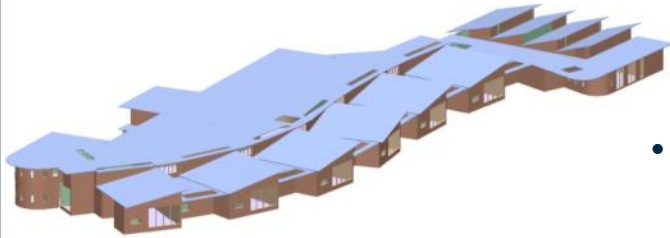


Royal National Institute for the Blind

Hevacomp Enabled:

- Full detailed design of the services, including construction stage duties to oversee quality control and final commissioning of the services.
- Room Data, Heat Loss, CIBSE Gain, Air Flow and Emitter Sizing
- SBEM for Part L compliance, Heat losses and gains, pipe and duct sizing



Results:

- The 3D model helps to visualize the complexities of buildings on our site which are built in multiple curves and on varying levels.
- The practice must have an audit trail which complies with our QA system, and the requirements of our Professional Indemnity insurers
- Hevacomp is an industry and insurance company standard calculation tool, which fits in with the audit trail requirement.

Project Facts:

- Project Location: Coventry, UK
- Construction Cost: £20 million
- The new Vision School and Children's Home for the Royal National Institute for the Blind
- OPERON's role: Design consultants for the Mechanical, Electrical and Public Health building services.

About OPERON:

- Founded in 1993
- Over 1000 Employees
- Offices in the UK, Middle East, Ireland, the Mediterranean and Iceland
- Facilities Management, Maintenance, Energy and Environmental, Design, Construction and Private Finance Partnerships
- Mission: "To be recognised internationally as a company of excellence, that embraces continuous improvement, in partnership with our clients, to achieve innovation, best value and service excellence."

Analytical Results

SBEM Main Calculation Output Document Fri Dec 19 13:01:50 2008

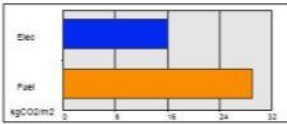
Building name

RNIB Vision School & Children'

Building type: Secondary school

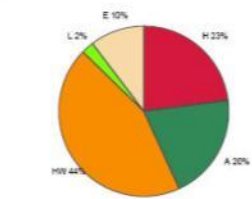
SBEM is an energy calculation tool for the purpose of assessing and demonstrating compliance with Building Regulations (Part L for England and Wales, Section 6 for Scotland, Part F for Northern Ireland and Part L for Republic of Ireland) and to produce Energy Performance Certificates and Building Emission Statements. The results produced by the tool may be of use in the design process, **SBEM is not intended as a design tool.**

Building Energy Performance and CO2 emissions

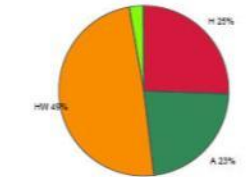


12 kgCO₂/m² displaced by the building
Building area is 4513.66m²

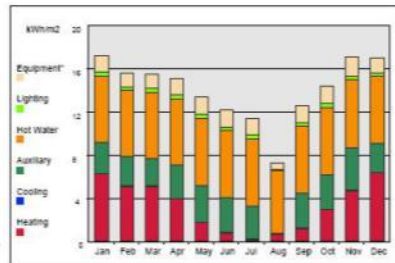
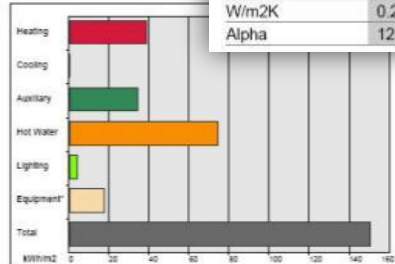
Annual Energy Consumption



(Pie chart excluding Equipment end-use)



(*) Although energy consumption by equipment is shown in the graphs, the CO₂ emissions associated with this end-use have not been taken into account when producing the rating.



Building Global Parameters

	Actual	Notional
Area (m ²)	4514	4514
External area (m ²)	10129	10129
Weather	BIR	BIR
Infiltration	7	10
W/K	2566.57	7554.29
W/m ² K	0.25	0.75
Alpha	12.58	10

HVAC Systems Performance

System Type	Heat dem MJ/m ²	Cool dem MJ/m ²	Heat kWh/m ²	Cool kWh/m ²	Aux kWh/m ²	Heat SSEE ^F	Cool SSEER	Heat G SEFF	Cool G SEER
[ST] Central heating using water: radiators, [HS] District heating, [FT] District Heating									
Actual	89.6	32.3	28	0	33.3	0.89	0	0.95	0
Notional	397.5	215.3	141.6	0	15.5	0.73	0	----	----
[ST] Central heating using water: radiators, [HS] District heating, [FT] District Heating									
Actual	440.7	34	137.2	0	34.9	0.89	0	0.95	0
Notional	753.9	353.3	268.5	0	21.8	0.73	0	----	----

BRUKL Output Document



Compliance with England and Wales Building Regulations Part L

Project name

RNIB Vision School &

As designed

Date: Fri Dec 19 13:04:35 2008

Administrative information

Technical Data Sheet (Actual vs. Notional Building)

1.1	Calculated CO ₂ emission rate from notional building	53.6 KgCO ₂ /m ² annum
1.2	Improvement factor	0.2
1.3	LZC benchmark	0.1
1.4	Target CO ₂ Emission Rate (TER)	38.6 KgCO ₂ /m ² annum
1.5	Building CO ₂ Emission Rate (BER)	28.5 KgCO ₂ /m ² annum
1.6	Are emissions from building less than or equal to the target?	BER <= TER
1.7	Are as built details the same as used in BER calculations?	Separate submission

Criterion 2: The performance of the building fabric and the building services systems should be no worse than the design limits

2.1 Are the U-values better than the design limits? **Better than design limits**

Element	U _{limit}	U _{calc}	U _{limit}	U _{calc}	Surface where this maximum value occurs*
Wall**	0.35	0.35	0.7	0.35	RISER Wall 1
Floor	0.25	0.12	0.7	0.2	L-S-01 Exposed Floor 1
Roof	0.25	0.15	0.35	0.15	S0-065 Exposed Roof 1
Windows***, roof windows, and rooflights	2.2	1.1	3.3	1.1	S0-007 Window 3
Personnel doors	2.2	0	3	0	"No Personnel doors in project"
Vehicle access & similar large doors	1.5	0	4	0	"No Vehicle access doors in project"
High usage entrance doors	6	0	6	0	"No High usage entrance doors in project"

U_{limit} = Limiting area-weighted average U-values [W/m²K]

U_{calc} = Calculated area-weighted average U-values [W/m²K]

U_{limit} = Limiting individual element U-values [W/m²K]

U_{calc} = Calculated individual element U-values [W/m²K]

* There might be more than one surface exceeding the limiting standards.

** Automatic U-value check by the tool does not apply to curtain walls whose limiting standards are similar to those for windows.

*** Display windows and similar glazing are not required to meet the standard given in this table.