

RICHMOND COLLEGE SITE, EGERTON ROAD, TWICKENHAM

FOR CLARION HOUSING GROUP

Prepared by:

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Project No: EJ1078

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1.0 EXECUTIVE SUMMARY

This report assesses the predicted energy performance and carbon dioxide emissions for the proposed development by Clarion Housing Group at the Richmond College Site, Egerton Road, Twickenham.

The proposal is for the comprehensive redevelopment of the site to provide within the residential development zone, 45 x 1 bed apartments, 63 x 2 bed apartments, 8 x 3 bed apartments, 2 x 4 bed apartments, 18 x 2 bed maisonettes, 28 x 3 bed terrace houses, 16 x 4 bed terrace houses, together with associated car parking, cycle parking and amenity space.

The report will demonstrate that there is commitment and response to each of the items relating to planning condition U07956 'Climate Change Adaption – 35% CO₂', namely;

- A minimum 35% reduction in regulated carbon emissions when compared to a building regulations 2013 compliant development.
- A minimum 20% contribution to total energy demand through low carbon decentralized heat and energy networks, or renewable energy sources
- All residential units to achieve a minimum 19% reduction in DER/TER as determined by SAP 2012.

This report also responds to planning condition U07958 'Energy Statements' by demonstrating achievement of the provision of condition U07956 in line with the Site-wide 'Outline Energy Statement: Energy Comparison for Outline Planning' (2015) approved under condition U08044 'Site Wide Energy Statement'.

The scheme has considered the issue of carbon emissions management from an early stage. The client and architect have been decisive in their brief and design intentions.

The methodology used to determine the CO₂ emissions is in accordance with the approved Outline Energy Statement.

Be Lean - Energy Efficient Design and Construction

The first step addresses reduction in energy use, through the adoption of sustainable design and construction measures.

In accordance with this strategy, the proposed development will incorporate a range of energy efficient measures including exceeding current Building Regulation Part L1A 2013 requirements for the levels of insulation and air tightness; eliminate thermal bridging; mechanical ventilation with heat recovery; installation of high-performance glazing and energy efficient lighting.

The implementation of these measures will reduce CO₂ emissions by 19.1% compared to a Part L1A 2013 notional development.

Be Clean - Combined Heat & Power (CHP)

As concluded in the approved Outline Energy Statement, CHP has not been considered appropriate for this development.

Be Green - Renewable Energy

The third stage covers renewable technologies.

The site-wide 'Outline Energy Statement: Energy Comparison for Outline Planning' (2015) approved under condition U08044 'Site Wide Energy Statement' recommends air source heat pumps (ASHP), photovoltaic cells (PV) and solar thermal collectors as the most feasible renewable energy sources for the proposed development.

Further analysis considered the effect on the energy strategy, energy demand contribution, aesthetics and available amenity space for each of the sources. PV cells were considered the most suitable renewable energy technology for the proposed residential development.

Details of the analysis undertaken are in section 4.0 of this report.

Total energy demand for the proposed residential development is calculated using the FSAP 2012 methodology. The calculated demand is 753,319 kWh per annum.

20% of the energy demand is to be generated through the PV cells. The implementation of PV cells for the proposed development will generate 152,389 kWh per annum when calculated using the FSAP 2012 methodology.

PV cell electricity generation has been shared between all houses and apartments for the proposed development, with each unit surpassing the 19% minimum requirement in CO₂ emission reductions.

The implementation of the PV cells will reduce the proposed developments total CO₂ emissions by a further 45.5%.

Conclusion

Energy efficient design and the use of PV cells for the proposed residential development zone will reduce CO_2 emissions by a total 55.9% compared to a Part L1A 2013 notional development and surpassing the minimum requirements of planning condition U07956 'Climate Change Adaption – 35% CO_2 '.

In addition to the overall reduction on CO₂ emissions, the introduction of PV cells will generate 20.2% of the total energy demand for the proposed development with each unit achieving more than 19% CO₂ emission reductions individually.

