

Parkside Prospect

Part L Issue 2006

Introduction by Simon Jones, Technical Director



The latest Approved Document L legislation is a step in the right direction to improve the thermal efficiency of buildings. Moving away from the "Elemental method" to the "Whole building method" gives a truer picture of a building's thermal efficiency. The whole building method gives flexibility to the problems that achieving a blanket 2.2 U-value on every type of size and window/door configuration gave. Comar has always provided project-by-project U-value calculations, using BRE software for the Comar elements of the building, Comar fabricators should now be prepared to deal

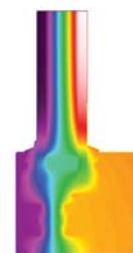
with the scrutiny that the new legislation will bring.

Now with one method the industry has a standard which, over a period of time, will ensure faster, accurate thermal calculations. Our main concern is the current lack of education and stable software. The lack of education brings its first problem. How are "Building control" to control a new set of standards without the necessary understanding? This may result in inconsistency across the country. Also, how are specifiers to design buildings that comply without the necessary knowledge?

Stable calculating software for the CO₂ emissions is a must. Allegedly, the system at the moment was rushed through without the necessary time to debug the software, resulting in all-glass buildings easily passing the compliance test.

The great question, therefore, is who is going to be ultimately responsible for the building's compliance? Will it be a great "passing the buck" operation with the sub-contractor, usually the last in the chain, left holding the baby? Only time will tell.

For Comar fabricators we have put together this special newsletter to provide a quick reference point. This will be backed up with a complimentary copy of our industry's trade association, the Council for Aluminium in Building (CAB) "Setting the Standard 7", which has been endorsed by Steve Irving, from Faber Mansell. Mr Irving has been leading the team of experts supporting the OPDM on the 2006 revision of Part L. These reference points should support all Comar partners in ensuring compliance through contractual negotiations. Comar's Technical Department, as always, will be on hand to offer project-by-project U-value calculation and design advice. If you have any questions, please do not hesitate to contact us.



Temperature change (0 deg - 20 deg) graphically shown in infrared, through a 5P.i. fixed light outer frame, using Therm 5.

Also in this issue

- Window Energy Ratings • Standard Assessment Procedure
- How will we Comply • Summary of Document L



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Approved Document L 2006

The methodology of assessment for compliance has changed from the "Elemental Method" to the "Whole Building Method", which highlights the fact that a building is a sum of its parts and will be assessed as such. This will now mean that the building is rated in terms of its **TER⁽¹⁾ (Target CO₂ Emission Rate)** which is expressed as the mass of **CO₂ gas (kg/m² floor area/year)** that is emitted annually as a result of providing heat, hot water, ventilation, cooling and lighting for the building. The **TER⁽¹⁾** is determined with the use of **SAP⁽²⁾ (Standard Assessment Procedure)** for domestic buildings and **SBEM⁽³⁾ (Simplified Building Energy Method)** for non-domestic buildings. However, U-values are still required and should be calculated in accordance to the **BRE guide⁽⁴⁾**.

In some instances the use of a 1.2 W/m²/K centre pane is an option. Please refer to Table B in this newsletter.

The forthcoming **CAB Setting the Standard No.7** offers a condensed guide to the requirements for fenestration products and the new **ADL 2006**. It will provide an insight to available assessment tools and methodology and will include comprehensive 'route to compliance' flow charts.

Window Energy Ratings

The published Approved Document L is the first time we see mention of "Window Energy Ratings", or WER. However, this is a trend, which will no doubt gather ground in the market. In readiness for this, Comar's Technical Department have worked the calculation through and we can achieve an "A" rating.

Please refer to Table A. However, we must stress that this has not yet been confirmed with a BRFC test. Therefore, we would appreciate your feedback on this point, e.g. if you need the window energy rating to secure work, please contact Alison Davey in the Marketing Department.

What is SAP?

SAP is the Government's Standard Assessment Procedure which produces an energy cost rating (SAP) and a carbon index (CI). These are based on calculated annual energy figures for space and water heating. Both the energy cost rating and the CI are adjusted for floor area so that the size of the dwelling does not affect the results, which are expressed on a scale of SAP 1 to 120 and CI 0.0 to 10.0. The higher the number, the better the standard.

The method of calculating these figures is via a number of work-sheets and tables or software that can be purchased from BRE's approved SAP software list.

What is SBEM?

