, by way of example, if there is a requirement that a finished beam is 5m long and it must be cut from a beam that is supplied 6m long then the rate charged for the finished steel must include for the cost of the wasted steel (i.e. the wasted 1m). In the event that material is wasted because of design changes (abortive works) then the additional cost arising from the instructed change is recoverable, provided that the procedures set out in the particular Conditions of Contract are adhered to.

It should also be noted that ARM 4 requires the quantification of the work required in the completed project. How much material has to be bought by a fabricator / contractor to arrive at the nett quantity required in the completed project is for determination by the fabricator / contractor. The cost of material bought by the fabricator / contractor but not present in the completed project is deemed to be included for in the rates tendered by the fabricator / contractor for the nett quantity of work that is required in the completed project.

## **ARM 4**

### **SECTION M and M - Mechanical and Electrical Installations**

#### **Query 4 - M&N.1**

**Topic: Pricing Document preparation by which Design Team member**

#### **QUERY**

**Who should prepare the M&E Pricing Document?**

**As a QS I feel that M&E Consultants are best placed to prepare the M&E Pricing Doc. I have spoken to several QS Practices & all concur.**

#### **ANSWER**

The Rules in Sections M&N of ARM 4 and Supplement 2 are provided for the measurement of M&E Services.

These, particularly in the case of ARM 4, require provision of the same level design detail from the Services' Engineer that is required of other designers.

It is reported by QS practices that provision of the required information can be challenging to obtain for some projects but that does not affect the need for both the party preparing the Pricing Document and the tenderers to have access to it.

Who actually measures the work is a project decision and, if not determined by the Client, will be decided within the Design Team.

## **ARM 4**

### **SECTION M and M - Mechanical and Electrical Installations**

#### **Query 4 - M&N.2**

**Topic: Public Works Contracts – full measurement of Mechanical and Electrical services**

#### **QUERY**

**When will the Mech & Electrical work content be fully measured in the BQs for projects using the Public Works Conditions of Contract?**

#### **ANSWER**

It is up to the Public Sector Contracting Authority responsible for each project to decide if the Mechanical and Electrical Installations should be measured in accordance with ARM 4 or whether ARM 4 Supplement 2 is to be used.

Regardless of the approach decided on, the BQ must make clear the basis on which the BQ M&E and associated works have been measured.

## ARM 4

### SECTION M and M - Mechanical and Electrical Installations

#### Query 4 - M&N.3

**Topic: Private Sector Contracts - Mechanical and Electrical services measurement**

#### QUERY

**For private sector projects, what is the Committee's view on whether ARM4 Supplement 2 or the standard full ARM4 is the most suitable for use with the M&E work content when preparing the BQ.**

#### ANSWER

Typically, on private sector projects, mechanical and electrical installation services are not measured and are instead dealt with by using the Prime Cost Sum mechanism to include the work in the Contract Sum.

If the Employer requires the measurement of M&E services, the option to use either the Rules of ARM 4 or ARM 4 Supplement 2 is available and which is adopted will be determined by the instructions of the Employer. A decision may take into account the size of the project, the nature of the M&E services, the extent to which it is anticipated that the installations will be designed by the Contractor and what level of design detail will be available prior to the tender documents being issued for pricing.

For most small to medium projects, ARM 4 Supplement 2 should provide an adequately detailed BQ for tender purposes but the Design Team / QS may need to obtain ancillary information with respect to tender rates prior to concluding an award recommendation.

The measurement of Mechanical and Electrical Installations in accordance with ARM 4, where required by the Employer, will result in a more comprehensive BQ but doing so will depend on the availability of the required M&E design information.



## ARM 4

### SECTION O: - Floor Wall and Ceiling Finishings: Finishings

#### Query 4 - O.1

**Topic: Plaster beads**

#### QUERY

**Are the angles and beads (used to reveals and corners of a building) to external render separately measurable items in a BQ prepared for use on a project using RIAI re-measurable Yellow Form Conditions of Contract? The published BQ does not have the beads separately measured.**

#### ANSWER

Beads are measurable in accordance with the Rules of ARM 4 Section O, see Page 120 Item 5 in Category 1 'Sundries' and Item 6 Category 2 for '*beads.*'

Additionally, Page 121 Measurement Scope Item 2 states '*Beads include angle beads, stop beads and the like.*'

## ARM 4

### SECTION O: - Floor Wall and Ceiling Finishings : Finishings

#### Query 4 - O.2

**Topic:** Adequacy of Architect's Specification reference to satisfy ARM requirements in a BQ description.

#### QUERY

The query arises from several claims that have been raised by a Contractor working on a large project using the PWC CF1 v2.2 09-01-17 Conditions of Contract.