The table below demonstrates the carbon emissions at each stage of the energy hierarchy

	Carbon dioxide emissions (kg CO ₂ per annum)
Building Regulations 2013 Part L1A compliant development	79375
After Be Lean energy demand reduction	64199
After Be Clean efficient energy supply	64199
After Be Green renewable technologies	34986

The table below provides a summary of the CO₂ savings at each stage of energy hierarchy.

It can be seen in the table that significant savings are made through the provision of efficient building fabric and services systems, with further reductions made through the provision of a renewable energy generating technologies.

	Carbon Dioxide Savings	
	kg CO ₂ per annum	Percentage
Savings from energy demand reduction	15176	19.1%
Savings from CHP	0.0	0.0%
Savings from renewable technologies	29214	45.5%
Total Cumulative Savings	44390	55.9%

2.0 INTRODUCTION

The proposal is for the comprehensive redevelopment of the site to provide within the residential development zone, 45×1 bed apartments, 63×2 bed apartments, 8×3 bed apartments, 2×4 bed apartments, 18×2 bed maisonettes, 28×3 bed terrace houses, 16×4 bed terrace houses, together with associated car parking, cycle parking and amenity space.

This document demonstrates how the development addresses the relevant planning conditions in accordance with the granted outline planning application.

In particular this report responds to the energy related planning conditions listed in the decision notice (2016), including:

- U07956 Climate Change Adaption 35% CO₂
 - A minimum 35% reduction in regulated carbon emissions when compared to a building regulations 2013 compliant development.
 - A minimum 20% contribution to total energy demand through low carbon decentralized heat and energy networks, or renewable energy sources
 - All residential units to achieve a minimum 19% reduction in DER/TER as determined by SAP 2012.
- U07958 Energy Statements
- U08044 Site Wide Energy Statement

The methodology employed to determine the potential CO₂ savings for this development is in accordance the Site-wide 'Outline Energy Statement: Energy Comparison for Outline Planning' (2015) approved under condition U08044 'Site Wide Energy Statement':

- Be Lean Improve the energy efficiency of the scheme
- Be Clean Supply as much of the remaining energy requirement with low-carbon technologies such as combined heat and power (CHP)
- Be Green Off-set a proportion of the remaining carbon dioxide emissions by using renewable technologies.

As concluded in the approved Outline Energy Statement, CHP (Be Clean) has not been considered appropriate for this development.

Energy calculations were carried out using the FSAP2012 methodology. This is in line with Building Regulations Part L1A 2013. Outputs from the energy calculations are provided in Appendix B.

3.0 BE LEAN - ENERGY EFFICIENT DESIGN AND CONSTRUCTION

Passive Design Measures

Enhanced Building Fabric

The heat loss of different building elements is dependent upon their U-value. The lower the U-value, the better the level of insulation of a particular element. A building with low U-values has a reduced heating demand during the cooler months.

The proposed development will incorporate high levels of insulation and high-performance glazing on all of the facades to significantly reduce the demand for space heating (table 1 below).

Air Tightness

Heat loss may also occur due to air infiltration. Although this cannot be eliminated altogether, good construction detailing and the use of best practice construction techniques can minimise the amount of air infiltration into a building.

Current Part L Building Regulations (2013) sets a maximum air permeability rate of 10m³/h.m² at 50Pa. The development is likely to improve upon this to achieve at least 3m³/h.m² at 50Pa through the application of best practice construction techniques.

	Limiting Fabric Parameters Part L1A 2013 (2016 Amendments)	Notional Dwelling Specification Part L1A 2013 (2016 Amendments)	Richmond College Site Fabric Specification
Opening Areas	25% max of total floor area	As measured (25% max of total floor area)	As measured
Walls	0.30 W/m²K	0.18 W/m²K	0.15 W/m²K
Party Walls	0.20 W/m²K	0.00 W/m²K	0.00 W/m²K
Floor	0.25 W/m²K	0.13 W/m²K	0.13 W/m²K
Roof	0.20 W/m²K	0.13 W/m²K	0.13 W/m²K
Windows (incl. frame)	2.00 W/m²K	1.4 W/m²K (g-value 0.63)	1.27 W/m²K (g-value 0.63)
Doors (incl. frame)	2.00 W/m²K	Opaque 1.0 W/m²K / Semi-glazed 1.2 W/m²K	1.0 W/m²K
Air Tightness @ 50Pa	10.0 m³/h.m²	5.0 m³/h.m²	3.0 m³/h.m²
Thermal Bridging	y = 0.15 W/m²K	y = 0.05 W/m²K	0.072 W/m²K

Table 1 Fabric Specification

Active Design Measures

High Efficiency Lighting

The development intends to incorporate low energy lighting fittings throughout the buildings. 100% of all light fittings will be specified as low energy lighting, and will accommodate LEDs, compact fluorescent (CFL's) or fluorescent luminaries only.