SBEM is the Simplified Building Energy Method for buildings other than dwellings. The new calculation process is used to assess both the target emissions and the proposed building emissions. This method of assessment is performed using iSBEM which is a software package that has been developed by the BRE for the OPDM.

iSBEM is a computer program that provides an analysis of a building's energy consumption by calculating the monthly energy use and carbon dioxide emissions of a building. This is achieved by inputting the building geometry, construction, use and HVAC and lighting equipment. It was originally based on the Dutch methodology NEN 2916:1998 (Energy Performance of Non-Residential Buildings) and has since been modified to comply with the emerging CEN Standards.

iSBEM makes use of standard data contained on associated databases and available with other software.

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How will we comply?

In an ideal world, the specifier will give the sub-contractor a target U-value for the elements of the building, based on the results from SAP or SBEM. Hopefully, this won't just be the safe option of 2.2! Comar will provide you with project-by-project U-value calculations to show compliance, based on the sizes and configuration of the element.

However, we do expect that we will get pressure to meet extremely low U-values, which may be impossible to achieve. This is where partnering and design consultation throughout the tender process will really come to the fore.

Compliance can only be achieved with careful planning and design

With emphasis on planning and design, it must be understood that the minimum performance requirements are not always achievable due to design and/or product limitations, so an "open minded" approach is required, factoring in all the variables and allowing for variable U-values.

Some of the variables that are considered are **Air Permeability**⁽⁵⁾ (10m³/h.m²), **Ventilation**⁽⁵⁾, **Solar Properties** (solar gain; solar shading; window/building orientation), **Thermal Bridging**⁽⁵⁾, the use of **Solar Heating**⁽⁶⁾, **Photovoltaic Cells**⁽⁶⁾, **Wind Turbines**⁽⁶⁾, and **efficient HVAC systems** when using **SAP**⁽²⁾ and **SBEM**⁽³⁾ to determine a building's **TER**⁽¹⁾ rating.

The new **Document L** has been divided into 4 documents for easier use. The basic minimum performance criteria have been listed below:

L1A – New dwellings

Windows, roof windows, rooflights & doors, area weighted average U-value = 2.2W/m²K and no more than 3.3W/m²K for an individual element.

L1B – Existing dwellings

Replacement windows, roof windows & rooflights, whole window U-value = 2.0W/m²K or window energy rating = band E or glass centre-pane U-value = 1.2W/m²K.

Replacement doors (with more than 50% of

internal face area glazed), whole unit U-value = 2.2W/m²K or glass centre-pane U-value = 1.2W/m²K.

L1B – Extensions to Existing dwellings

New windows, roof windows & roof lights, whole window U-value = 1.8W/m²K or window energy rating = band D or glass centre-pane U-value = 1.2 W/m²K.

New doors (with more than 50% of internal face area glazed), whole unit U-value = 2.2W/m²K.

L2A – New Buildings not dwellings

Windows, roof windows, rooflights & doors, area weighted average U-value = 2.2W/m²K and no more than 3.3W/m²K for an individual element.

Display windows and similar glazing, are not required to meet the standard, though a value of 6.0W/m²K is advocated as a notional value in **SBEM**⁽³⁾. An improved value is likely to be required to meet the **TER**⁽¹⁾.

Personnel doors, area weighted average U-value = 2.2W/m²K and no more than 3.0W/m²K for an individual element.

High usage entrance doors, roof ventilators/smoke vents, area weighted average or individual element U-value = 6.0W/m²K.

Vehicle access & similar large doors, area weighted average U-value = 1.5W/m²K and no more than 4.0W/m²K for an individual element.

Curtain walling, refer to the latest CAB/CWCT documents.

L2B – Existing buildings not dwellings

This applies to buildings with a useable floor area that exceeds 1000m², when including the proposed extension. All windows and doors (excluding display windows and high usage entrance doors) with a U-value worse than 3.3W/m²K in the area served by the increased capacity plant, should be replaced.

Windows, roof windows, rooflights, whole window U-value = 2.2W/m²K or glass centre-pane U-value = 1.2W/m²K. Window Energy Rating Band E.

Personnel doors (with more than 50% of internal face area glazed), whole unit U-value = 2.2W/m²K or glass centre-pane U-value = 1.2W/m²K.

High usage entrance doors, whole unit U-value = 6.0W/m²K.

Vehicle access & similar large doors, whole unit U-value = 1.5W/m²K.

Roof ventilators (including smoke extractors), whole unit U-value = 6.0W/m²K.

L2B – Extensions to existing buildings not dwellings

NOTE: When the extension has a total floor area greater than 100m² and 25% of the existing building, then the work should be regarded as a new building and reference made to **ADL2A**.