The Contractor's consistent position is that the QS cannot rely on a reference to the Specification in BQ descriptions, that the Contractor should be able to price the BQ without reference to the Specification and that the descriptions presented in the BQ do not comply with the Rules of ARM 4.

Below is a summary of one particular issue that is representative of several items that are in contention. Clarification is sought from the Committee about whether the BQ descriptions being challenged are in compliance with ARM 4.

#### Sample BQ description

*Hygienic PVC-U wall cladding; semi rigid; to selected colour; flexible rubber jointing strip, 3 wide; double sided tape fixing; silicone sealant joints; seal plasterboard surface with primer sealer; two part cementitious adhesive; all in accordance with the manufacturer's requirements and Architect's specification K13/167*

#### Walls; to skimmed plasterboard surfaces

A 2.5 thick; exceeding 300 wide

The Works Requirement Specification forming part of the tender package and Contract Documents was relatively long and detailed. It included a requirement for a patterned surface finish to the PVC wall cladding but it did not provide information on the pattern required.

#### Contractor's Claim

A high-quality image printed on the wall cladding can be categorised as a 'Surface Treatment', which should be described in the BQ as required by the Rules of ARM 4.

The image could also be categorised as 'Patterned Work' and the General Rules of ARM 4 for Section O Wall Finishes states that 'Patterned work shall be fully described or shown in detail on a drawing provided with the Bill of Quantities'.

Whichever of the above is applicable, ARM 4 requires the description in the BQ to 'fully describe' and 'accurately represent' the work called for in the Works Requirements. The digital printed images now being sought are not described at all in the BQ and therefore the Works Requirements are neither fully described nor accurately represented by the BQ description(s).

#### QS response

The pattern on the cladding is neither a 'surface treatment' nor 'patterned work'.

Surface treatment would be used to describe a site applied finish to the material that is separate to the material itself – e.g. a varnish or lacquer applied to timber cladding. The printed image required in this case is part of the product itself, as supplied from the manufacturer, and not a separate finish

**applied to the cladding. Patterned work would be for describing if the material was to be cut and laid in a pattern - e.g. herringbone.**

**The BQ description provides sufficient information and, if the BQ description is taken in conjunction with the Specification, there is no reason this work could not have been accurately priced.**

## ANSWER

It is of the view of the ARM Standing Committee, based on the information provided, that the BQ description of the wall cladding did not require a tenderer pricing the Bill item to include for the imagery alluded to (but not specified) in the Specification extract that accompanied the query. Accordingly, the BQ does not comply with the descriptive requirements of ARM 4.

ARM 4 General Rule 7 (second paragraph) provides that, where the requirements of the Rules require a detailed description, a reference to a standard specification may be given in an item description instead of complying with the descriptive requirements of the Rules. It does not elaborate on what a 'standard specification' is and leaves it open to debate whether an architect's specification can be deemed a 'standard specification'.

The wording of A7 in ARM 4 includes:

*'Reference to a standard specification or a precise reference to a catalogue item may be given in an item description instead of the descriptive requirements of these Rules or a Component Detail.'*

By way of comparison, the wording of A7 in ARM 4 Supplement 1 includes:

*Reference to a Standard specification (EN, IS, etc.) that is adequate to identify the material or process required, subject to the requirement to consider equivalents, may be given in an item description instead of the descriptive requirements of these Rules or a Component Detail.*

The text of Supplement 1 is more specific about what a 'Standard' specification is and its use. A7 does not recognise the use of references to 'catalogue' items that the ARM 4 Clause provides for. Because Supplement 1 is so definite about what a 'Standard specification' is, scope is not allowed for a BQ description to rely on an architect's specification or other published specification type documents.

The term '*detailed description*', which appears in both versions of the Rules, needs to be put in context. It only arises where it is mentioned as a requirement in a 'Category' column of the Rules.

For Section O - Floor, Wall and Ceiling Finishings, this '*detailed description*' requirement applies to Category 1 items 12 to 20 on page 118 and to Category 1 items 2 to 4 on page 120.