Internal areas of infrequent use will be fitted with occupant sensors.

Mechanical Ventilation with Heat Recovery

Mechanical ventilation with heat recovery is proposed for all dwellings in order to achieve ventilation in the most energy efficient way.

CO₂ Emissions

The implementation of these passive and active design measures will reduce CO₂ emissions by 19.1% beyond Building Regulations Part L1A (2013) notional building as shown in the table below.

	kg CO₂ per annum
Building Regulations 2013 Part L1A compliant development	79375
After energy demand reduction	64199
Total savings from energy demand reduction	15176
Total percentage improvement over baseline	19.1%

4.0 BE GREEN - RENEWABLE ENERGY

In accordance with the Site Wide Energy Statement, the range of renewable technologies deemed suitable for the proposed development are:

- Air source heat pump
- Photovoltaic panels
- Solar thermal panels

In determining the appropriate renewable technology for the site, the following factors were considered:

- Energy strategy
- Effect on energy demand contribution
- Effect on design

Feasibility

Air Source Heat Pumps

Apartments

Energy strategy	Effect on energy demand contribution	Effect on design
Centralised system for each block. Generates low grade hot water to distribute to each apartment. Each apartment requires a Heat Interface Unit to transfer heat to the apartments heating and domestic hot water system.	Can convert approximately 1 kW of electricity into 3 kW of low grade heat (55 °C).	Difficult to generate instantaneous hot water within the apartments at 50 °C whilst maintaining high efficiency. Requires metering & billing system. Requires plant space in each block. Performs best with UFH but can be used with specialist or oversized radiators.

There are no internal plant spaces within each block for this option. Roof mounted plant is likely to cause issues with acoustics. Difficulty in generating 50 °C domestic hot water from 55 °C heat. Air source heat pumps for the apartments are deemed unsuitable.

Houses

Energy strategy	Effect on energy demand contribution	Effect on design
Individual system for each house. Generates low grade hot water for heating system. Stored hot water generated by immersion heater.	Can convert approximately 1 kW of electricity into 4 kW of low grade heat (45 °C)	Each house will have a condensor mounted externally. Possible problems with noise from the external unit. Requires space for the internal unit (approximate size of a fridge freezer). Performs best with UFH but can be used with specialist or oversized radiators

The external unit is likely to cause acoustic and aesthetic problems. There is no internal space for the internal unit. Air source heat pumps for the houses are deemed unsuitable

Photovoltaics (PV)

Apartments

Energy strategy	Effect on energy demand contribution	Effect on design
PV cells on the roof linked to the		Large roof areas available for
landlords supply. Panels need to		installation. Requires specialist
face south-east to south-west.	Can generate approximately 204	mounting system for green roof.
Apartments would still need a	kWh / m ² of electricity per annum.	Space for inverters in each block.
system to generate heat and		Panels can face a south-east to
domestic hot water		south-west.

There is considerable roof area for a PV array. The roof mounted PV array will be unobtrusive and combined with another system for generating heat and hot water would work well. A PV array for the apartments is deemed suitable.

Houses

Energy strategy	Effect on energy demand contribution	Effect on design
PV cells mounted on each individual house roof. Panels need to face south-east to south-west. Houses would still need a system to generate heat and domestic hot water	Can generate approximately 204	Panels can face a south-east to south-west. Space required in each house for inverter.

Each house has enough roof area for a small PV array. The roof mounted PV array will be unobtrusive and combined with another system for generating heat and hot water would work well. A PV array for the houses is deemed suitable.

