

2019-03-08

## Measuring Element (31) External Walls Completion. An Introductory Demonstration

Tony Cunningham

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## Measuring Element (31) External Walls Completion. An Introductory Demonstration

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### About this demonstration

This demonstration is addressed to Irish students taking measurement or quantities modules at first year or entry level of quantity surveying related programmes.

The worked example has been carried out using traditional handwritten quantity surveying processes on traditional dimension paper. It is acknowledged that, in actual practice, this would be carried out using measurement software or on-screen measurement technology. The traditional handwritten approach, however, has been retained in order to enable novice students to develop the necessary measurement skills and build confidence through direct contact with drawings and written taking off processes. In addition the presentation illustrates how the work may be laid out under typical examination conditions.

The demonstration has been kept simple in the interests of clarity but nevertheless accords with the principles of the Agreed Rules of Measurement (ARM4 – 2009) and aims to provide a foundation for the measurement of more challenging scenarios.

# The National Standard Building Elements

BUILDING (Direct Costs)						
Substructure	Structure	Structure Completions	Finishes	Services (Mainly Piped and Ducted)	Services (Mainly Electrical)	Fittings and Furniture
(1 -) Substructure Generally	(2 -) Structure Generally	(3 -) Structure Completions Generally	(4 -) Finishes Generally	(5 -) Services (mainly Piped and Ducted) Generally	(6 -) Services (Mainly Electrical) Generally	(7 -) Fittings and Furniture Generally
(11) Ground, Earth Shapes	(21) External Walls	(31) External Walls : Completions within Openings	(41) Wall Finishes Externally	(51) Heating Centre	(61) Electrical Supply and Main Distribution	(71) Display, Circulation Fittings
(12) Reserved	(22) Internal Walls, Partitions	(32) Internal Walls, Partitions : Completions within Openings	(42) Wall Finishes Internally	(52) Drainage and Refuse Disposal	(62) Power	(72) Work, Rest, Play Fittings
(13) Floors in Substructure	(23) Floors, Galleries	(33) Floors, Galleries : Completions	(43) Floor Finishes	(53) Water Distribution	(63) Lighting	(73) Culinary Fittings
(14) Reserved	(24) Stairs, Ramps	(34) Stairs, Ramps : Completions	(44) Stairs, Ramps : Finishes	(54) Gases Distribution	(64) Communications	(74) Sanitary, Hygiene Fittings
(15) Reserved	(25) Reserved	(35) Suspended Ceilings	(45) Ceiling Finishes	(55) Space Cooling	(65) Security and Protection	(75) Cleaning, Maintenance Fittings
(16) Foundations and Rising Walls	(26) Reserved	(36) Reserved	(46) Reserved	(56) Space Heating	(66) Transport	(76) Storage, Screening Fittings
(17) Piled Foundations	(27) Roofs	(37) Roof : Completions	(47) Roof Finishes	(57) Ventilation and Air Conditioning	(67) Reserved	(77) Reserved
(18) Reserved	(28) Frames	(38) Reserved	(48) Reserved	(58) Other Services (Mainly Piped and Ducted)	(68) Other Services (Mainly Electrical)	(78) Reserved
(19) Summary : Building Substructure	(29) Summary : Building Structure	(39) Summary : Building Structure Completions	(49) Summary : Building Finishes	(59) Summary : Building Services (Mainly Piped and Ducted)	(69) Summary : Building Services (Mainly Electrical)	(79) Summary : Building Fittings and Furniture

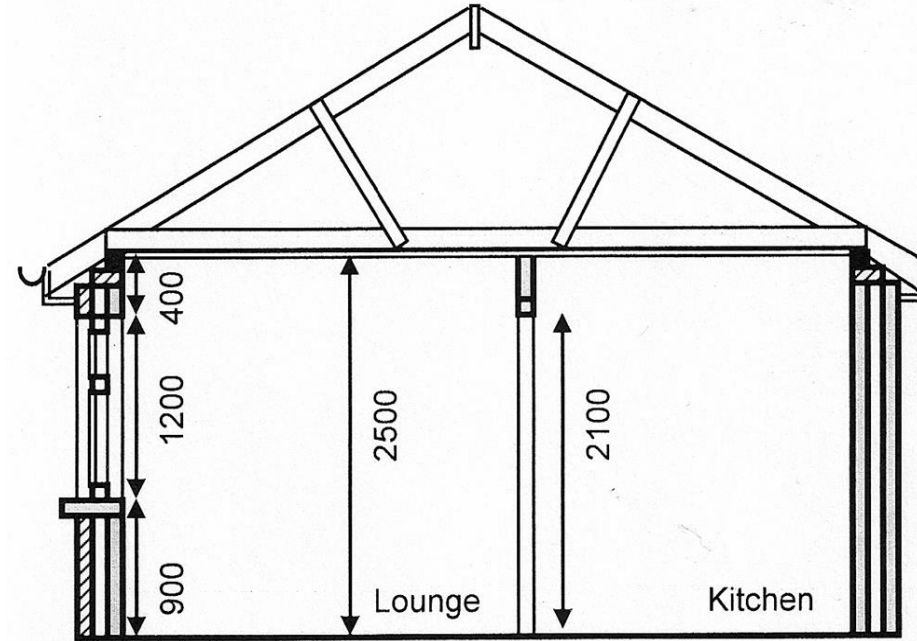
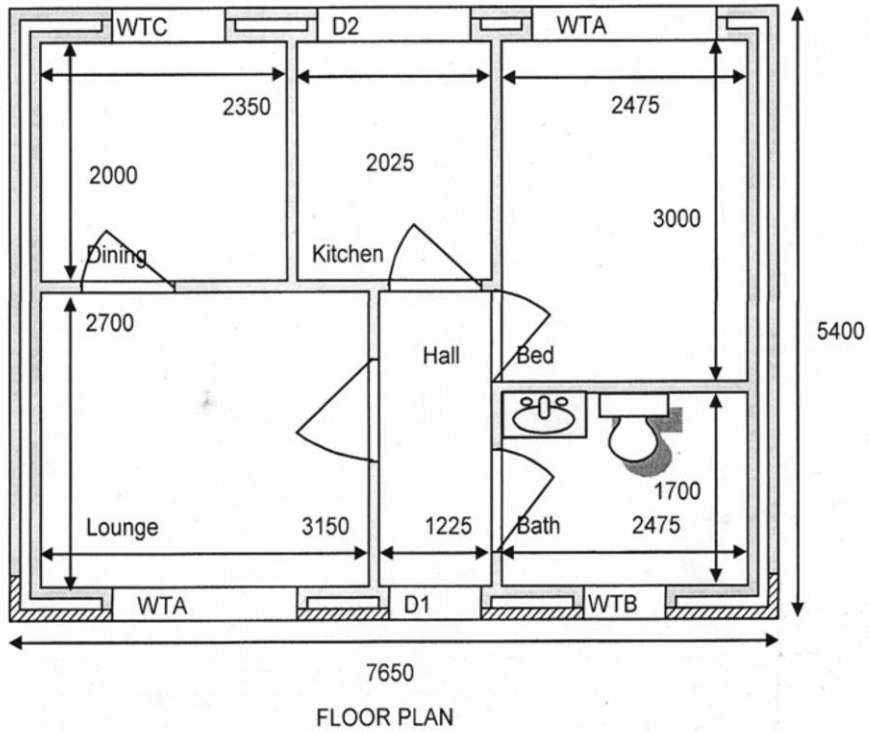
## The National Standard Building Elements