In all cases apart from the above, the details in the Information Required at the start of Section O must be given.

Descriptions for 'Flexible Sheet Finishings' should state their nature, preparatory work to the base and, for the particular finish, the kind, quality and thickness, width and laying directions, treatment of joints, method of fixing and nature of surface treatment.

### **BQ prepared using ARM4**

For projects where the BQ is prepared using ARM 4 an appropriate reference to a specification forming part of the tender package (such as an architect or engineer's document) that has sufficient information to comply with the full descriptive requirements of ARM, can satisfy the information requirements of ARM 4, even though this takes away from one of the purposes of a fully described BQ – namely to provide the estimator with the correct information rather than obliging the estimator to search through pages of specification content to get the information required for his suppliers / subcontractors to price their inputs.

### **BQ prepared using ARM4 Supplement 1**

For a project where the BQ is prepared using ARM 4 Supplement 1, the facility to substitute a specification reference for a detailed description is NOT permitted except where the reference is to a Standard specification such as an EN, IS, etc. A description can be supplemented by reference to a specification contained in a document forming part of the Works Requirements, provided that the description is in compliance with the requirements of the Rules, but such a specification reference cannot be substituted for a description.

The query submitted refers to work that is to be undertaken on a project contracted for using PW CF1, one of the Public Works suite and published for use where the work is designed by the Employer.

It is clear from the query that:

- a) The description provided in the Bill of Quantities relied on the content of the Architect's Specification to convey to the Contractor what the Bill rate quoted was to include for. This reliance is not in compliance with the requirements of Rule A7 of ARM4 Supplement 1.
- b) The Architect's Specification referred to did not provide all the '*Information Required*' in respect of the '*Flexible Sheet Finishings*' that it was intended to have applied. In general terms, a Contractor's rate is only required to include for what has been called for in the BQ description (and '*deemed to be included*').

Regardless of whether ARM 4 or ARM 4 Supplement 1 is being used, a BQ description may be reliant on the text content alone or an appropriate supplemental reference(s) to a comprehensive Drawing detail.

For an ARM 4 BQ, reliance may also be placed in a clause from the specification provided by the Architect, Engineer, etc., as long as the specification clause satisfies the full descriptive requirements of ARM.

With respect to the imagery that is required to be applied to the sheet finish on this particular project, the provision of the imagery was not included in the BQ description, as required by the ARM 4 Supplement 1 Rules. Moreover, had it been covered in the description, it could not have been priced by the Contractor as no details of the imagery were provided by the Works Requirements with the Specification content only indicating an intention to make the imagery details available.

## ARM 4

### SECTION O - Floor Wall and Ceiling Finishings: Finishings / Stud Partitions

#### Query 4 - O.3

#### Topic: Columns within stud partitions

#### QUERY

Where in ARM 4 are the rules of measurement for columns framed out within the length of a stud partition, as occurs in the details provided below?

Screen shots of the Columns in question are below.



12.



**ANSWER**

The work shown on the drawn information is not '*partitions*' and is therefore not measurable in accordance with the Stud Partitions Section of ARM 4.

This work should be measured as '*Board Finishes*' in the Finishings Section.

## ARM 4

### SECTION R - Drainage: Below Ground

#### Query 4 - R.1

#### Topic: Multiple pipes in trenches at crossings

#### QUERY

Can the Committee advise on the interpretation of the Rules shown below:

2 Extra over excavating trenches irrespective of depth	9 around existing services crossing excavations
8 type of services stated	6 multiple pipes in trench

Our understanding of this is that the '*multiple pipes in trench*' that are referred to means the pipes that are in the new trench (i.e., if an ESB line has 2 nr ducts then this is 2 nr crossings).

Is our understanding correct?

#### ANSWER

It is the view of the ARM Standing Committee that the reference to '*multiple pipes in trenches*' in the '*Extra over excavating trenches irrespective of depth*' Category in the query refers to existing services crossing the new trench.

