Guidelines on NRM 2: Detailed measurement of building works
1st edition
Guidelines on NRM 2: detailed measurement for building work

RICS information paper

1st edition

Acknowledgments

RICS would like to thank the following for their contributions to this information paper:

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This is an information paper. Information papers are intended to provide information and explanation to RICS members on specific topics of relevance to the profession.

The function of this paper is not to recommend or advise on professional procedure to be followed by members. It is, however, relevant to professional competence to the extent that members should be up to date and have knowledge of information papers within a reasonable time of their coming into effect.

Members should note that when an allegation of professional negligence is made against a surveyor, a court or tribunal may take account of any relevant information papers published by RICS in deciding whether or not the member has acted with reasonable competence.

This information paper is believed to reflect case law and legislation applicable at its date of publication. It is the member’s responsibility to establish if any changes in case law or legislation after the publication date have an impact on the guidance or information in this document.

Document status defined

RICS produce a range of professional guidance and standards products. These have been defined in the table below. This document is an information paper.

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<tr>
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<tr>
<td>Standard</td>
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<tr>
<td>International standard</td>
<td>An international high level principle based standard developed in collaboration with other relevant bodies</td>
<td>Mandatory</td>
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Part 1: Introduction

About these guidelines

These guidelines accompany the New Rules of Measurement (NRM) and are intended to be read in conjunction with Parts 2 and 3 of NRM 2: Detailed measurement for building works. The guidelines have four main purposes:

1. to assist the quantity surveyor (QS) in understanding and implementing the rules of measurement in NRM 2
2. to encourage good practice in the measurement of building works
3. to give guidance on the communication of information relative to quantities of finished work where their value is modified by position, complexity, simplicity, repetition, eccentric distribution or other cost significant factors
4. to give a brief explanation of a number of novel features introduced into NRM 2; why they have been included and how they came about.

Some of the content of these guidelines may be considered to be of an elementary nature. It should be remembered, however, that these notes are directed towards the student or beginner as much as to the experienced practitioner and that which may seem elementary to the latter is not necessarily so to the former. For this reason certain elements of basic practice have been included.

General principles

The measurement rules in NRM 2 have been prepared on the assumption that main contractors, when seeking tenders from sub-contractors, will issue information in accordance with the rules of NRM 2. This means that any extracts from bills of quantities should be accompanied by the appropriate drawings, extracts from the specification, preliminary bill items and descriptions of work given in accordance with the rules of NRM 2.

The format of bills of quantities continues to be a matter for the discretion of the surveyor preparing bills of quantities for a particular project.

It is recommended that items for individual buildings should be kept separate. This can be achieved, for example, by providing separate bills for each block, or by providing a multi-column analysis on the page facing the items. The choice of presentation is a project decision largely based on the degree of difference in the form of construction in separate blocks.

However, if the documents, drawings and bills of quantities of a particular project are to be co-ordinated in accordance with the Co-ordinated Project Information principles, it is appreciated that some bills of quantities may need to be prepared in accordance with the Common Arrangement of Work Sections (CAWS). Since the NRM 2 rules have not been cross coded to CAWS, the codes may be found elsewhere such as the Project Specification for that project or the Common Arrangement of work sections for building works, 2nd edition, published by the Construction Project Information Committee.

In order to define the precise nature and extent of the proposed work it will be necessary to give, in descriptions or elsewhere, certain supplementary information, including any limits on tolerances, method, sequence, etc. imposed by the designer.

Where appropriate, additional information shall be given to ensure full clarity of description. If in doubt give additional information regarding quality and location of work. For example, if the majority of brickwork was at ground floor level but there was also some at roof level the QS should measure this high level brickwork separately in the bill of quantities stating its location.

Additional items

Where the rules state that an item of work is deemed included but this work is of particularly high value either by material content or location, the QS should measure the work, clearly stating the departure from the rules.

Composite bill items of work is allowed provided it is made clear in the bill description what is and what is not included. This is especially important when using specific specification references in bill descriptions. The bill description needs to make clear what in the specification clause is or is not included in the bill item that contains a specification reference.
The Drawn information items listed at the beginning of each work section must be provided. Without this minimum drawn information the work can not be adequately measured.

Unless all of the items listed under the heading of ‘Mandatory information’ are available at the time of measurement the work can not be adequately measured.

Work and Materials listed as ‘Deemed included’ can only be priced by the tenderer if that work is clearly shown on drawings, specifications or description. The tenderer can not be asked to guess.

Approximate quantities are appropriate where the work can be described in accordance with the rules but the quantity of work required cannot be accurately determined. The tenderer should make allowance for their effect when pricing the relevant preliminaries and programming the contract works. Work which is the subject of approximate quantities should be remeasured as executed and the appropriate adjustments effected in accordance with the Contract.

**Provisional sums**

There are two types of provisional sum (defined work and undefined work). Each sum for defined work should be accompanied in the bills of quantities by a description of the work sufficiently detailed for the tenderer to make allowance for its effect in the pricing of relevant preliminaries. The information should also enable the length of time required for execution of the work to be estimated and its position in the sequence of construction to be determined and incorporated into the programme. If the surveyor cannot include sufficient details of the work the sum must be described as an ‘Undefined Sum’.

**Work not covered by the rules**

Rules of measurement adopted for work not covered by these rules shall be stated in the bill of quantities. Such rules shall, as far as possible, conform to those given in this document for similar work.
Part 2: Guidelines relating to NRM 2 work sections

2 Off Site manufactured materials, components or buildings

Mandatory information

Ensure the description makes clear what is and what is not included in the material, component or building.