In Ireland the measurement of new building work is typically organised in accordance with The *National Standard Building Elements for Design Cost Control Procedures* (NSBE). (ERU, 1993) Elements are defined as 'that part of the building, which always performs the same function irrespective of design or specification'. The object of the NSBE is to enable design teams to adopt, on a national basis, a common approach to the building process. The NSBE Elements identify what is included and excluded from each element, which helps design teams coordinate their work and allows the measurement of the work to be divided up among teams while ensuring that all aspects of the building works are fully covered in the Bill of Quantities.

Completions are defined in the National Standard Building Elements as "non-integral secondary items or work to the structure, including the completions of openings in the structure".

This demonstration deals with the first element within the Structure Completions group - Element (31) External Walls: Completions within openings

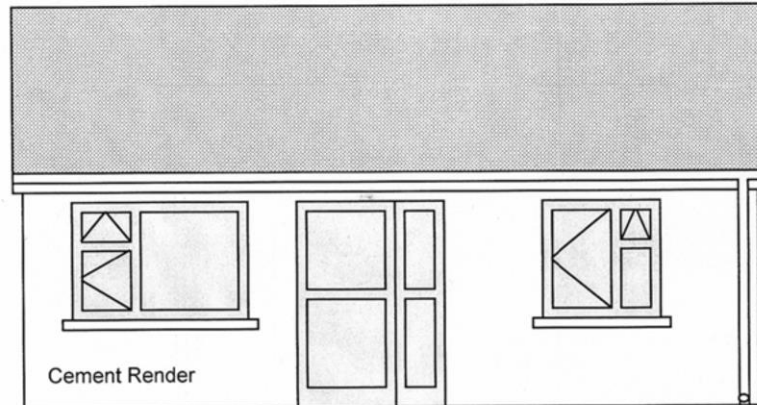
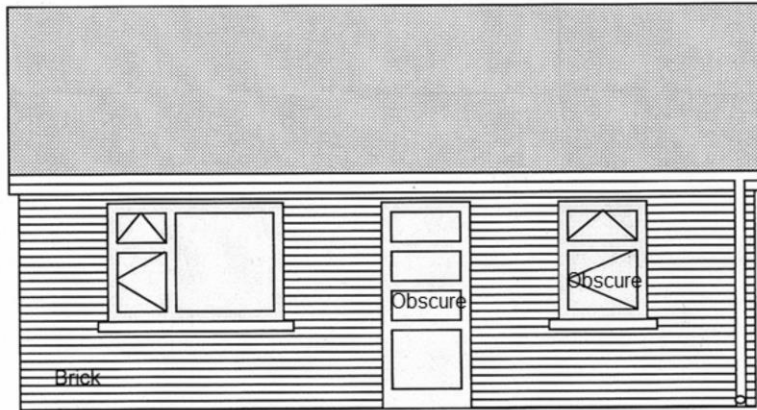
# The Location Drawings



TYPICAL SECTION

# The Elevations

## Drawing 31-1



### External Walls Completion

External Walls Completion comprises the following:

- Doors, windows, frames and composites of these.
- Completions of all other openings in external walls.
- Ironmongery.
- Glazing.
- Shutters, awnings and canopies.
- Decoration to the forgoing.