## **ARM 4 SUPPLEMENT 1**

### **SECTION A - General Rules**

#### **Query 4S1 - A.1**

**Topic: References in a BQ to the Works Requirements (drawings / specifications)**

#### **QUERY**

**Where ARM Supplement 1 is being used, can the QS include in his BQ description a reference to the architect's/engineer's project specific Specification / Works Requirement's clause(s) that includes the appropriate EN, IS, BS or other Standard for the item being described.**

#### **ANSWER**

See Paragraph 3 of Advice notes for users of ARM 4 dated 27 May 2019 issued by SCSi and CIF



## **ARM 4 SUPPLEMENT 1**

### **SECTION A - General Rules**

#### **Query 4S1 - A.2**

#### **Topic: Bill Diagrams**

#### **QUERY**

**What is the status of Bill Diagrams contained at the back of a BQ but not listed as forming part of the Works Requirements?**

#### **ANSWER**

ARM 4 Supplement 1 does not provide for Bill Diagrams.

In the Public Works scenario, Bill Diagrams have no status since they do not form part of the 'Works Requirements'.

## **ARM 4 SUPPLEMENT 1**

### **Section B - Preliminaries**

#### **Query 4Sp1 - B.1**

#### **Topic: Profit on a Reserved Sum**

#### **QUERY**

**Where a BQ is prepared using ARM 4 Supplement 1, the profit on a Reserved Sum is measured as an Item (as required by the Rules). The tender of the selected Reserved Specialist is in excess of the Reserved Sum in the Pricing Document.**

**Is the Contractor stuck with the original sum for profit in his tender?**

#### **ANSWER**

See Advice Note issued by ARM Standing Committee dated 7th December 2020.

## **ARM 4**

### **ARM 4 SUPPLEMENT 1**

#### **Section B - Preliminaries**

#### **Query 4Sp1 - B.2**

**Topic: Schedule 1 entries for PWC Condition of Contract to be stated in BQ items for pricing**

#### **QUERY**

**Where a BQ is prepared using ARM 4 Supplement 1, are priceable items to be included for the entries made on behalf of the Employer in Schedule Part 1 to the Conditions of Contract. This query refers particularly to the resourcing of the Project Board by the Contractor. The BQ item stated 'Project Board' but did not provide any information on how many persons were to constitute the Board. The ER has responded to the Contractor's claim for recovery of costs arising from provision of the required representation to the Project Board with a determination of 'no entitlement' on the basis that the BQ referred to the Project Board.**

**Should the item in the BQ have provided the information shown in Schedule Part 1 with respect to the Project Board to allow for the pricing of the actual requirement?**

#### **ANSWER**

It is the opinion of the ARM Standing Committee that, with respect to the Project Board, the requirements of the second paragraph of Clause 2.1 and the first paragraph of Clause 3.2 of Section B Preliminaries, ARM 4 Supplement 1 Issue 2 were not complied with in the preparation of the BQ.

## ARM 4 SUPPLEMENT 2

### GENERAL ENQUIRY

Query 4Sp2 – GE.1

**Topic: Supplement 2 to be used when?**

### QUERY

**Page 5 of ARM 4 Supplement 2 – What does the ‘*not warranted*’ actually mean in the statement: -**

*‘This Supplement provides a set of rules for use in the measurement of Mechanical & Electrical Installation where the Design Team, with the agreement of the Employer, have decided that the measurement of Mechanical and Electrical Installations in accordance with ARM 4 is not warranted.’*

**This Supplement was produced for a particular reason – what was it?**

### ANSWER

ARM 4 Supplement 2 is available for the measurement of mechanical and electrical installations where the level of detail provided on the drawings and specification is sufficient to allow for compliance with the measurement requirements of the Supplement but is not sufficient to allow for compliance with the more detailed requirements of the Mechanical and Electrical sections of ARM 4.

The use of Supplement 2 may also be decided on where the extent of the mechanical and electrical work required for a project is relatively small and the pricing information resulting from the measurement of the relevant work in accordance with the Rules of the Supplement is deemed adequate, by both the Design Team and the Employer, for the assessment of tenders received and the subsequent management of the project.

It should be noted that the decision to use Supplement 2 is to be made by the Design Team, having considered the requirements of the project concerned, and its use is to be agreed with the Employer. Regardless of the measurement rules adopted, the drawings and specification must be sufficiently well developed to adequately define the scope of the mechanical and electrical installation work required of the Contractor.

## **ARM 4 SUPPLEMENT 2**

### **GENERAL ENQUIRY**

**Query 4Sp2 – GE.2**

**Topic: Supplement 2 – what is its relevance?**

### **QUERY**

**How relevant is Supplement 2, given that the Mech and Elec Services are rarely priced in detail at tender stage?**

### **ANSWER**

ARM 4 Supplement 2 provides an alternative set of Rules for use in the measurement of Mechanical and Electrical installations where the Design Team, with the agreement of the Employer, have decided that the measurement of Mechanical and Electrical Installations in accordance with ARM 4 is not warranted. It is relevant as it gives an agreed method for quantifying Mechanical and Electrical Installations.