Solar Thermal Collectors

Apartments

Energy strategy	Effect on energy demand contribution	Effect on design
Panels need to face south-east to south-west. Would require a centralised domestic hot water system distributed to each apartment. Apartments would still need a system to generate heat and to top-up the domestic hot water system.	Can provide approximately 40% of domestic hot water (395 kWh / m ² /	Large roof areas available for installation. Requires specialist mounting system for green roof. Requires metering & billing system. Requires plant space in each block for storage tanks, boilers and pumps. Panels can face a southeast to south-west.

Each block has enough roof area for a large solar thermal collector array. The roof mounted solar collectors will be unobtrusive however, there are no internal plant spaces within each block for the hot water storage tanks, boilers and pumps required for the system. A solar thermal array for the apartments is deemed unsuitable.

Houses

Energy strategy	Effect on energy demand contribution	Effect on design
Panels need to face south-east to south-west. Each system would be linked to individual flats. Houses would still need a system to generate heat and top-up the domestic hot water system.	Can provide approximately 4/% of	Panels can face a south-east to south-west. Requires space for the hot water tank, solar pump and control system.

Each house has enough roof area for a small solar thermal array. The roof mounted panels will be unobtrusive however, there is no internal space for the storage tank, solar pumps and control system. A solar thermal array for the houses is deemed unsuitable.

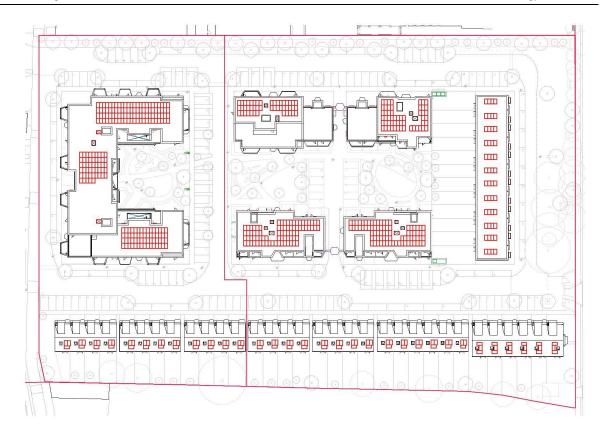
Feasibility conclusion

Air source heat pumps and solar thermal collectors were deemed unsuitable for the development. PV cells were considered the most suitable renewable energy technology as the development has large roof areas to mount the arrays, they generate electricity reducing the impact on the electricity grid and the inverters only require a small amount of space.

In order to maximise CO₂ reductions, it is proposed that PV panels are installed on the roofs of the development. The panels will be installed horizontally on the unshaded areas of the roof to maximise array area.

PV Electricity Generation		
Predicted site solar energy	832.7	kWh/annum
Total estimated system losses	22.6	%
System peak power	183	kWp
Array area	1023	m^2
Primary electricity offset by PV Array	152389	kWh/yr
Total CO₂ savings	79090	kg/annum
Part L 2013 Baseline Regulated CO ₂ emissions	79375	kg/annum
Regulated CO2 emissions after energy demand reduction	64199	kg/annum
After renewable technology reduction	34986	kg/annum
Total percentage improvement over energy demand reduction	29214	kg/annum
Percentage improvement over energy demand reduction	45.5%	%

In total, 1,023 m² of PV cells, rated at 183 kWp, would produce CO₂ emissions savings of 45.5% for the proposed development after the energy demand reduction. The site-wide PV layout is shown below.



Renewable energy generation

In accordance with the Site Wide Energy Statement, a minimum 20% contribution to total energy demand through low carbon decentralized heat and energy networks, or renewable energy sources.

PV cells were considered the most suitable renewable energy technology to achieve the minimum 20% contribution to total energy demand. The energy demand is calculated using the FSAP 2012 methodology.

It can be seen in the table below that 20.2% of energy demand will be generated by the PV cells for the proposed development.

	Energy demand (kWh)
Building Regulations 2013 Part L1A compliant development	753319
20% contribution through renewable energy	150664
Total contribution from PV cells	152389
Total percentage contribution from PV cells	20.2%

In accordance with the Site Wide Energy Statement, all residential units are to achieve a minimum 19% reduction in DER/TER as determined by SAP 2012. It can be seen in the table below that each different unit type surpasses the minimum 19% reduction.