This element **excludes** the following

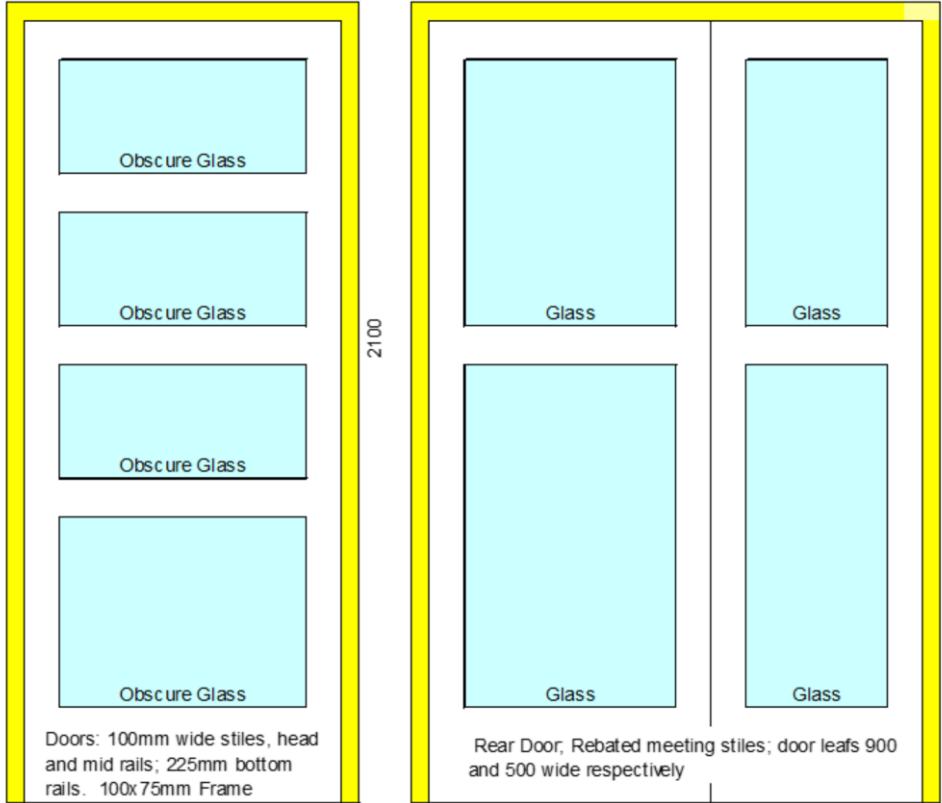
- Sills and lintels. These are measured in (21) External Walls.
- Doors and windows integral with walls, (for example where these form part of a curtain wall system).
- Continuous screens and continuous shop-fronts having the nature of walls.

Windows and external doors for domestic residential projects can be manufactured from a variety of materials, most notably wood, metal or PVC coated aluminium extrusions.

This example takes a 'traditional' approach to measuring hardwood glazed external doorsets and windows and associated works in connection therewith across three ARM4 work sections: woodwork, glazing and painting. This approach has been adopted for demonstration purposes only, as it is becoming less widely used in practice.

The author acknowledges that it is standard practice for such windows and external doors to be manufactured off-site pre-glazed and pre-finished and fitted with the ironmongery specified by the architect; an alternative which greatly simplifies the measurement of this element of work.

# The Details Drawing 31-2



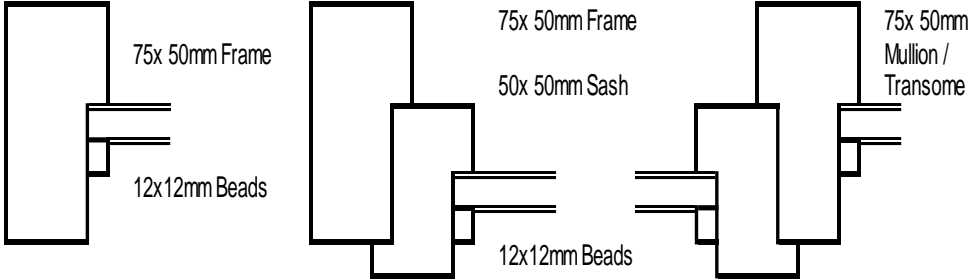
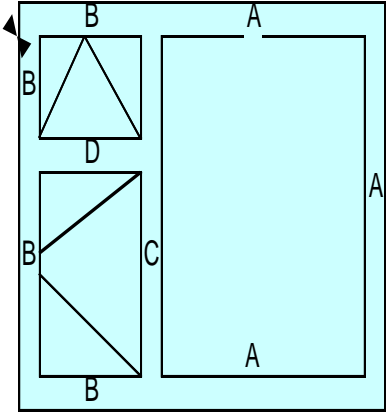
1000

2100

1500

Not to scale

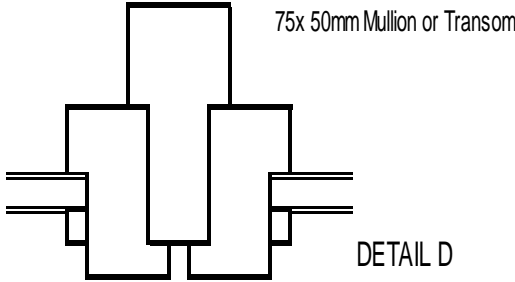
Reference	Size
WTA	1800x1200
WTB	900x1200
WTC	1200x1200
D1	1000x2100
D2	1500x2100



DETAIL A

DETAIL B

DETAIL C



DETAIL D

Notes

Allow 12mm rebates for glass and sash seating



# The Specifications

## WOODWORK

Iroko

### *Secondfixings*

- 200x25mm bullnosed edged window board. Allow 50 mm nibbed end

### *External doors and associated frame sets*

- as drawing 31-1 fixing with 125mm long 'Hilti' or equal approved door bolts
- Double doors to be 900 and 500mm wide respectively.