## **ARM 4 SUPPLEMENT 2**

### **GENERAL ENQUIRY**

#### **Query 4Sp2 – GE.3**

**Topic: Private Sector projects – use ARM4 or ARM4 Supplement 2 for the Mech and Elec Services?**

### **QUERY**

**For private sector projects, should ARM4 Supplement 2 or the standard full ARM4 Rules be used for the measurement of the Mech and Elec work content?**

### **ANSWER**

On private sector projects, mechanical and electrical installation services are typically not measured in detail in the BQ and are instead dealt with using the Prime Cost Sum mechanism to have the cost of the M&E work include in the Contract Sum.

Should the Employer require the measurement of M&E services, the options to use either the Rules of ARM 4 or of ARM 4 Supplement 2 are available. Which is adopted will be determined by the instructions of the Employer, which may take into account the size of the project, the nature of the M&E services, the extent to which it is anticipated that the installations will be designed by the Contractor and what level of design detail is expected to be available prior to the tender documents being issued for pricing.

For most small to medium projects, ARM 4 Supplement 2 should provide an adequately detailed BQ for tender purposes but the Design Team / QS may need to obtain ancillary pricing information with respect to tender rates prior to concluding an award recommendation.

The measurement of the Mechanical and Electrical installations in accordance with ARM 4, where required by the Employer, will result in a more comprehensive BQ but doing so will depend on the availability of the required M&E design information.

## ARM 4 SUPPLEMENT 2

### Section N – Electrical Installations

#### Query 4Sp2 - N.1

**Topic: Electrical Section typographic error**

#### QUERY

**Is there a typographical error in the Electrical section of ARM 4 Supplement 2 where ‘Item’ is included in the ‘Unit’ column – see extract reproduced below.**

**If all of these systems can be measured as ‘Items’, does it make the rest of the Rules in the Section redundant?**

CATEGORIES	1	2	3	4	Unit
1. System		1 HV/MV installation 2 LV installations 3 Cable ladder/tray/trunking installations 4 Lighting and emergency lighting installations 5 General services and small power installations 6 Fire alarm installation 7 DATA/I.T. installations 8 Mechanical & BMS wiring installations 9 Earthing & bonding installation 10 Lightning protection installation 11 Transport installation 12 Other installations - function stated	1 Details stated and reference to Specification given		item

#### ANSWER

The ARM Standing Committee have considered your query.

The ‘Item’ highlighted in the Query is clearly a typographical error and should not be there.

## ADVICE NOTE FOR USERS OF ARM 4 DATED MAY 27<sup>th</sup> 2019

### Advice notes for users of ARM 4

The ARM Joint Committee representing the SCSi and CIF, together with an observer representing the Government Contracts (Construction) Committee, maintains oversight on the content and implementation of the Agreed Rules of Measurement (ARM) in the Republic of Ireland. ARM 4 is the version currently in use, together with Supplement 1 (Amendments to ARM 4 to incorporate the Public Works requirements) and Supplement 2 (Alternative Rules for the measurement of Services).

The Joint Committee has become aware of concerns in the industry and amongst parties commissioning construction contracts about the standard of some Bills of Quantities currently being issued with tender documents.

Queries submitted to the Joint Committee indicate that compliance with the requirements of ARM 4 and of Supplements 1 and 2 is less than satisfactory. This may carry serious implications, particularly where the Employer is allocated the risks arising from errors in the Bills.

The following advice note is being issued by the ARM Joint Committee to assist practitioners to comply fully with the relevant ARM requirements. Such adherence is particularly important for Public Works Contracts where 'quantities form part of the Contract' and are subject to differing Rules under Supplement 1. This advice may in some cases also apply in private sector work {see 2, 3(iv), 3(vii)} but, regardless of the Client, the maintenance of appropriate professional standards in the preparation of all Bills of Quantities is encouraged. Failure to do so may give rise to reputational damage to both the practitioners involved and the profession in general and to potential negligence claims.