Windows, roof windows, rooflights, whole window U-value = 1.8 W/m²K or glass centre-pane U-value = 1.2W/m²K.

Personnel Doors (with more than 50% of internal face area glazed), whole unit U-value = 2.2W/m²K or glass centre-pane U-value = 1.2W/m²K.

High usage entrance doors, whole unit U-value = 6.0W/m²K.

Vehicle access & similar large doors, whole unit U-value = 1.5W/m²K.

Roof ventilators (including smoke extractors), whole unit U-value = 6.0W/m²K.



Table B Summary of Document L

Document	Element	Area Weighted Average U-value	Window Energy Rating	Maximum Individual Element
L1A New Dwellings	Windows, Roof Windows, Rooflights & Doors	2.2 W/m ² /K		3.3 W/m ² /K
L1B Existing Dwellings	Replacement Windows, Roof Windows & Rooflights	Whole Window U-value = 2.0 W/m ² /K or glass centre pane value of 1.2 W/m ² /K	Band E	
	Replacement Doors (with more than 50% of the internal face area glazed)	2.2 W/m ² /K or glass centre pane value of 1.2 W/m ² /K		
L1B Existing Dwellings - Extensions	New windows, roof windows and roof lights	Whole window U-value = 1.8 W/m ² /K or glass centre pane value of 1.2 W/m ² /K	Band D	
	Replacement Doors (with more than 50% of the internal face area glazed)	2.2 W/m ² /K & 3.0 W/m ² /K or glass centre pane value of value of 1.2 W/m ² /K		
L2A New Buildings not Dwellings	Windows, Roof Windows, Rooflights and Doors	2.2 W/m ² /K		3.3 W/m ² /K
	Display Windows and Similar Glazing – are not required to meet the standard though a value of 6.0 W/m ² /K is advocated as a notional value in SBEM. An improved value is likely to be required to meet the TER.			
	Personnel Doors	2.2 W/m ² /K		3.0 W/m ² /K
	High Usage Entrance Doors, Roof ventilators/smoke vents	6.0 W/m ² /K		6.0 W/m ² /K
	Vehicle Access & Similar Large Doors	1.5 W/m ² /K		4.0 W/m ² /K
L2B Existing Buildings not Dwelling Applies to buildings with a useable floor that exceeds 1000m ² . All windows and doors (excluding display windows and high usage entrance doors) with a U-value worse than 3.3 W/m ² /K.should be replaced	Windows, roof windows, rooflights	2.2 W/m ² /K or a glass centre pane U-value 1.2 W/m ² /K	Band E	
	Entrance Doors with more than 50% of the internal face glazed.	2.2 W/m ² /K or glass centre pane value of 1.2 W/m ² /K		
	High Usage Entrance Doors	6.0 W/m ² /K		
	Vehicle Access & Similar Large Doors	1.5 W/m ² /K		
	Roof Ventilators (including smoke extractors)	6.0 W/m ² /K		
L2B – Extension to Existing Buildings not Dwellings When the extension has a total floor area greater than 100m ² and 25% of the existing building, then the work should be regarded as a new building and reference made to ADL2A	Windows, roof windows, roof-lights	1.8 W/m ² /K or glass centre-pane 1.2 W/m ² /K	Band D	
	Entrance Doors with more than 50% of the internal face glazed.	2.2 W/m ² /K		
	High Usage Entrance Doors	6.0 W/m ² /K		
	Vehicle Access & Similar Large Doors	1.5 W/m ² /K		
	Roof Ventilators (including smoke extractors)	6.0 W/m ² /K		

Turning Part L into a Strategic Advantage

Part L and how to comply is "Solution Selling" at its best. In an industry where low costs are always a driving force, we are finding that with the ever-increasing raw material costs, price sensitivity is becoming a real issue. Now with even more pressure for buildings to comply with Document L, the service and reassurance Comar and its fabricators offers is a real advantage. Clients and architects now will be all too aware of the needs for their buildings to be energy efficient, so therefore façade sub-contractors who can provide additional services, such as energy efficiency calculations and design advice, will find themselves involved earlier in the design process. A rival company may try and break specification, but if they cannot back the tender with timely U-value documentation, the specification may hold.

Advantage: Use Comar's Project-by-Project U-value Calculations Service as a Sales Tool

In the new Part L more emphasis is given to CO₂ emissions. Therefore, Passive means of solar control are a fortuitous advantage. There are outstanding examples in the Comar range



which can help you with this: Comar Brise Soleil and Light-trays. You will no doubt have seen the increasing use of Brise Soleil in buildings. Basically the specifier can use this as a means of reducing the CO₂ calculation, Brise Soleil provides passive shading, reducing the need for buildings to rely on CO₂ hungry air-conditioning. Light-trays, used in conjunction with Brise Soleil, redirect light and project it into the room, thus reducing the need to use electric lighting.