Ensure the description, drawings or specification makes clear who provides and installs any associated mechanical and electrical services and who is responsible for making final connections.

Work and materials deemed included

Ensure that the information listed here is fully given, either in the bill description, the tender drawings or the specification, as the tenderer can not price for work or services not given in the tender documents.

3 Demolitions

Mandatory information to be provided

Ensure the description or associated drawings and specification clearly state how the following are to be dealt with:

- existing services
- toxic or hazardous materials
- any asbestos noted in the asbestos survey

It may be necessary to inform the tenderer how long parts of the structure are to be retained if it is not left to the discretion of the contractor.

Work and materials deemed included

Ensure that the information listed here is fully given, either in the bill description, the tender drawings or the specification, as the tenderer can not price for work or services not given in the tender documents.

Ensure the description clearly states the lowest level to which the structure is to be demolished. This may be to the top of the lowest floor slab or to the lower surface of a basement floor or to a certain depth or level below existing ground floor level. It is important that a precise level is given, especially where there is differing ground floor or basement floor levels or steeply sloping external ground levels.

Specific rules

3.4 Decontamination

Examples of infestation removal would be woodworm, death watch beetle and other wood boring infestations from any parts of the structure being retained.

3.5 Recycling

This will only be measured if specific items have to be sent for recycling, i.e. concrete and masonry may be specified to be crushed and recycled as hardfill.

4 Alterations, repairs and conservation

Mandatory information to be provided

Ensure the location of the work can be clearly seen from the bill description.

The QS should not lump together similar work that is located in drastically different locations unless these locations can be clearly seen on the drawings.

It is recommended to set out spot items in a logical progression from location to location in the existing building.

Ensure the description or associated drawings and specification clearly state how the following are to be dealt with

- existing services
- toxic or hazardous materials
- Any asbestos noted in the asbestos survey

Work and materials deemed included

Ensure that the information listed here is fully given, either in the bill description, the tender drawings or the specification, as the tenderer cannot price for work or services not given in the tender documents.

The dimensions given for the various works of alteration relate to their original or finished net size. The amount of material needed in making good work disturbed and in extending finishes shall be left to the discretion of the contractor.
Specific rules

4.4 Decontamination
Examples of infestation removal would be woodworm, death watch beetle and other wood boring infestations from any existing timbers being retained.

4.24 Temporary works
It is important that the surveyor provides full information of any temporary works especially with works relating to fire regulations and possible adaptations needed during the course of the works.

4.25 Recycling
This will only be measured if specific items have to be sent for recycling, i.e. glass, metal, timber, etc.

5 Excavating and filling

Mandatory information to be provided
The rules for this section have been drafted on the assumption that the works will be carried out by mechanical plant. Any work carried out by hand must be clearly described as such and measured separately.

The information provided in accompanying drawings or in descriptions should identify those circumstances where it may be difficult or impractical to carry out excavation by mechanical means.

The rules cannot cover every situation and where unusual conditions prevail the surveyor should exercise their judgment in selecting an appropriate method of measurement, stating the method used.

Location of works: Unless clearly evident from the drawings or other information that will accompany the bills of quantities it is recommended that the location of each type of excavation or filling shall be stated in the description.

Ground conditions: The details provided will be the trial hole data that is available. Such information, if given in accordance with the relevant British Standard, should ensure that a reasonable indication of what can be expected has been given. If such information is not available the assumed data should be so stated.

Ground water level(s): The date when the ground water level was assessed shall be given in the tender documents. If such information is not available the assumed ground water level should be so stated. This may take the form of the following:

‘The ground water level has been assumed to be deeper than the deepest excavation’

Or

‘It has been assumed that the ground water level is 1.50m below existing ground level.’

Where the pre-contract and the post-contract water levels as defined in these rules differ the item will fall to be adjusted. If the varied level brings about the need for such an item where none previously existed an item will need to be included in the final account.

It is not intended that several water levels, with only minor variations, be established for each site. However, the water level could well differ substantially from one excavation to another (e.g. pits at opposite ends of the site) or from one part to another of an individual excavation (e.g. a very large basement) especially where springs are encountered. In most cases it should be possible to agree a common post-contract ground water level for the whole of the site.

Examples of starting levels of each type of excavation may be described as:

From existing ground surface level
Or
From 1.00m below existing ground surface level
Or
From reduced ground level.

Work and materials deemed included
Surface water is water on the surface of the site and excavations. This is intended to mean water that arises solely from rainwater. Water arising from leaking reservoirs or flooding rivers is an example of accepted risks or matters which can be dealt with by insurance.

Earthwork support is now deemed included unless its need is not left to the discretion of the contractor. If earthwork support needs to be measured it includes the use of timber planking and strutting, plywood trench sheeting and light steel trench sheeting and strutting. Interlocking driven sheet piling is not covered by the term ‘earthwork support’ and where this is required by the design or specification it should be measured in accordance with Work Section 7, Piling.

In the case of excavations designed with set-backs, each vertical face between set-backs should be considered separately. This would not apply where the contractor, at his or her discretion, decided to use set-backs, perhaps as an aid to or alternative to earthwork support.

The extent and need for working space is now left to the contractor’s discretion. This means that the
drawings need to show the location of work that traditionally needed working space. This would include placing foundation formwork, building masonry in deep foundation trenches, plastering or tanking foundation walls and the like.

If the type of backfill to working space is not left to the discretion of the contractor the backfill shall be measured.

Compacting surfaces would include the former traditional description ‘level and ram’.