1. The Schedule issued with the Public Works tender documentation (see Construction Procurement Reform) is clear that ARM 4 with relevant supplements 1 and 2 are to be used for the preparation of Bills of Quantities for construction projects. Qualification to those Rules is not permitted. A hierarchy of contractual precedence for contract documents is provided in the Public Works Contracts with the Pricing Document, in this case the Bill of Quantities, at the lower end of the list. Accordingly, any purported qualification to the ARM 4 Rules inserted in either the Work Requirements or the Pricing document will not have legal effect as the Schedule to the Conditions of Contract take priority over those other documents. Schedule Part 1 to the Conditions of Contract for Employer Design projects will normally identify ARM 4 Supplement 1 as the measurement rules adhered to.
2. General Rules, Rule 2 (Section A). This is the same in both ARM 4 and in Supplement 1 and is the source of a significant proportion of the queries directed to the Standing Committee with respect to the use of 'bulked' or 'composite' descriptions. The Rule requires that 'not more than one requirement from each of the Category 1, 2 and 3 columns can be applied in any one description'. This prohibits the amalgamation of different types of work in the same description. For example, a single Bill of Quantities item cannot include a concrete ground slab, the surface finish to it, its steel reinforcing and the damp proof membrane below it since the four types of work each have their own entry in the ARM Rules.
3. Practitioners are advised to take the requirements of ARM 4 Supplement 1 into consideration when preparing Bills of Quantities and, in particular, to note the following;
  - i) General Rules, Rule 7 (Section A). The requirement of Rule 7 in Supplement 1 with regard to the provision of a 'detailed description' differs considerably from the same Rule in ARM 4. Supplement 1 is specific that the requirement for a detailed description is satisfied by a



reference to a 'Standard' specification (note upper case 'S' in Supplement 1) and that EN or National Standards are adequate once the detail provided in the Standard is adequate to 'identify the material or process required'. A reference to a specification document provided by a Design Team member does NOT satisfy the requirement for the provision of a detailed description. It is essential that descriptions in Bills of Quantities fully describe the essential information that the Rules require to be provided.

- ii) Provisional sums or quantities. These mechanisms are not permitted by ARM 4 Supplement 1.
- iii) PC Sums may only be used in tender documents as specific Reserved Sums for Named Specialists and for the cost associated with the appointment of a Standing Conciliator (Rule AIO). In both instances the amounts in the Bill of Quantities, together with any ancillary items such as profit percentages, must be adjusted and replaced by the actual quoted sums and ancillary percentage amounts for the respective services before a tender is accepted.
- iv) Samples, tests and surveys. The scope and requirements called for in the Works Requirements (drawings and specification) must be fully described in the Pricing document so that a facility is provided to the Contractor to price them.
- v) Preliminaries Rule 2 (Section B). BQ items are required for all entries made by the Employer in Schedule Part 1 to the Form of Tender. This includes items for the various types of insurance to be provided by the Contractor and relevant information such as permitted excesses, special conditions (e.g. asbestos cover) as well as Bond requirements, contract duration, sectional completion requirements, retention percentages, arrangements about payment for materials, weather station information with respect to weather events, etc. For Schedule Part 1 item K (risk transfer allocations), items for pricing of risk transfer need to be given and the allocation of the risk for delays and compensation events identified.
- vi) Schedule part 1 K18 to K21 decided not to be 'Compensation events'. Where the risks described are allocated to the Contractor, the relevant BQ items affected by that risk allocation need to be clearly identifiable as ones where the quantum risk is with the Contractor and, for example, where the quantities priced in the BQ will not be adjustable under Schedule Part 1 item K17 in the event of a discrepancy between the extent of the work called up in the Work Requirements / Bill of Quantities and what is actually required to deal with the site conditions encountered.
- vii) Groundwater — the implications of its presence (i.e. excavation, earthwork support) and its disposal must be dealt with in accordance with ARM 4 Rules. If there is ground water anticipated by the Works Requirements then the assumed starting level must be stated (in the Works Requirements and the Bili of Quantities) to facilitate the subsequent re-measurement of the associated BQ items, including disposal, when the actual level is agreed. An item in the BQ for 'disposal of ground water' is meaningless without the required ancillary information and this is particularly the case if the Works Requirements do not provide for the presence of ground water.
- viii) Bill of Quantities to match the Works Requirements. The Bill of Quantities is NOT part of the Works Requirements and, in the event of a dispute about whether the provision of an item of work is a contractual obligation, the provisions of the Works Requirements will decide the matter.
  - a. If the work is called for in the Works Requirements and not included for in the Bill of Quantities then the Contractor is obliged to undertake the work but may wish to treat its execution as the basis of a Claim using the provisions of the relevant clause of the PWC Contract being used for the particular project.