Dwelling	No Off	DER/TER (%)	Dwelling	No Off	DER/TER (%)	Dwelling	No Off	DER/TER (%)
Plot A0.01	4	47.3%	Plot D4.01	1	39.1%	Plot F1.06	3	58.6%
Plot A0.03	2	47.0%	Plot C3.03	1	39.2%	Plot F1.07	1	57.4%
Plot A0.03	2	51.7%	Plot C3.02	1	41.0%	Plot F1.05	1	50.1%
Plot A0.05	4	44.2%	Plot C4.02	1	44.2%	Plot E1.07	1	50.5%
Plot A0.04	4	53.2%	Plot C4.01	1	35.6%	Plot E1.06	3	59.0%
Plot C0.04	1	48.8%	Plot A2.05	2	37.7%	Plot E2.06	2	60.9%
Plot C0.03	1	56.6%	Plot G.12	1	34.1%	Plot E2.07	2	53.8%
Plot D0.02	1	54.1%	Plot H.06	1	27.3%	Plot F2.06	2	61.4%
Plot A1.03	7	61.2%	Plot I.06	6	34.1%	Plot F2.05	2	50.9%
Plot A1.02	4	55.8%	Plot G.01	1	33.2%	Plot F2.07	2	59.7%
Plot A1.01	7	51.3%	Plot G.07	10	39.0%	Plot E3.01	2	45.9%
Plot D1.02	3	55.8%	Plot H.01	1	27.9%	Plot E3.02	4	48.6%
Plot C1.04	3	56.5%	Plot H.03	4	32.7%	Plot E3.04	1	44.3%
Plot C1.03	2	62.2%	Plot I.01	6	34.1%	Plot E3.05	1	45.7%
Plot C1.02	2	64.6%	Plot I.03	14	38.9%	Plot E4.02	1	48.4%
Plot C1.01	3	57.9%	Plot F0.01	4	77.0%	Plot E4.01	1	41.7%
Plot C2.02	4	53.4%	Plot F0.03	2	52.6%	Plot F4.06	1	47.1%
Plot C2.01	2	46.7%	Plot F0.06	2	50.5%	Plot F4.07	1	45.6%
Plot A3.03	2	46.6%	Plot F0.05	1	52.9%	Plot F4.08	1	44.1%
Plot A3.02	2	42.0%	Plot F0.04	1	49.3%	Plot F4.05	1	33.9%
Plot A3.01	2	38.8%	Plot F1.01	5	61.6%	Plot E0.05	1	46.8%
Plot D4.03	1	42.1%	Plot F1.02	10	60.9%			
Plot D4.02	1	41.9%	Plot F1.04	6	53.8%	1		

5.0 CONCLUSION

This report demonstrates how the development will addresses the relevant planning conditions in accordance with the granted outline planning application.

In particular, it responds to the energy related planning conditions listed in the decision notice (2016), including:

- U07956 Climate Change Adaption 35% CO₂
 - A minimum 35% reduction in regulated carbon emissions when compared to a building regulations 2013 compliant development.
 - A minimum 20% contribution to total energy demand through low carbon decentralized heat and energy networks, or renewable energy sources
 - All residential units to achieve a minimum 19% reduction in DER/TER as determined by SAP 2012.
- U07958 Energy Statements
- U08044 Site Wide Energy Statement

Energy efficient design and the use of PV cells for the proposed residential development zone will reduce CO_2 emissions by a total 55.9% compared to a Part L1A 2013 notional development and surpassing the minimum requirements of planning condition U07956 'Climate Change Adaption – 35% CO_2 '.

In addition to the overall reduction on CO_2 emissions, the introduction of PV cells will generate 20.2% of the annual energy demand for the proposed development with each unit achieving more than 19% CO_2 emission reductions individually.

The table below demonstrates the carbon emissions at each stage of the energy hierarchy

	Carbon dioxide emissions (kg CO ₂ per annum)
Building Regulations 2013 Part L1A compliant development	79375
After Be Lean energy demand reduction	64199
After Be Clean efficient energy supply	64199
After Be Green renewable technologies	34986

The table below provides a summary of the CO₂ savings at each stage of energy hierarchy.