### *Windows*

- as drawing 31-1 details as drawing 31-2 including standard ironmongery, fixing with galvanised iron frame cramps.

## Ironmongery

- Prime Cost Sum - €500 supply only for external doors.
- Fix only ironmongery: cylinder night latch; pair flush bolt; rebated mortice lock; pair of lever handles; letter plate and weather bar.

## GLAZING

Hermetically sealed double glazed units comprising 4mm sheet glass to both panes with 10mm Argon filled cavity; glazing in clear mastic silicon sealant; securing with glazing beads bedding in inert cushion strip.

- Obscure glass to bathroom window and front door.

## PAINTING AND DECORATING

- 3 coats Ronseal clear wood varnish internally.
- 3 coats Ronseal yacht varnish externally.

## Order of Measurement

The order of measurement of this particular work element varies among individual quantity surveying practices. Some practices measure in accordance with the ARM sequence, others measure the composite items first (windows and external doors and screens) in order to emphasise their importance within this element and then arrange the remaining work in ARM4 sequence. Individual practices may also begin this element with works which are the subject of a Prime Cost sum(s).

Note that standard UK measurement practice (the BCIS Elements) separates doors and windows into two distinct elements.



# Rules of Measurement

## Woodwork: ARM Section J

Woodwork is categorised into four distinct sections

- Structural and First Fixings
- **Boarding and Second Fixings**
- **Composite Items**
- **Ironmongery, Accessories and Sundries**

### Boarding and second fixings

- Descriptions must specify the timber type, quality, preservative treatment, surface finish (in this example the boards are wrot) and fixings (if fixed other than with nails) and jointings. - The boards in the demonstration are fixed with screws and pelleted.
- This category covers items including architraves, trims and window boards (J80.3.17)
- Descriptions state details of the mouldings and, typically, cross sectional dimensions.
- Measured in **linear metres**.

### Composite items

- Composite items, are those which may arrive on site ready for incorporation into the works without further assembly.
- Information for this class of work requires: location drawings (the floor plan and elevations), component details where not fully described; the timber type, quality, preservative treatment, surface finish, fixings and jointing, and colour or grain matching (if applicable).
- A detailed description of the item is given usually referring to a particular drawing(s).
- Composite items are categorised as: (1) Doors; (2) **Doors with associated frame set**; (3) Frame set; (4) **Windows**; (5) Screens; (6) Rooflights; (7) Stair flights; (8) Balustrades; (9) Like items.
- Composite Items are **enumerated**.

## Ironmongery

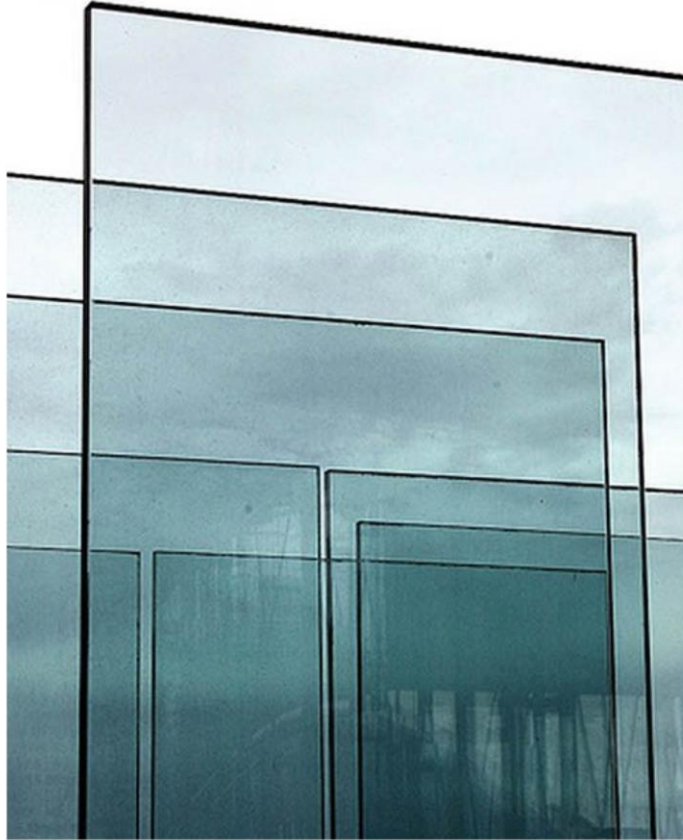
The supply and fixing of units of ironmongery is **enumerated** giving a full description of the various items. Where ironmongery is fixed to backgrounds other than timber, the nature of the background shall be stated. Items of ironmongery may be described by the set where appropriate and this shall be stated in the description. Rates for Ironmongery are deemed to include the following.

- Screws, bolts and the like;
- Labours on timber and to receive units, and
- Fitting and hanging doors, windows and like items.

The manufacturer of butt hinges is seldom specified, but the architect may require that their source is approved.

# Rules of Measurement

## Section P - Glazing



### GLAZING

Glazing is measured in accordance with section P of the ARM. The following information is required for general glazing applications.

- Location Drawings – i.e the general arrangement drawings.
- Kind, quality, size and thickness of glazing materials.
- Kind and quality of glazing compound.
- Method of glazing (such as with beads and screws).
- Nature of frame or surround

### General Rules

Panes of irregular shape shall be measured and defined as the smallest rectangle area from which such irregular shape can be obtained.

Labours on glass shall be grouped with the glass to which they relate.