- b. If the work is not called for in the Works Requirements but has been included for in the Bill of Quantities then the Contractor is not obliged to carry out the item unless issued with a Change Order instructing an amendment to the Works Requirements, which will then be valued in accordance with the provisions of the Conditions of Contract.
- c. Schedule Part 1, item K 17 sets out the arrangements in the event of a discrepancy between the Works Requirements and the Bill of Quantities. All such discrepancies are deemed Compensation Events, subject to the cost of each being more than €500.
- d. Please note that sub-clause 1.3.4 in the PWC contracts was introduced to afford a clear operation of the Schedule Part 1, item K17 process by requiring that the ER must issue an instruction to resolve any discrepancy between the Works Requirements and the Pricing Document, either in favour of the Works Requirements or to change the Works Requirements to match the Pricing Document item.

Michael Mulryan

Chair of ARM 4 Joint Committee

27<sup>th</sup> May 2019

## ADVICE NOTE FOR USERS OF ARM 4 DATED MAY 27<sup>th</sup> 2019

**Query: AdvN - Qry 1**

**Topic: Acceptance of the Advice Note dated May 27<sup>th</sup> 2019 and ancillary queries.**

### QUERY

- 1. Are the Advice Notes accepted by all the respective bodies mentioned in the notes?**
- 2. Do the GCCC accept the notes?**

**Specific queries on Volume C Extracts accompanying this query are attached at Appendix 1**

### ANSWER

The Standing Committee's responses to the queries are below.

As it is not clearly stated in the query, this response assumes that they relate to ARM 4 Supplement 1

- Are the Advice notes accepted by all the respective bodies mentioned in the Notes? - Yes
- Do the GCCC accept the Notes? - Yes

Response to Volume C Extracts (see Appendix 1): -

#### **Example 1: Measurement of Steel Lintels**

Steel lintels should be measured in accordance with the Rules of Section L - Metalwork: Non- Structural. These Rules cover 'support angles' within the Category 1 group of Bars, rods and the like' (Page 92, Category 1, Item 2)

The description for the steel lintels provided in the Query does **not** comply with ARM 4, Supplement 1 requirements for 'detailed descriptions' in accordance with the General Rules 4 and paragraph 3 i) of the Advice note dated May 27<sup>th</sup>, 2019 for users of ARM 4.

#### **Example 2.1: Measurement of Blockwork**

The description falls within the scope of the terms 'bulked' or 'composite' descriptions at Item 2 of the Advice note for users of ARM. Joint reinforcement should be measured in accordance with the Rules of Section G - Brickwork and Blockwork: Ancillaries to Brickwork/ Blockwork (Page 52, Category 1, Item 4)

In addition, the rest of description does **not** comply with ARM 4, Supplement 1 requirements for 'detailed descriptions' in accordance with General Rule 4 and paragraph 3 i) of the Advice note for users of ARM 4.

A BQ description will **not** satisfy the ARM Rules of Supplement 1 if it does not provide:

- a) the information required by the Rules for the type of work involved,  
AND
- b) necessary additional information by way of the repetition of the detail provided in the Engineer's and Architect's Specification and or the Drawings to comply with the Rules.

### **Example 2.2: Measurement of Bonding Ends of Blockwork**

This should be described as required for ‘Designed Joints’, see Section G - Brickwork and Blockwork: Ancillaries to Brickwork/ Blockwork (Page 52, Category 1, Item 7).

Nonetheless the requirement for ‘detailed descriptions’ (see above) is **not** satisfied by Detail 2/110 with respect to the wall ties. The reference to the wall ties on Detail 2/110, which enables the number of ties to be assessed, is not sufficiently precise to identify the exact type of tie required.

The concrete infill should be measured separately under ‘Sundries’ in Section F - Concrete Work: In- Situ Concrete (Page 36, Category 1, Item 20, Category 3 Item 1).

### **Example 3.1: Measurement of Stone Cladding**

These descriptions do **not** comply with the Rules of Section H Stonework: Stone Cladding and neither do they comply with the ARM 4, Supplement 1 requirements for ‘detailed descriptions’ in accordance with General Rule 4 and paragraph 3 i) of the Advice note for users of ARM 4, May 27th 2019.