**Specific rules**

5.4 Site clearance

It is important that the QS makes the tenderer aware of any invasive vegetation, such as Japanese knotweed, to be removed as its removal may require special plant, chemical treatment or other means of removal and disposal. The disposal costs may also be greater than general vegetation.

5.5.2 Remove topsoil

Unless topsoil is specified to be preserved its removal need not be measured as a separate item from general excavations.

5.6.1 Bulk excavation

On major projects the surveyor is recommended to separate the differing types of bulk excavation into their differing quantities as there may be significant cost differences due to different depths or locations.

5.7.1 Foundation excavation

On major projects the surveyor is recommended to separate the differing types of foundation excavation into their differing quantities as there may be significant cost differences due to different depths or locations.

5.7.1.5 Unstable ground

The words ‘and the like’ have been included in the definition of unstable ground in an attempt to avoid the many arguments that have arisen by limiting the application of the rule quite literally to running silt or running sand when the same problems pertain with such materials as loose gravel, fly ash, etc. It is suggested, as a guideline, that strata could be said to fall within the intended category only when the newly excavated face will not remain unsupported sufficiently long to allow the necessary support to be inserted.

5.7.2.1 Definition of rock

Examples of ‘special plant’ in this context would include power operated hammers, drills and chisels, special attachments to mechanical plant such as rock buckets, rippers, hammers and chisels. It would include the situation where the normal teeth of an excavator bucket need to be changed to special rock breaking teeth.

5.7.3 and 5.7.4 Excavating along and across existing services

The QS is advised to obtain advice from the relevant Utility Bodies when existing live underground services are likely to be encountered. This advice should be sufficient to allow the QS to decide what items need to be measured. One important piece of information will be the minimum distance an excavation needs to be from a live service before precautions are required. It should be remembered that different services have differing risks.

5.8 Support to face(s) of excavation

The QS is advised to consult with the project engineer when measuring the foundation excavations to decide if any earthwork support is required.

If earthwork support is required its location should be described with respect to the type of excavation it is supporting, i.e. trenches, pits, basements, etc. The type of ground being supported will not be included in the description.

5.9 Disposal

Handling of excavated material is normally at the discretion of the contractor. Any design-imposed conditions should be given in the description of the disposal items e.g. requirements regarding the provision or location of temporary spoil heaps.

Unless there are specific requirements for the handling of excavated material or imported filling (e.g. spoil heaps) the contractor will be entitled to assume that he may handle the distribution/disposal of such materials as he deems fit.

5.10 Retaining excavated material on site

Where excavated materials are to be retained and/or disposed on site the information provided should state any specific requirements for the location of such deposits and the average distance from the excavation in metres.

5.20 Cutting off tops of piles

The item for cutting off tops of piles is now measured in the excavation section to reflect the timing of the work as it will usually be carried out during the excavation process.
6 Ground remediation and soil stabilisation

This type of work is specialist and the measurements must be accompanied by detailed drawings and specification.

7 Piling

It is considered that the provision of the drawings noted under this clause is essential to properly measure and describe the work. These drawings will normally be the structural consultant’s piling drawings. If inviting tenders direct from piling contractors the quantity surveyor must forward these drawings to each tendering contractor. Equally if inviting tenders through a main contractor the drawings must be sent to each main contractor. Thereafter the main contractor must forward copies of these drawings to each tendering piling contractor.

The tender documents must set out who provides the piling platform, to what level(s) it is laid to and who is responsible for removing it on completion of the piling operations.

Specific rules

7.2.3 Raking, inclination stated

When measuring raking piles the description must include the inclination. This is expressed as the ratio of horizontal displacement to vertical distance.

Examples are as follows:

<table>
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<th>Angle</th>
<th>Ratio</th>
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<tr>
<td>14°</td>
<td>1:4</td>
</tr>
<tr>
<td>9.5°</td>
<td>1:6</td>
</tr>
<tr>
<td>5.8°</td>
<td>1:10</td>
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</table>

The responsibility for cutting off tops of piles and subsequent disposal of debris should be made clear in the bill of quantities. This work is measured in accordance with Rule 20 of Work Section 5, Excavating and filling.

8 Underpinning

The rules set out here are for the measurement of simple underpinning works such as to the foundations of a house or other such simple construction. In the event that the underpinning is more complicated the works shall be measured in detail in accordance with the relevant rules of each work section involved with the works described as ‘In Underpinning’.

Specific rules

8.1–8.13.1 The requirement for the maximum width to be stated is intended to cover the occurrence of stepped brick footings.

9 Diaphragm walls and embedded retaining walls

These are concrete walls constructed using slurry or other fluids to support a trench which is then filled with concrete to form the wall, the concrete being placed through the support fluid which is thereby displaced.

Excavated material which has been in contact with the support fluid may be contaminated and not fit to be used as filling material. Its subsequent disposal may be subject to restrictions. The tenderer’s attention must be drawn to any such restrictions.

10 Crib walls, gabions and reinforced earth

All preliminary works of excavation, disposal, backfilling and foundations are measured in accordance with the relevant Work Sections.

Gabion basket walls are now measured in square metres on the front face with the description giving the basket size and type of fill. In the case of gabion walls that are stepped on face separate areas shall be given for each thickness within the work.

Specific rules

10.1 Crib walls

Final filling of voids with topsoil and subsequent planting is measured in accordance with the rules of Work Section 37, Soft Landscaping

11 In-situ concrete works

Work shall be separated into the three locations of substructure, superstructure and external works. An additional sub-separation shall apply to watertight construction. These separations shall apply to the measurement of the in situ concrete, surface finishes, formwork, reinforcement, designed joints, accessories cast in and concrete sundries.
Minimum information to be shown on drawings

The purpose of this information is to convey to the tenderer not only the specific sizes of members and thickness of slabs but also such information as the relative positions of precast floors and in situ beams. It will also allow the tenderer to assess the type of formwork to be used and the length of time the formwork must remain in place.