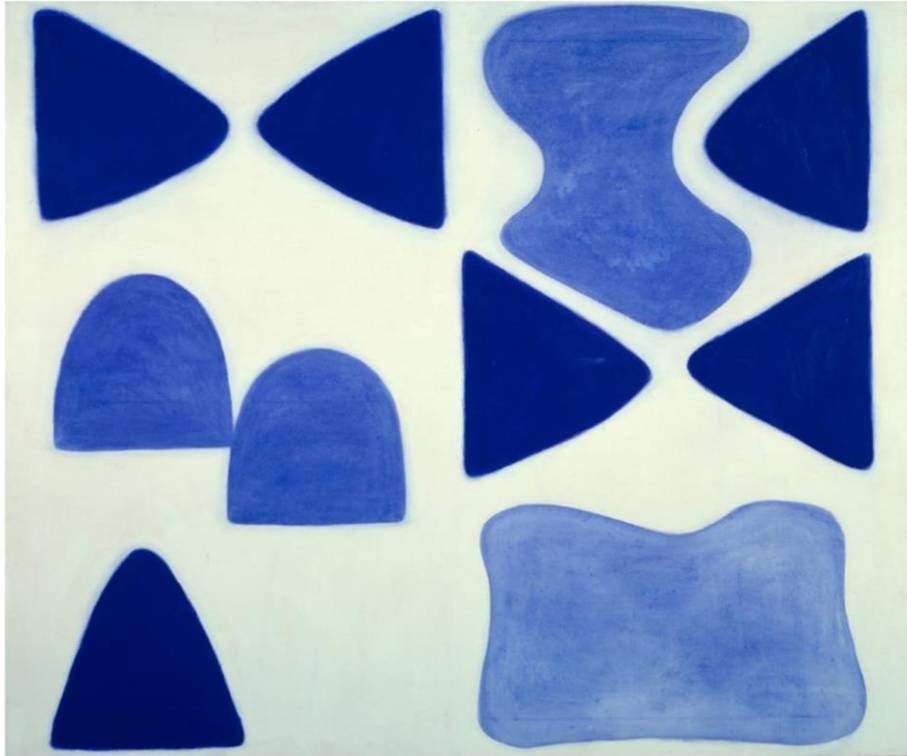
Raking cutting is deemed to be included.

### Sealed glazed units

Are measured in **square metres** and classified as **double** or multiple, stating number of panes. Irregular shaped units and/or curved units are measured separately.

# Rules of Measurement Section Q

## Painting And Decorating



## PAINTING AND DECORATING

The measurement of painting and decorating is regulated by section Q of ARM4.

Painting specifications include the following information:

- Preparatory work to base
- Kind and quality of materials
- Number of priming or sealing coats and undercoats
- Number of finishing coats stating the surface finish
- Abrasive or other treatment applied between coats.
- Method of application where not at the contractor's discretion

### **General Rules** related to this demonstration

- The work is deemed to be internal. External work shall be given separately.
- Nature of base shall be stated in description.
- Work shall be measured on the exposed face except for glazed surfaces which shall be measured as plane surface across frames and glass.
- Work  $\leq 300\text{mm}$  girth isolated from similar work shall be so described.

### **Deemed to be included** related to this demonstration:

- Rubbing down between coats with glass or sand paper.
- Cutting in next glass.
- Opening edges.

### **Painting Classifications** related to this demonstration:

Painting is categorised in 13 separate work classifications which include second fixings (window boards), glazed doors and frame sets, and windows.

## ELEMENT (31) EXTERNAL WALLS COMPLETION

## WOODWORK

Iroko; wrot; selected

Second fixings

200 x 25mm window  
board; bullnose edge;  
fixing with screws to  
blockwork; counter-  
sinking and flush  
pellating

6 m

WTA 1800

Ends 2/50 100

2/1 90 3.80

1900

1.00

WTB) 900 1200

100 100

1.30

2.30 WTC) 1000 1300

TOTAL

6.10

TOTAL

Composite items; doors  
with associated frame set

fixing frame with bolts  
(measured separately)  
to blockwork; 3 Nr brass  
butt hinges per leaf;  
panels left open for glazing  
(measured separately);  
taking off glazing beads  
and refixing

1000 x 2100 x 100mm  
overall; four panel  
door and frame;  
as drawing 31-1  
Front Elevation

1 Nr

1

1

31/1

## THE WORKED EXAMPLE

## WOODWORK

The specification information to be provided for carpentry and joinery identifies the particular timber species/type (Iroko) stating the quality, preservative treatment, surface finish, fixings and jointing.

## Window Boards

Window boards are a separate sub-classification within the second fixings category. They are measured in linear metres including details of any mouldings (bullnose edge). Other general woodwork rules are also applicable here.

- Fixings other than nails to be stated in descriptions.
- Fixings to backgrounds other than timber to be stated in the descriptions.
- Pelleting where required to be given in the descriptions.

The length of the board is measured to its extreme length and comprises the width of the structural opening and includes a 50mm nib at both ends. - Ends, angles intersections mitres, splays, and the like are deemed to be included.

## COTTAGE

1500 x 2100 x 100 mm Composite items; windows;  
overall; double doors details as drawing 31-2  
and frame as drawing  
31-1 Rear Elevation;  
door widths 900  
and 500 mm respectively;  
rebated meeting  
styles

1 Nr

1 1

fixing to blockwork  
with frame cramps  
(elsewhere measured)  
brass casement hinges;  
selected standard  
range handles, catches,  
casement stays and pins;  
open for glazing  
(measured separately)  
taking off glazing beads  
and refixing

Type A; 1800 x 1200  
x 87 mm overall;  
fixed lights - 1;  
opening lights - 2;  
as drawing 31-1  
Front Elevation

2 Nr

2 2

Frame 75  
Proj casemnt 12  
o/a thick. 87

31/2

## Composite items;

These are **enumerated** and given with a detailed description

## Doors with associated frame sets

Doors and associated frame sets are enumerated.