	Carbon Dioxide Savings	
	kg CO ₂ per annum	Percentage
Savings from energy demand reduction	15176	19.1%
Savings from CHP	0.0	0.0%
Savings from renewable technologies	29214	45.5%
Total Cumulative Savings	44390	55.9%

APPENDIX A - PRELIMINARY SAP CALCULATIONS

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.16 *Printed on 22 November 2018 at 12:41:11*

Project Information:

Assessed By: () Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 57.4m²

Site Reference: Clarion Richmond College Plot Reference: GF 1B2P WCH Type 1A

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 19.09 kg/m²
Dwelling Carbon Dioxide Emission Rate (DER) 10.06 kg/m²

10.06 kg/m² **OK**

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

47.4 kWh/m² 41.3 kWh/m²

ок

OK

2 Fabric U-values

Element
External wall
Party wall
Floor
Roof
Openings

Average 0.15 (max. 0.30)

0.00 (max. 0.20) 0.13 (max. 0.25)

(no roof) 1.22 (max. 2.00) Highest 0.15 (max. 0.70)

0.13 (max. 0.70)

1.27 (max. 3.30)

OK OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

OK

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

None

Cylinder insulation			
Hot water Storage:	No cylinder		
Controls			
Space heating controls	•	one control by device in database	OK
Hot water controls:	No cylinder		
	No cylinder		
Boiler interlock:	Yes		OK
Low energy lights			
Percentage of fixed lights wit	h low-energy fittings	100.0%	-11
Minimum		75.0%	OK
Mechanical ventilation			
Continuous supply and extra	ct system		
Specific fan power:		0.52	
Maximum		1.5	OK
MVHR efficiency:		90%	016
Minimum		70%	OK
Summertime temperature			
Overheating risk (Thames va	lley):	Medium	OK
sed on:			
Overshading:		Average or unknown	
Windows facing: North		1.08m²	
Windows facing: North		3.78m ² 3.78m ²	
Windows facing: South		1.08m ²	
Windows facing: East Ventilation rate:		3.00	
Blinds/curtains:		None	
Billius/curtains.		Closed 100% of daylight hours	
		Closed 100 % of daylight flodis	
Key features			
Air permeablility		3.0 m³/m²h	
Doors U-value		1 W/m²K	
Party Walls U-value		0 W/m²K	
- value value		O VV/III IX	

Photovoltaic array

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.16 Printed on 22 November 2018 at 12:41:10

Project Information:

Assessed By: () **Building Type:** Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE Total Floor Area: 57.98m²

Plot Reference: Site Reference : Clarion Richmond College GF 1B2P WCH Type 1B

, London, TW2 7SJ Address:

Client Details:

Name: Address:

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 19.12 kg/m² Dwelling Carbon Dioxide Emission Rate (DER) 10.13 kg/m²

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) Dwelling Fabric Energy Efficiency (DFEE)

2 Fabric U-values

Element External wall

Party wall Floor Roof **Openings**

Average 0.14 (max. 0.30)

0.00 (max. 0.20) 0.13 (max. 0.25)

(no roof)

1.20 (max. 2.00)

Highest 0.15 (max. 0.70)

45.5 kWh/m²

41.0 kWh/m²

0.13 (max. 0.70)

1.27 (max. 3.30)

OK **OK**

OK

OK

OK

OK

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

Air permeability at 50 pascals Maximum

10.0

3.00 (design value)

4 Heating efficiency

Database: (rev 435, product index 017511): Main Heating system:

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

None

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls Hot water controls:	Time and temperature z No cylinder No cylinder	one control by device in database	ок
Boiler interlock:	Yes		OK
7 Low energy lights			
Percentage of fixed lights wit Minimum	h low-energy fittings	100.0% 75.0%	ок
8 Mechanical ventilation			
Continuous supply and extra Specific fan power:	ct system	0.52	
Maximum		1.5	OK
MVHR efficiency: Minimum		90% 70%	ок
9 Summertime temperature			
Overheating risk (Thames va Based on:	lley):	Slight	ок
Overshading: Windows facing: South Windows facing: North Ventilation rate: Blinds/curtains:		Average or unknown 2.16m² 3.78m² 3.00 None Closed 100% of daylight hours	
Air permeablility Doors U-value Party Walls U-value Photovoltaic array		3.0 m³/m²h 1 W/m²K 0 W/m²K	