The decision to separate in situ concrete into mass, horizontal, sloping and vertical is to reflect the differing methods required to pour concrete into these locations and therefore reflect the differing costs involved. The cost of constructing a member, i.e. a floor slab, a column, a wall, a beam, etc. will be reflected in the formwork rate.

The surveyor may lump all in situ concrete of similar nature into one item or may separate the in situ concrete into its various component parts depending on the complexity of the project. It is recommended to keep work that is isolated or particularly complicated separate from general concrete work.

The lists contained in the rules for each concrete category are not exhaustive. If the surveyor is unsure as to which category a concrete member belongs to the surveyor should allocate a category that best reflects the function of the member and clearly note the choice in the bill description.

The concrete in wall kickers shall be included in the volume of their associated wall.

The requirement to describe concrete having reinforcement content in excess of 5% by volume is intended to indicate concrete that is very heavily reinforced resulting in problems in placing, vibrating and compacting. It is the total reinforcement in a complete member which has to be considered and not a small isolated part of a member which is particularly congested, e.g. where laps occur in the reinforcement. 5% by volume is roughly equivalent to a steel weight of 0.41 tonnes per cubic metre of the measured member.

It is not the intention that a concrete bed placed on concrete blinding with only its edges in contact with earth should be described as ‘poured on or against earth or unblinded hardcore’.

Concrete is deemed to be cast into formwork unless otherwise described.

The net volume of concrete laid on ribbed metal decking shall include the concrete within the ribs. It shall not include any addition concrete caused by deflection of the decking. The formulae for calculating these volumes can be found in the relevant manufacturers’ technical literature.

Specific rules

11.1 Mass concrete

This applies only to unreinforced in situ concrete.

Formwork

Information regarding permissible loads in relation to casting times is to allow the tenderer to assess, in the absence of specific instructions in the bills of quantities, the degree of propping and re-propping down through successive floors that may be required to be provided to the formwork. Any limitations on live loads during construction should be stated.

11.18 Sides and soffits of attached beams

Descriptions of formwork to beams that occur at the edge of a slab should include the attached edge of slab.

11.22 Faces of walls and other vertical work

Formwork to one side of a wall only would not include instances where there is a column or beam on the other side as formwork will be required to the column or beam.

11.28 Sloping top surfaces

Top formwork should be measured for surfaces sloping at an angle exceeding 15° whether it is provided or not. For example blinding concrete (measured as ‘slabs’) sloping at an angle exceeding 15° will require an item of formwork.

11.32 Wall kickers

Suspended kickers occur where a concrete wall rises off a concrete slab, the kicker being cast integrally with the slab, i.e. at the time the kicker formwork is erected, there is nothing on which to rest its bottom edge. Formwork to isolated column kickers is not required to be measured. Tenderers are given sufficient information to allow for this by the virtue that formwork to isolated columns is measured stating the number.

Reinforcement

11.33–34.1.4.3 Restrictions on bending may be given by a reference to an appropriate BS although it may be necessary to refer specifically to any temperature requirements.

11.33–34.1.3 This is intended to cover those bars which are specifically bent to curves to suit the shape of the member in which they are to be placed.
**Designed joints**

11.38 Plain joints will normally occur at the perimeter of concrete areas abutting walls.

**Accessories cast in**

11.41 It should be noted that the list of accessories given in the Notes column is not exhaustive. This will apply to any item that needs cast in to the in situ concrete at the time the concrete is being poured. It will not apply to an item subsequently built in to the concrete.

**Sundries**

11.42 Formwork or other means of temporary support to grouting under stanchion bases is deemed included irrespective of the thickness of the grouting.

**12 Precast/composite concrete**

Precast /composite concrete items are constructed from a combination of in situ concrete with filler units of other materials or a combination of proprietary precast concrete units with in situ concrete and/or filler units of other materials

*(extract from definition of Work Section E60, Common arrangement of work sections for building works, second edition 1998)*

**13 Precast concrete**

The provision of three units of measurement permits selection of the most appropriate in each case e.g. enumerated sills, lintels, padstones, landings, staircases and the like, linear measurement for frame members, coping stones and kerbs and superficial measurement for floor decking, wall panels, etc.

**14 Masonry**

The rules of this Work Section apply to all forms of masonry construction whether it is brickwork, blockwork, glass blockwork, natural or artificial stonework.

Plans, elevations and sections required to be provided under this rule should show the locations of materials to be used in all walls and partitions. If only one kind of brick is to be used for walls and one kind of block for partitions the drawings probably need not show anything other than the thickness. In the case of several different kinds of bricks and blocks an appropriate annotation should be included on the drawings.

Sections may helpfully augment the descriptions of the work, e.g. the fact that a wall or partition is of a different thickness or material at a higher level would not be revealed by study of a plan only.

It is recommended that isolated areas of masonry work be measured separately to allow the tenderer the opportunity of fully pricing the work.

The brick or block being used and any imposed limitations on laying should be fully described. This is particularly so where the brick or block is the subject of a prime cost sum for nominated supply where it is possible for different types of identical purchasing cost to have widely differing laying costs. Where the supply is the subject of a PC Sum or PC rate per thousand the assumptions to be made by the tenderers should be clearly stated.

Where an order has been placed with a supplier for bricks or blocks the terms of the order should be given stating in particular the number reserved and supplier’s terms regarding the initial and subsequent deliveries.