A detailed description is provided stating the overall dimensions and the cross section size and moulding of each component where not shown on the accompanying drawings. These are shown on Drawing 31-2. Member sizes will normally be nominal sizes unless stated as finished sizes.

Fixing of all metalwork, ironmongery and the like included in the description is deemed to be included in the rate(s).

In this demonstration the glazing is taken separately. Glazed doors usually come with matching glazing beads included in the description. It is normal to state that the glazing beads are to be taken off and refixed.

## Windows

Windows are **enumerated** and described in detail. This is usually done by referencing them to a drawing such as a window schedule, building elevation or bill diagram.

Window descriptions state the overall dimension, - note the waste calculation performed to establish the overall thickness of the window.



# COTTAGE.

Type B; 900 x 1200  
x 87 mm overall;  
opening lights - 2;  
as drawing 31-1  
Front Elevation.

1 Nr

1 1

Type C; 1200 x 1200  
x 87 mm overall;  
fixed lights - 1;  
opening lights - 2;  
as drawing 31-1  
Rear Elevation.

1 Nr

1 1

## Windows (Continued)

The remaining windows are taken for in turn.



Ironmongery; Accessories  
and sundries

## Prime Cost Sum

Include the Prime Cost  
Sum of FIVE HUNDRED  
EURO for ironmongery to  
be provided by a nomin-  
-ated supplier

€500 -

€500 -

€500 -

## Profit

Item Item

Item

Other charges required  
by the Contractor

Item

Item Item

**Ironmongery**

Prime Cost Sums are often used to cover the supply of ironmongery. In this instance **€500** has been provided (for demonstration purposes only) for the ironmongery to the front and rear doors.

The rules governing prime cost sums are set out in Section B (Preliminaries) of ARM 4. Section 3.2 states that 'Goods and materials which are required to be obtained from a nominated supplier shall be given as a Prime Cost Sum. The name of the supplier to be nominated shall be given (if known).

An item shall be given for any **profit** required by the Contractor.

An item shall be given for **other charges required by the Contractor** associated with the employment of each nominated supplier.

Fixing goods and materials shall be given in accordance with the appropriate sections of these Rules. Taking delivery, unloading, storing and hoisting the goods and materials and returning packing materials to the nominated supplier carriage paid and obtaining credits therefore shall be deemed to be included with the items for fixing. Particulars shall be given where the Contractor is required to pay the costs of conveying goods and materials to the site and/or of any special packing or similar requirements.'

It is good practice to compile an ironmongery schedule when measuring a complete building, if this has not already been prepared by the architect. This simplifies the task of measuring the work and reduces the risk of error.



FIX ONLY the following ironmongery

cylinder night latch

1 1 1 Nr  
front door)

letter plate

1 1 1 Nr

weather bar; 900mm  
fixing to concrete

1 1 1 Nr

rebated mortice lockset

1 1 1 Nr  
back doors)

pair lever handles

1 1 1 Pair

pair flush bolts

1 1 1 Pair

weather bar; 1400  
mm long fixing to  
concrete

1 1 1 Nr

## Fixing Ironmongery

Where ironmongery is supplied by a nominated supplier, a separate fixing item must be taken for each item supplied. Each is **enumerated**, stating the background where fixed to background other than timber.

Items of ironmongery may be described by the set where appropriate and this shall be stated in the description. Rates for Ironmongery are deemed to include the following.

- Screws, bolts and the like
- Labours on timber and to receive units
- Fitting and hanging doors, windows and like items.

**Note.** In practice ironmongery is typically fixed at the joinery during the manufacturing process. In these cases the ironmongery is usually included in the descriptions of the particular composite item and does not need to be measured as demonstrated here.

## COTTAGE

### Accessories

straps and hangers;  
250 x 30 x 3 mm  
galvanised mild steel  
fixing cramps; bent once;  
fixing to frame with  
screws; building into  
blockwork

16 Nr

windows  
2 per jamb.

4/2/2 16

### Sundries

bedding and pointing;  
10 x 20 mm clear  
flexible sealant

75 mm wide.

21 M

windows

2/2/1.80 7.20 A  
2/0.90 1.80 B  
2/1.20 2.40 C  
4/2/1.20 9.60 jambs & heads  
21.00

100 mm wide.

13 M

doors

2/1.00 2.00  
2/1.50 3.00  
2/2/2.10 8.40  
13.40

31/6

## Accessories, Sundries and Fixings

The accessories category (J84.2) comprises water bar, dowel bar, **straps and hangers**, sash weights, and like items. These require a detailed description and are **enumerated**. Installation including forming recesses and the like in all materials to receive the items is deemed to be included.

Note the water bars to the doors have been supplied and fixed under the ironmongery heading above.

The fixing cramps to the four windows have been measured under the straps and hangers sub classification.

The sundries category (J84.3) comprises bedding, pointing, and, **bedding and pointing** are measured in **linear metres** stating the width and the thickness involved. The category also comprises seals and intumescent seals both requiring a detailed description to be provided. Where pointing is to both sides this shall be given in the description.

Here the 75mm width refers to the frame width windows and the 100mm to the door frame.