Advantage: Use/suggest Passive means of solar control such as Brise Soleil and Light-trays.

Naturally the product that has been specifically designed for thermal efficiency is Comar 5P.i. The Pi. logo provides trade-marked thermally efficient reassurance. There is no better way to reassure specifiers of Comar 5P.i. and its thermal performance than the exhibit we had at the Comar 5P.i. launch at RIBA. From the photograph you can see that: Comar 5P.i. and Comar 5 resin were placed on dry ice. The temperature to the outside face showed -25.4°C. For the internal faces the temperature was +29.4°C for Comar 5P.i. and +19.1°C for resin Comar 5. The test results showed the level of cold conductivity was higher in Comar 5 resin and lower in Comar 5P.i. by some +8°C which means:

Comar 5P.i. offers excellent thermal performance

- buildings with Comar 5P.i. windows will stay warmer for longer
- heating does not need to be turned up as high
- end users will be saving money and reducing carbon emissions

Advantage: Select Comar 5P.i. with proven, trademarked thermal efficiency.

Thermal Matrix

For your quick reference, please refer to our U-value matrix on the next page. To confirm



U-values, please contact our Technical Department on a project-by-project basis.

The following reference documents and tools should be used in conjunction with the ADL's.

- 1.) CAB Setting the Standard No.7
 - 2.) CAB/CWCT Curtain Wall Document
 - 3.) SAP⁽²⁾
 - 4.) SBEM⁽³⁾
- (1) **TER** (Target CO₂ Emission Rate) – The minimum energy performance required for new dwellings as approved by the Secretary of State in accordance with Regulation 17A & 17B.
- (2) **SAP** The Government's Standard Assessment Procedure for Energy Rating of Dwellings, 2005 edition, Defra, 2005.
- (3) **SBEM** – www.bre.co.uk & www.odpm.gov.uk
- (4) **BR 443** – Conventions for U-value calculations, BRE, 2006.
- (4) Registered designs at www.robustdetails.com (thermal bridging, etc); www.modeldesigns.info (air leakage, etc).
- (5) Low or Zero Carbon Energy Sources – Strategic Guide, interim publication on ODPM website.

Comar 5Lt 45mm

Glass Centre Pane Value (W/m²K) Double Glazed Units

	1.7				1.5				1.3				1.1			
	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4
Fixed Light Internally Beaded	2.6	2.4	2.3	2.2	2.5	2.2	2.1	2	2.3	2	1.9	1.9	2.2	1.9	1.8	1.7
Fixed Light Externally Beaded	2.6	2.3	2.3	2.2	2.4	2.2	2.1	2	2.3	2	1.9	1.8	2.1	1.8	1.7	1.7
Opening Out Internally Beaded	3	2.6	2.5	2.4	2.8	2.5	2.4	2.3	2.7	2.3	2.2	2.1	2.6	2.2	2	2
Opening Out Externally Beaded	2.9	2.5	2.4	2.4	2.7	2.4	2.3	2.2	2.6	2.2	2.1	2	2.5	2.1	2	1.9

	> 2.4 W/m ² K
	2.4 W/m ² K
	2.3 W/m ² K
	2.2 W/m ² K
	< 2.2 W/m ² K

Comar 5 50mm

Glass Centre Pane Value (W/m²K) Double Glazed Units

	1.7				1.5				1.3				1.1			
	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4
Fixed Light Internally Beaded	2.7	2.4	2.3	2.3	2.6	2.3	2.2	2.1	2.4	2.1	2	1.9	2.3	2	1.8	1.8
Fixed Light Externally Beaded	2.7	2.4	2.3	2.2	2.5	2.2	2.2	2.1	2.4	2.1	2	1.9	2.2	1.9	1.8	1.7
Opening Out Internally Beaded	3.2	2.8	2.7	2.6	3.1	2.7	2.5	2.4	3	2.6	2.4	2.3	2.9	2.4	2.3	2.1
Opening Out Externally Beaded	3	2.7	2.5	2.5	2.9	2.5	2.4	2.3	2.8	2.4	2.3	2.2	2.7	2.3	2.1	2
Tilt & Turn	3.2	2.8	2.6	2.5	3	2.6	2.5	2.4	2.9	2.5	2.3	2.2	2.8	2.4	2.2	2.1
Reversible Pivot	3.4	3	2.8	2.7	3.4	2.9	2.7	2.6	3.3	2.8	2.6	2.5	3.2	2.7	2.5	2.3
Top Swing	3.3	2.9	2.7	2.6	3.2	2.7	2.6	2.5	3	2.6	2.4	2.3	2.9	2.4	2.3	2.2