Examples of stone rubble materials would include the type, e.g. sandstone, limestone, granite or flint and the texture and finish, e.g. natural, rough dressed or hammer dressed.

Examples of stone masonry materials would include the type, e.g. limestone, granite, slate, marble, etc. and the texture and finish, e.g. sawn, rubbed, vermiculated, polished, etc.

Examples of cast stone materials would include the texture and finish, e.g. rough, smooth, rubbed, vermiculated and polished.

**Specific rules**

14.2 Diaphragm walls are wide cavity walls with two leaves of brickwork or blockwork bonded together with brick or block cross ribs. The cross ribs are bonded to the outer skins by the use of steel ties or block bonding.

14.11 and 14.12. The distinction between perimeters and abutments and opening perimeters is to help the QS in allocating the relevant costs to the cost analysis. These items are now composite items and therefore the description must include everything necessary to form the detail. Each detail shall be measured separately. The surveyor is again reminded that materials and work can only be deemed included if its
type and scope can be readily ascertained from the
drawings, specification and bill description.

14.13 Special purpose blocks include purpose made
blocks within other measured items such as purpose
made corner blocks to sills involving the use of stones
larger than the sills. Special purpose blocks are also
blocks which by their very nature are purpose made
namely those comprising:

- ornaments
- small panels (defined as panels not exceeding 0.1
  m²)
- caps and bases to columns
- kneeler-blocks, bonder-blocks, apex-blocks, angle-
  blocks and stooling-blocks to ‘copings’ and
  ‘ornamental band courses’.
- plinth blocks, angle-blocks, key-blocks and the like
to slab architraves and surrounds to openings
- springers, voussoirs and keystones of arches
- tumbler blocks to buttresses
- pier-caps, chimney-caps and the like
- finials, terminals, brackets, corbels and the like
- stones forming tracery
- special features composed of one or more stones
  (special features would include ornamental panels,
oriel windows, niches, etc.)
- stones forming balustrade panels and the like
- balusters, half balusters, newels and newel-caps
- templates, bases, thresholds, hearths and the like
- stones forming shelves, divisions, table tops, work
  tops and the like
- the purpose made blocks can be either natural
  stone or artificial stone.

14.15 The rule relating to cavity insulation is for work to
new buildings where the insulation is installed during
the course of the construction works. Insulating
cavities of existing buildings is measured in accordance
with Rule 6 of Work Section 31, Insulation, fire stopping
and fire protection.

15 Structural metalwork

Drawings that must accompany the measurement

It is considered that the provision of the drawings
noted under this clause is essential to properly
measure and describe the work. These drawings will
normally be the structural consultant’s framing
drawings. If inviting tenders direct from structural
steelwork contractors the quantity surveyor must
forward these drawings to each tendering contractor.

Equally, if inviting tenders through a main contractor,
the drawings must be sent to each main contractor.
Thereafter the main contractor must forward copies of
these drawings to each tendering structural steelwork
contractor.

The drawings or the description should give details of
the method of fabricating and type of site connections.
Connections would include fittings used to form a joint
and thus enable the members to be united by bolting,
welding or riveting in the shop or on the site.

Details of secondary steelwork and fittings for other
trades should be shown on the drawings, e.g. opening
frames, pipe brackets, supports for services and
supports and stiffeners for mechanical, electrical and
ventilating plant.

It is recommended that differing individual buildings are
kept separate if appropriate. Thus if a project
comprises an office block with storage depot both of
which are steel framed then each building should be
billed separately. However, in instances of a retail park
with a number of buildings of similar construction the
need to separate these units is not considered
necessary.

Mandatory information

In describing any tests of materials or workmanship
that may be required, an indication should also be
given of where the tests are to be carried out.
Requirements for destructive and non-destructive tests,
procedure tests (welding and flame cutting),
qualification and testing of welders, run-off production
tests and inspections should be clearly stated.

Specific rules

15.1 and 15.2 Note 9 Secondary steelwork is any
framed steelwork that is scheduled to be erected after
completion of the main structural frame. Examples of
secondary steelwork include support work for curtain
walling, windows, doors and the like.

15.3 An isolated structural member is a member not
connected to a structural steel frame. Examples of
isolated structural members include steel beams
supporting timber joists, lifting beams, tank supports
etc.

15.5 Allowance for fittings. If the drawings are
sufficiently detailed the QS should be able to calculate
the weight of fittings. If the drawings do not provide the
necessary information the QS should make a
reasonable allowance on a percentage basis. This
allowance will need to be re-measured on completion of
the structural steelwork.
15.8 The rules allow the QS to measure profiled metal decking in the structural steelwork section if both are to be supplied and erected in the same package even if the decking is to support in situ concrete.

15.8.1 – 3.1 Shear studs are steel studs welded to the steelwork at various centres. Their purpose is to tie the concrete to the steel beams and to resist shear loadings between the concrete slab and steel beam in composite construction.

15.15 Surface treatments are only measured when carried out as part of the steelwork subcontract. Decorative painting is covered by the rules given in Work Section 29, Decoration. Since separate items are not required for touching-up, responsibility for such work should be made clear as between the main contractor and sub-contractor.

When measuring galvanising it is important to remember that local facilities may not be able to cope with long or large components. It is recommended that the tenderers attention is drawn to exceptionally long or large components that are specified to be galvanised.

16 Carpentry

The rules for this section have been drafted on the assumption that most woodworking is now a shop process using machinery rather than a site craft process, hence the emphasis on engineered members and machined labours

Dimensioned diagrams should be used unless a simple description is sufficient for full clarity. Diagrams and descriptions should show all labours.