# COTTAGE

Seals ; air tightness;  
Certified tape to Technical  
Guidance Document D  
to Architects approval

34 M

perims of windows  
& door opes  
See previous page  
windows)

21 00

13.40 34.40 doors)

Fixings

drilled; door bolts;  
125 mm long; Hilti  
ref HT 10132 or equal  
approved; drilling  
blockwork; flush  
pellingating frame.

12 Nr

2/3 12

door frame

**Seals** are also measured in linear metres giving a detailed description provided. In this example air tightness tape has been measured to the perimeters of the structural openings of the windows and the door frames – these have been copied down from the bedding and pointing calculations on the previous page.

The fixings category (J84.4) applies where the fixings are not otherwise included in the descriptions. In this demonstration the fixings have been specified by the Architect and have been specifically excluded in the descriptions of the door sets.

Fixings are sub-categorised as either shot fixings or drilled fixings. Drilled fixings require a detailed description to be given, stating the nature of the background and are enumerated.

# COTTAGE

## GLAZING (PROVISIONAL)

Hermetically sealed units  
comprising two sheets  
4 mm float glass; 10 mm  
cavity filled with Argon  
gas; glazing in clear mastic  
silicon sealant; taking  
off glazing beads and  
refixing; bedding in inert  
cushion strip; to wood

Double glazed units

clear glass in 13 panes

7 M<sup>2</sup>

Scaled Measurements

0.75  
0.75 0.56  
0.75  
0.95 0.71  
0.35  
0.75 0.26  
0.35  
0.95 0.33

A/C  
B/D

Rear double doors.

1.86

1.86 Continued.

2/0.50 Window A  
0.25 0.25  
2/0.50 A/C  
0.80 0.80 B/C

2/1.10  
1.10 2.42

0.35 Window C  
0.25 0.09  
0.50 A/C  
0.80 0.40 B/C

0.75  
1.10 0.83  
6.65

## GLAZING

Glazing specifications are required to set out the kind, quality, size and thickness of glazing materials; the kind and quality of glazing compound; the method of glazing and the nature of frame or surround.

This demonstration deals with **sealed glazed units** which are measured in **square metres** in accordance with rules under section P130.5. Units are classified as **double** or multiple, stating **number of panes**. Irregular shaped units and/or curved units are measured separately.

The glazing beads are normally included with the joinery items with the glazed for taking them off and refixing them on completion. When measuring glazing, allowance must be made for the rebates in the enclosing members of the door.

In this demonstration, the glazing is measured **provisionally**. In situations where shop drawings of glazed joinery items are not available at tender stage, the QS may choose to include scaled measurements when billing these work items. These measurements are subsequently firmed up on site and adjusted, if necessary, at final account stage. This approach may also be viewed as a pragmatic alternative to the somewhat 'forensic' academic method shown at the end of this demonstration.

Note the annotations used to identify the location of the various panes.

# COTTAGE

obscure glass; 6 panes

2 M<sup>2</sup>

3/0.75 Scaled.

0.30 0.68

0.75

0.60 0.45 Front door

0.80

0.25 0.20

0.80

0.80 0.64 Window B

1.97

Obscure glass has been taken to the front door and bathroom window.

Again, these measurements are **provisional**

PAINTING AND DECORATING.

Three coats Ronseal clear  
varnish on wood

Second fixings

not exceeding 300mm  
girth

6m

REPEAT

TOT A

6.10

m.

as window board

Glazed doors and screens

internally

5 M<sup>2</sup>

1.00

2.10

2.10

1.50

2.10

3.15

TOT B

5.25

## PAINTING AND DECORATING

This worked example involves varnishing new second fixings and joinery. Iroko is a hardwood and does not require the preservative treatment required for softwood joinery items.

### Second Fixings.

Painting second fixings is generally measured in square metres unless it is less than 300mm in girth and isolated from similar work, in which case it is measured in **linear metres**. The dimensions here have been copied down from the window board total on page 1 of the take off.

### Glazed Doors and Screens

Painting glazed doors and screens is measured in **square metres**. The painting general rule Q134.1.4 states that 'work shall be measured on the exposed face except for glazed surfaces which shall be measured as plane surface across frames and glass. Opening edges are deemed to be included within this measurement.

All panes in these doors exceed the 0.15 sq.m. classification.

COTTAGE			
Windows			Three coats Ronseal yacht varnish on wood
internally			Glazed doors and screens
		<u>7 M<sup>2</sup></u>	externally
			<u>5 M<sup>2</sup></u>
2/1.80			REPEAT
<u>1.20</u>	4.32	WT A)	TOT B
0.90			5.25
<u>1.20</u>	1.08	WT B)	M <sup>2</sup>
1.20			<u>5.25</u>
<u>1.20</u>	1.44	WT C)	
TOT C	<u>6.84</u>		