W1	600 x 900mm
W2	900 x 1200mm
W3	1200 x 1200mm
W4	1230 x 1480mm

Comar 5P.i. 60mm

Glass Centre Pane Value (W/m²K) Double Glazed Units

	1.7				1.5				1.3				1.1			
	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4
Fixed Light Internally Beaded	2.6	2.3	2.3	2.2	2.5	2.2	2.1	2	2.3	2	1.9	1.9	2.2	1.9	1.8	1.7
Fixed Light Externally Beaded	2.5	2.3	2.2	2.2	2.4	2.1	2	2	2.2	2	1.9	1.8	2.1	1.8	1.7	1.6
Opening Out Internally Beaded	2.9	2.6	2.5	2.4	2.8	2.5	2.4	2.3	2.7	2.3	2.2	2.1	2.6	2.2	2.1	2
Opening Out Externally Beaded	2.8	2.5	2.4	2.3	2.7	2.3	2.2	2.2	2.5	2.2	2.1	2	2.4	2.1	1.9	1.9
Tilt & Turn	2.9	2.6	2.4	2.4	2.7	2.4	2.3	2.2	2.6	2.3	2.1	2.1	2.5	2.1	2	1.9
Reversible Pivot	3.1	2.7	2.6	2.5	3	2.6	2.5	2.4	2.9	2.5	2.3	2.2	2.8	2.4	2.2	2.1
Top Swing	3	2.7	2.5	2.5	2.9	2.5	2.4	2.3	2.8	2.4	2.3	2.2	2.7	2.3	2.1	2

All generated U-values are based on the **BS EN ISO 10077-1** method of calculation using the **BRE U-VALUE CALCULATOR Version 1.10d**

Glass Type

1.7	W/m ² K	4/16/4	Pilkington K Glass (Air)
1.5	W/m ² K	4/16/4	Pilkington K Glass (Argon)
1.3	W/m ² K	4/16/4	Pilkington Optitherm (Argon)
1.1	W/m ² K	4/16/4	Pilkington Optitherm S (Argon)

Comar 5P.i. 60mm

Glass Centre Pane Value (W/m²K) Triple Glazed Units

	1				0.8				0.7				0.6			
	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4
Fixed Light Internally Beaded	2	1.7	1.6	1.6	1.8	1.5	1.4	1.4	1.8	1.5	1.4	1.3	1.7	1.4	1.3	1.2
Fixed Light Externally Beaded	2	1.7	1.6	1.6	1.8	1.5	1.4	1.4	1.8	1.5	1.4	1.3	1.7	1.4	1.3	1.2
Opening Out Internally Beaded	2.5	2.1	1.9	1.8	2.4	1.9	1.8	1.7	2.3	1.8	1.7	1.6	2.2	1.8	1.7	1.6
Opening Out Externally Beaded	2.3	2	1.9	1.8	2.2	1.8	1.7	1.6	2.2	1.8	1.6	1.5	2.1	1.7	1.6	1.5
Tilt & Turn	2.4	2	1.9	1.8	2.3	1.9	1.7	1.6	2.2	1.8	1.7	1.6	2.1	1.7	1.6	1.5
Reversible Pivot	2.7	2.3	2.1	2	2.6	2.1	2	1.9	2.5	2.1	1.9	1.8	2.5	2	1.8	1.7
Top Swing	2.6	2.2	2	1.9	2.5	2	1.9	1.8	2.4	2	1.8	1.7	2.4	1.9	1.7	1.6

	> 2.0 W/m ² K
	1.9 W/m ² K
	1.8 W/m ² K
	1.7 W/m ² K
	< 1.6 W/m ² K

Glass Type

1	W/m ² K	4/12/4/12/4	Pilkington K Glass / (Argon) / Optifloat / (Argon) / K Glass
0.8	W/m ² K	4/16/4/16/4	Pilkington K Glass / (Argon) Optifloat / (Argon) / K Glass
0.7	W/m ² K	4/12/6/12/6	Pilkington Optitherm SN / (Argon) / Optifloat / (Argon) / Optitherm SN
0.6	W/m ² K	4/16/4/16/4	Pilkington Optitherm / (Argon) / Optifloat / (Argon) / Optitherm SN