Mandatory information to be provided

Examples of protective coatings would include shop priming, staining, varnishing or polishing before delivery to the works. Such treatments after fixing should be measured in accordance with Work Section 29, Decoration.

Selection and protection for subsequent treatments would include timber to be ‘left in the white’ or to receive transparent finishes.

When stating nominal or finished dimensions it is necessary to draw attention to different cross sections even if the cross sectional dimensions of the timber are the same; e.g. it will be possible to have two or more sections of rebated frames of the same dimensions, only the shape of the rebate differing. This is important in order that the contractor can assess the different machine settings and the knock on cost.

17 Sheet roof coverings

The areas of sheet roof coverings are measured as the net area in contact with the base. No allowances are to be added for labours. Labours within the general body of the roof covering are measured as extra over the general sheet roof covering. Labours at the boundaries are measured full value. It is important that these labours are fully described and the description lists out all associated labours, undercloaks, insulation, ventilation strips, bedding and pointing, etc. to allow the tenderer to fully assess the additional quantities of sheet roof material.

The minimum information requirement clause 5 allows the QS to fully measure all relevant details and dressings that need to be formed during the laying of the sheet roof covering and will allow the tenderer to fully assess the additional quantities of sheet roof material required over and above the net areas given in the bill of quantities.

Surface finishes or treatments would include chippings, gravel, tiles, solar reflective paint, etc. It would not include grass, sedum or other like live finishes. These are measured in Work Section 28, Floor, wall, ceiling and roof finishes.

A step in roof level over 500mm wide will require both an upstand and a downstand to be measured as well as the vertical covering.

A step less than 500mm will be measured as such in linear metres giving the actual vertical height (see figure 1 below).

Figure 1
18  **Tile and slate roof and wall coverings**

18.3 Boundary work. Sheet metal linings to valleys or any other boundary work shall be measured in accordance with the rules of Work Section 17, Sheet roofing.

19  **Waterproofing**

*Mandatory information to be provided*

Surface finishes or treatments would include chippings, gravel, tiles, solar reflective paint, etc. It would not include grass, sedum or other like live finishes. These are measured in Work Section 28, Floor, wall, ceiling and roof finishes.

**Specific rules**

19.6 & 19.7. There is no limiting girth to differentiate between a gutter and a channel but it should be made quite clear from the description what has been measured.

19.6 & 19.7. To give the girth only may not be sufficient in describing asphalt to gutters, etc. because of the additional requirements of rule 19.6.1–5.2.

As the thickness of asphalt with the same number of coats varies as between horizontal and vertical it will be necessary to indicate the extent of each. This may, in some instances, be best achieved by the use of dimensioned descriptions or bill diagrams.

20  **Proprietary linings and partitions**

The mandatory information required for the description should give details of head and sole plates, jointing battens, studs, metal stiffening sections, firrings, channels, metal resilient bars and treatment of joints.

Information must be given either in the description, the specification or the drawings to show the size and spacing of supports and details of design module both for the building and the work in this section and the method of fixing and where to steel structures, the size and spacing of the framing members.

The drawings should show services which are integrated with the ceiling, partition or lining including additional members and the like.

Examples of the layout of joints are random, symmetrical, whole units stating any pattern required, whole units with necessary cut margins or make up pieces stating any pattern required, and joints laid out to detail. Where the spacing of the joints is governed by the spacing of backings then details should be given.

**Specific rules**

20.1. Proprietary partitions are now measured in square metres and classified by their height in 1.00m increments. The height of a partition that has a sloping head is the simple mean height calculated by adding the lowest and highest heights and dividing by two. The descriptions will state either the height or the average height in the wording.

The total length of each quantity of partition will be given in the description.

20.3 and 20.13. The items for forming openings in partitions and linings do not include materials incorporated into the partition that are not proprietary, e.g. softwood or plywood grounds inserted into the metal studs would be measured in accordance with the rules of Work Section 16, Carpentry.

20.4 and 20.14. Non standard perimeter details are those that comprise proprietary components that differ from those required in the general body of work. Examples would be deflection heads, acoustic seals, fire seals and the like.

21  **Cladding and covering**

The rules of this Work Section are to cover the measurement of the many types of modern cladding and covering systems.

Because of their complexity it is essential that sufficient drawings are provided with the bill of quantities. Many are specialist systems therefore it will be essential to have component drawings and, when writing descriptions, to use proprietary references.

It is essential that the tender information makes clear who is responsible for providing primary and secondary support to attach the cladding and covering to the structure.

**Specific rules**

21.8.1 – 2.3. Where translucent sheets are used in large areas, thus becoming the roofing material rather than an insertion therein, they should be classified as a main sheeting material and measured full value, not extra over.

22  **General joinery**

This work section contains the rules for the measurement of all general joinery work.
Specific rules

22.1–5.1 – 2.3. When stating nominal or finished dimensions it is necessary to draw attention to different cross sections even if the cross sectional dimensions of the timber are the same; e.g. it will be possible to have two or more sections of rebated frames of the same dimensions, only the shape of the rebate differing. This is important in order that the contractor can assess the different machine settings and the knock on cost.

23 Windows, screens and lights

All glass and ironmongery associated with each unit shall be measured in this section. Glass may be included within the description of the unit or measured separately.

24 Doors, shutters and hatches

All glass and ironmongery associated with each unit shall be measured in this section. Glass may be included within the description of the unit or measured separately.

25 Stairs, walkways and balustrades

Unless the component is of simple shape or construction it is essential that a drawing accompanies the bill of quantities.