KINGS OF BOLTON STREET

31/10



COTTAGE

Windows

externally

7 M<sup>2</sup>

REPEAT

TOT C

6.84

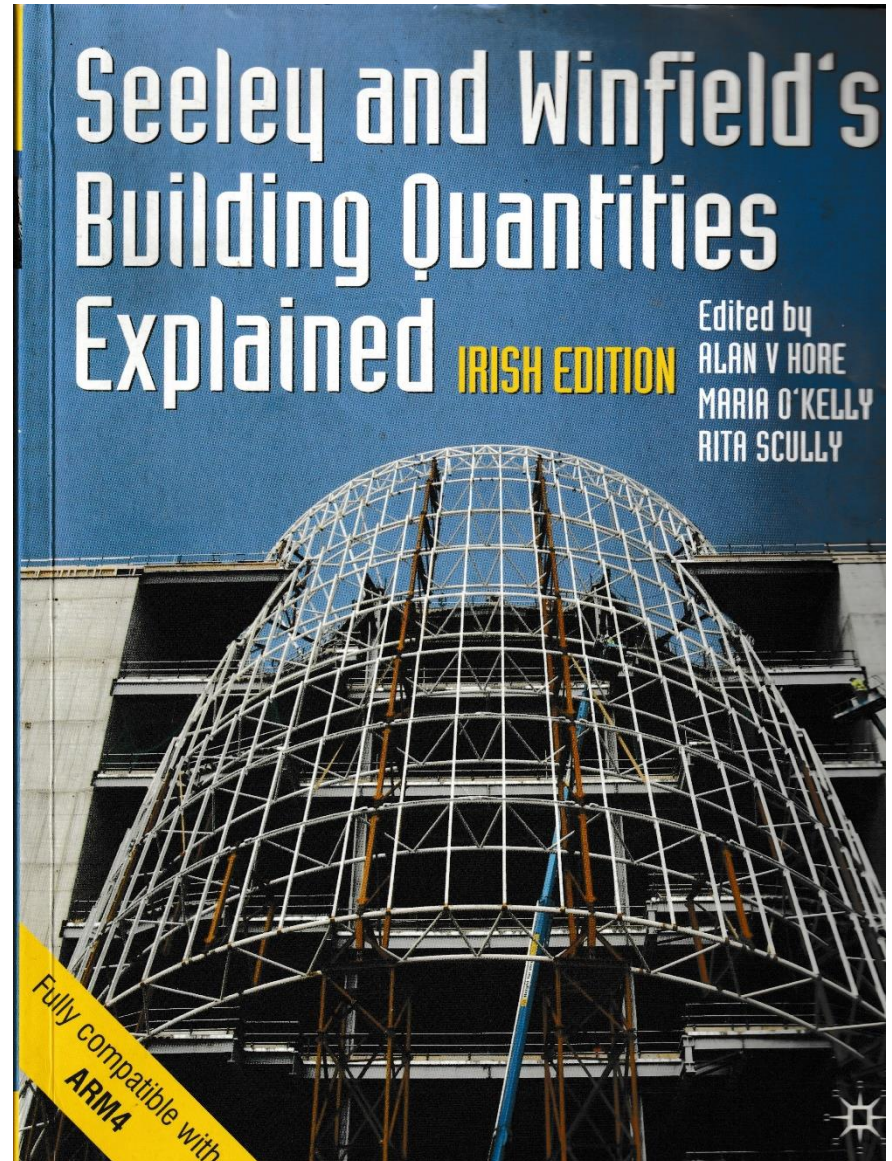
M<sup>2</sup>

6.84

END OF ELEMENT (31)

EXTERNAL WALLS COMPLETION

## FURTHER READING



# An 'Academic' Approach to Measuring the Glazing

This method adopts a more scientific (intricate) approach to measuring the glass based on the details shown on Drawing 31-2 and provides a check on the accuracy of the scaled dimensions

<p><u>GLAZING</u></p> <p><u>Hermetically sealed units</u>  <u>comprising two sheets</u>  <u>4 mm sheet glass; 10mm</u>  <u>cavity filled with Argon</u>  <u>gas; glazing in clear</u>  <u>mastic silicon sealant;</u>  <u>taking off glazing beads</u>  <u>and refixing; bedding in</u>  <u>inert cushion strip</u></p> <p>Double glazed units</p> <p>clear glass; in 13 panes</p> <p style="text-align: center;"><u>7 m<sup>2</sup></u></p> <p>rear doors</p> <p>adjustments on width</p> <p style="padding-left: 40px;">shile 100</p> <p style="padding-left: 40px;">- rebate <u>12</u></p> <p style="padding-left: 40px;">both sides 2/ <u>22</u></p> <p style="padding-left: 40px;"><u>176</u></p> <p>head rail 100</p> <p>mid rail 100</p> <p>bottom rail 225</p> <p>- rebate - 4/12 - 48</p> <p style="text-align: center;"><u>377</u></p>	<p>Widths 900 500</p> <p>shiles - <u>176</u> <u>176</u></p> <p style="padding-left: 100px;"><u>724</u> <u>324</u></p> <p>0.72</p> <p><u>1.67</u> 1.20 Height. 2050</p> <p>0.32 rails - <u>377</u></p> <p><u>1.67</u> 0.53 Rear Doors) <u>1673</u></p> <p>Window adjustment</p> <p><u>Detail A</u> (plain shile)</p> <p style="padding-left: 40px;">shile 50</p> <p style="padding-left: 40px;">reb <u>-12</u></p> <p style="padding-left: 40px;"><u>38</u></p> <p><u>Detail B</u> opening st</p> <p style="padding-left: 40px;">stile 50</p> <p style="padding-left: 40px;">sash 50</p> <p style="padding-left: 40px;">- rebs 3/12 - <u>36</u></p> <p style="padding-left: 40px;"><u>64</u></p> <p><u>Detail C</u> mullion</p> <p style="padding-left: 40px;">mullion 50</p> <p style="padding-left: 40px;">sash 50</p> <p style="padding-left: 40px;">- rebs 4/12 - <u>48</u></p> <p style="padding-left: 40px;"><u>52</u></p> <p><u>Detail D</u> transom</p> <p style="padding-left: 40px;">50</p> <p style="padding-left: 40px;">sashes 2/50 100</p> <p style="padding-left: 40px;">- rebs 6/12 - <u>72</u></p> <p style="padding-left: 40px;"><u>78</u></p> <p style="text-align: center;"><u>317</u></p>
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[illegible]