With respect to the specific query of ‘Does the reference to drawings in the Vol C description above exclude the requirement to fully describe the work mentioned in the description above?’

General Rule 7 on Page 6 of Supplement 1 provides that ‘these Rules for ‘Detailed Descriptions’ shall be deemed to have been complied with if referenced drawn information included in the Works Requirements is provided that indicates fully the items to be described’. As this information is not provided with the query, we cannot comment any further.

### **Example 3.2: Measurement of Site Structures**

Qualification of the Rules of ARM 4 are not permitted in Pricing Documents used for Public Works Contracts.

The tiered seating should be measured in accordance with the Rules of the various sections of ARM 4 and Supplement 1.

### **Example 3.3: Measurement of Painting to a windowboard.**

This description is **not** in accordance with ARM 4 and Supplement 1, despite the fact that the required information appears to be included in the Specification referred to within the description.

Once again, a BQ description will not have satisfied the rules of ARM 4 Supplement 1 without including:

- a) the information required by the Rules for the type of work involved,
- AND
- b) necessary additional information by way of the repetition of the detail provided in the Engineer’s and Architect’s Specification and or the Drawings to comply with the Rules.

The last part of the query raised seeks advice on:

‘What reasonably are Contractors expected to price when presented with poorly described or incorrectly measured BQ entries’

It is suggested that a tenderer who is unclear about the content of any part of the Works Requirements or the Pricing Document should request clarification from the party designated as managing the particular competition.

## ADVICE NOTE FOR USERS OF ARM 4 DATED MAY 27<sup>th</sup> 2019

Query: AdvN - Qry 2

Topic: Use of Design Team Specification rather than published Standard Specification such as EN

### QUERY

Could you please clarify the following in relation to paragraph 3.i) ‘detailed description.’

The advice note states ‘A reference to a specification document provided by a Design Team member does NOT satisfy the requirement for the provision of a detailed description.’

A measurement exercise is required for concrete in foundations where the structural engineer has taken into consideration the nature of the ground conditions and has specified a concrete mix with applicable additives that addresses all site specific issues. The ‘Standard’ specifications, whether it be EN, a BS or IS, are generic standards.

Surely a QS has an obligation to provide a BQs that provide a level of information that will allow the tendering contractors to achieve a reasonable understanding of the particular specification of concrete which has been specified in the Engineers Specification.

How can reference to a generic Standard specification provide more detail than a project specific specification, designed and developed for a specific project in a specific location?

A number of QSs (PQS and Contractors QS) spoken about Advice Note dated May 27<sup>th</sup>, 2019 think that this advice note, rather than bringing clarity to the situation, has only added to the difficulties being experienced by QSs in preparing BQs for projects based on the use of the PWC Conditions of Contract.

Any clarity the Committee can provide would be appreciated.

### ANSWER

The paragraphs of the Advice Note must be read in their entirety rather than taking individual sentences, or parts thereof, in isolation.

The query only quotes the second sentence of the paragraph, that:

*‘A reference to a specification document provided by a Design Team member does NOT satisfy the requirement for the provision of a detailed description.’*

The requirements in the third sentence are ignored in the query, namely ‘**It is essential that descriptions in Bills of Quantities fully describe the essential information that the Rules require to be provided.**’

The intention of 3 (i) is not to prohibit the use of additional information required to convey the information about the BQ item required to be priced. In the example provided in the query, the additional information about the detail of the work to be carried out is included in the Engineer’s Specification. The ‘essential information’ that the Rules require to be provided must therefore be extracted from the Engineers Specification and included in the Bill of Quantities descriptions if the description is to satisfy the requirements of ARM Supplement 1.

The particular point of 3 (i) is that a BQ description solely reliant on a reference to a Specification clause to convey the scope of work purported to be covered will **not** be compliant with the Rules of Supplement 1. Furthermore, the provision of additional information where necessary to fully describe work in a BQ item is mandatory.

A Bill of Quantities description will not have satisfied the ARM Rules of Supplement 1 where it provides only a reference to an EN, IS or BS without also including.

- a) the information required by the Rules for the type of work involved,  
AND
- b) necessary additional information by way of the repetition of the detail provided in the Engineer's and Architect's Specification to comply with the Rules.