26 Metalwork

This work section is for the measurement of all non-structural metalwork not covered elsewhere within these rules.

When measuring galvanising it is important to remember that local facilities may not be able to cope with long or large components. It is recommended that the tenderers attention is drawn to exceptionally long or large components that are specified to be galvanised.

27 Glazing

Glass will only be measured in this Work Section if it is not associated with windows, screens, lights, doors, shutters, hatches, stairs, walkways or balustrades or is replacing glass into existing doors, windows or screens.

Whether the glass is measured in this Work Section or in another Work Section the following general rules will apply:

28 Floor, wall, ceiling and roof finishings

The rules of this work section are for the measurement of any type of applied finish to the interior or exterior of a building.

Work and materials deemed included

Cutting includes cutting to angles, boundaries and junctions, cutting to enumerated items, cutting and fitting to recessed covers and the like, allowing for the lining up of joints with the general work and curved and radiused cutting for special edge tiles on work described as curved.

Patterned work includes general patterned work, isolated panels within a general wall or other surface or work in more than one colour and is deemed to include all extra work. This extra work is work to fair edges, flush joints, working to strips in work divided into panels and the like.

Working around accessories refers to steel joists, angles, trunking, ducting, floor springs, ventilators, pipes, tubes and the like.

Narrow widths less than 600mm wide include isolated linear surrounds to dissimilar finishes.

The descriptions of lathing materials should identify the kind and quality of the lathing together with details of fixings such as screws, staples, clips, nails, wire ties, steel banding, etc.

28.23 Special tiles are non standard tiles that have to be made specifically for the project. They do not include standard specials that are readily available off the shelf. Special tiles include all non standard tiles regardless of their location in the works. They include non standard tiles needed to form fair edges, internal and external angles, beaded edges and coved junctions.

28.24 The application of surface dressings, sealers or polishes may be incorporated into the description of the finish provided this qualification to the rules is made clear in the description. This may be by written word or by use of a reference to the specification.

29 Decoration

Sealing and polishing wood block floors are dealt with under Work Section 28.
The drawings or schedules that accompany the bill of quantities should draw attention to any known variety of colour requirements and such specification items as whether or not the ironmongery, electrical or other fittings are to be removed before and refixed after decorating. The description should also highlight work in confined locations such as staircase areas.

Examples of preparatory work would include rubbing down, burning off, stripping old paper or other decorations (specifying the number of layers or type if appropriate), cutting out and repairing cracks, knotting, stopping, staining, bodying in, etc.

Work is internal or external according to its position in the finished building.

For examples of multi-coloured work see figure 2 below.

Figure 2
30 Suspended ceilings

These rules now apply to both demountable and solid suspended ceilings.

The description should give details of:
- the framing and suspension system, stating the size and spacing of supports
- the design module both for the building and the suspended ceiling
- the layout of the joints
- the treatments of the joints
- the method of securing the suspension system to the structure
- integrated services and resultant additional hangers, framing and the like
- insulation materials.

Notwithstanding that the structure from which a flat ceiling is suspended is interrupted by downstand beams, the suspension height should still be measured to the main structural soffit. Where a downstand beam has different suspension heights on either side the measurement of ceiling areas should be taken to the centre line of such a downstand beam.

Where the structure from which the system is suspended is sloping the maximum and minimum depths of suspension should be stated.

31 Insulation, fire stopping and fire protection

Specific rules

31.8 If the QS measures any fire sleeves, collars and the like where services pass through fire rated structures it is important that the description makes clear who supplies and who installs the sleeve or collar and also who is responsible for fire stopping around the sleeve or collar.

32 Furniture, fittings and equipment

Specific rules

32.2 Ensure the bill description, specification or drawing makes clear who is responsible for final service connections.

33 Drainage above ground

Specific rules

33.3.1 It is not necessary to state the type of fitting when measuring fittings ≤ 65mm diameter.

Examples of pipe fittings would include bends, springs, offsets, swan necks, Y junctions, double Y junctions, shoes, blank flanges, puddle flanges, bushes, reducers, elbows, tees, crosses, etc.

33.7.1 Examples of gutter fittings would include bends, elbows, junctions, stopped ends, nozzle outlets, etc.

33.10.1.1 – 2.1. Examples of preparatory operations would include flushing out, sterilisation, etc.

33.10.1.1 – 2.2. Examples of stage tests would include sectional and final hydraulic and performance tests.
34 Drainage below ground

Specific rules

34.1.3. Pipes not laid in the bottom of the trench are usually those to be found in a multi-purpose trench and will be described as multiple pipe drain runs.

34.1.1 – 3.1 – 3.4 Drain runs would be described as being ‘next to existing roadway or path’ if the distance from the side of the drain trench is less than the trench depth. See figure 3 below.

**Figure 3**

![Diagram of drainage next to roadway](image)

When \( L \) is less than \( D \) the trench shall be described as next to existing roadway or path.

34.1.1 – 3.1 – 3.5 Drain runs would be described as being ‘next to existing building’ if the distance from the side of the drain trench to edge of foundation is less than the trench depth. See figure 4 below.

**Figure 4**

![Diagram of drainage next to building](image)

When \( L \) is less than \( D \) the trench shall be described as next to existing buildings.
34.2.7 & 34.2.8. Excavating along and across existing services

The QS is advised to obtain advice from the relevant Utility Bodies when existing live underground services are likely to be encountered. This advice should be sufficient to allow the QS to decide what items need to be measured. One important piece of information will be the minimum distance an excavation needs to be from a live service before precautions are required. It should be remembered that different services have differing risks.

34.3. Types of fittings should be clearly described and in cast iron work special consideration should be given to cost significant items, e.g. long radius and short radius bends being kept separate. It could be considered good practice to identify items by reference to a manufacturer’s catalogue number.

34.13. Sundry items are measured separately from the manhole because there can be many minor variations between manholes resulting in many items for individual manholes. On smaller projects it may be possible to include these sundries in the manhole description provided this departure from the rules is clearly stated in the bill of quantities.

34.14. Manhole covers and frames are measured separately because it may be the case that there are many similar manholes on a project except the covers differ due to their location on the site. On smaller projects it may be possible to include these sundries in the manhole description provided this departure from the rules is clearly stated in the bill of quantities.

34.17.1 – 2.1 – 2.1. Examples of preparatory operations would include flushing out and clearing out rubbish.

34.17.1 – 2.1 – 2.2. Examples of stage tests would include sectional and final hydraulic and performance tests.

35 Site works

Specific rules

35.4 Examples of paving accessories include cats-eyes, tree grilles, traffic calming accessories, etc.

35.5.1 Examples of special units include purpose made quadrants, stop ends, drop crossover kerbs, etc.

35.25 The same rules as set out in the drawn information, mandatory information and items deemed included set out at the beginning of Work Section 19, Waterproofing will apply to the measurement of sheet linings to pools, lakes, ponds, waterways and the like.

36 Fencing

Construction details to be given under the mandatory information include:

* components and methods of jointing;
* supports and special supports and method of fixing.
* treatment of the tops of pales or bars including whether pointed, shaped, etc.
* methods of jointing which in the case of metal bar fencing and supports would include riveted, welded, etc.

Examples of surface treatments include impregnating or galvanizing.

Examples of the type of fencing include chain link, woven wire, strained wire, wooden post and rail, metal continuous bar, concrete post and rail, close boarded, cleft chestnut pale, wooden palisade, metal vertical bar railings, metal palisade, concrete palisade, woven wood, concrete post and panel, profiled sheet, etc.

The type of close boarding would include sawn or cleft.

Examples of types of gates include field gates, bridle gates, kissing gates, garden gates, driveway gates, counterbalanced poles, ornamental gates, factory gates, etc.

Ensure the description, drawings or specification makes clear who provides and installs any associated mechanical and electrical services and who is responsible for making final connections.

37 Soft landscaping

Mandatory information to be provided

All preparatory excavation work such as reducing levels, contouring the site, pond digging and top soil spreading, etc. will be measured in accordance with the rules of Work Section 5, Excavating and filling.

Any restrictions on planting or sowing dates must be clearly stated.

Work and materials deemed included

Internal planting includes areas such as atriums, planter boxes.

Specific rules

37.13 Maintenance relates to that required in a Defects Liability Period only.
38 Mechanical services

Specific rules

38.3 All pipework fittings are deemed included within the running length of pipework unless they have been measured separately in accordance with rule 38.4. This can only apply if all mandatory drawn information has been provided prior to measuring the works.

38.6 All ductwork fittings are deemed included within the running length of ductwork unless they have been measured separately in accordance with rule 38.7. This can only apply if all mandatory drawn information has been provided prior to measuring the works.

38.9 All insulation and fire protection to pipe fittings and equipment is deemed included with the item of equipment or fitting or within the running length of pipework unless it has been measured separately in accordance with rules 38.10 & 11. This can only apply if all mandatory drawn information has been provided prior to measuring the works.

38.12 All insulation and fire protection to duct fittings is deemed included with the running length of ductwork unless it has been measured separately in accordance with rules 38.13. This can only apply if all mandatory drawn information has been provided prior to measuring the works.

39 Electrical services

Specific rules

39.3 All cable containment fittings are deemed included within the running length of the cable containment unless they have been measured separately in accordance with rule 39.4. This can only apply if all mandatory drawn information has been provided prior to measuring the works.

39.9 All busbar fittings are deemed included with the busbar unless they have been measured separately in accordance with rule 39.10. This can only apply if all mandatory drawn information has been provided prior to measuring the works.

40 Transportation

Transport systems include Lifts, Escalators, moving pavements, powered stairlifts, fire escape chutes and slings, hoists, cranes, travelling cradles, gantries and ladders, goods distribution and mechanised warehousing, mechanical document conveying, pneumatic document conveying, automatic document filing and retrieval systems and the like.

41 Builder’s work in connection with mechanical, electrical and transportation installations

Specific rules

41.1 General builders work in connection with mechanical, electrical and transportation installations shall be given as an item for each installation or system installed. In the case of large projects it may be necessary to sub-divide installations into zones or locations e.g. ground floor, first floor, plant room, Block A, Block B etc.

42.1 Marking positions of holes mortices and chases in the structure in connection with mechanical, electrical and transportation installations shall be given as an item for each installation or system installed. In the case of large projects it may be necessary to sub-divide installations into zones or locations, e.g. ground floor, first floor, plant room, Block A, Block B, etc.

41.3 If the QS measures any fire sleeves, collars and the like where services pass through fire rated structures it is important that the description makes clear who supplies and who installs the sleeve or collar and also who is responsible for fire stopping around the sleeve or collar.

41.13 The same definitions for trenches being next to existing roadways or paths or buildings as is shown previously shall apply in this work section.

41.14.7 & 8 Excavating along and across existing services

The QS is advised to obtain advice from the relevant Utility Bodies when existing live underground services are likely to be encountered. This advice should be sufficient to allow the QS to decide what items need to be measured. One important piece of information will be the minimum distance an excavation needs to be from a live service before precautions are required. It should be remembered that different services have differing risks.
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