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.16 *Printed on 22 November 2018 at 12:41:10*

Project Information:

Assessed By: () Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 55.24m²

Site Reference: Clarion Richmond College Plot Reference: GF 1B2P WCH Type 2

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER)

Dwelling Carbon Dioxide Emission Rate (DER)

18.13 kg/m²

8.75 kg/m² **OK**

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

39.4 kWh/m² 34.1 kWh/m²

OK

OK

OK

2 Fabric U-values

Element
External wall
Party wall
Floor
Roof
Openings

Average 0.14 (max. 0.30) 0.00 (max. 0.20)

0.13 (max. 0.25) (no roof)

1.20 (max. 2.00)

0.15 (max. 0.70) -

Highest

0.13 (max. 0.70)

1.27 (max. 3.30)

OK OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

OK

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

None

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls Hot water controls:	Time and temperature z No cylinder No cylinder	one control by device in database	ок
Boiler interlock:	Yes		ок
7 Low energy lights			
Percentage of fixed lights wit Minimum	h low-energy fittings	100.0% 75.0%	ок
8 Mechanical ventilation			
Continuous supply and extra Specific fan power: Maximum	ct system	0.52 1.5	oK
MVHR efficiency:		90%	OK .
Minimum		70%	ок
9 Summertime temperature			
Overheating risk (Thames va Based on:	lley):	Medium	ОК
Overshading: Windows facing: South Windows facing: South Ventilation rate: Blinds/curtains:		Average or unknown 2.16m² 3.78m² 3.00 None Closed 100% of daylight hours	
10 Key features Air permeablility Doors U-value Party Walls U-value Photovoltaic array		3.0 m³/m²h 1 W/m²K 0 W/m²K	

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Project Information:

Assessed By: () Building Type: Maisonette

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 84.96m²

Site Reference: Clarion Richmond College Plot Reference: GF 2B4P Masionette Type 3A

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 17.98 kg/m²
Dwelling Carbon Dioxide Emission Rate (DER) 10.03 kg/m²

10.03 kg/m² **OK**

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

45.0 kWh/m² OK

2 Fabric U-values

Element
External wall
Party wall
Floor
Roof
Openings

Average 0.14 (max. 0.30) 0.00 (max. 0.20)

0.13 (max. 0.25) (no roof) 1.24 (max. 2.00) Highest 0.15 (max. 0.70)

51.8 kWh/m²

0.13 (max. 0.70)

1.27 (max. 3.30)

OK OK

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

OK

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

None

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	Time and temperature	zone control by device in database	OK
Hot water controls:	No cylinder		
	No cylinder		
Boiler interlock:	Yes		OK
7 Low energy lights	ann ann fittin an	400.00/	
Percentage of fixed lights with leading to the Minimum	ow-energy fittings	100.0% 75.0%	ок
8 Mechanical ventilation		73.076	OK .
Continuous supply and extract s	cyctom		
Specific fan power:	system	0.77	
Maximum		1.5	ок
MVHR efficiency:		87%	
Minimum		70%	ОК
9 Summertime temperature			
Overheating risk (Thames valle	y):	Medium	ОК
Based on:			
Overshading:		Average or unknown	
Windows facing: North		1.08m²	
Windows facing: West		2.16m²	
Windows facing: South		2.16m²	
Windows facing: North		2.16m ² 2.16m ²	
Windows facing: West		3.78m ²	
Windows facing: South Windows facing: North		2.16m ²	
Windows facing: North		3.78m²	
Ventilation rate:		4.00	
Blinds/curtains:			

10 Key features

Air permeablility
Doors U-value
External Walls U-value
Party Walls U-value
Photovoltaic array

3.0 m³/m²h 1 W/m²K 0.13 W/m²K 0 W/m²K

Closed 100% of daylight hours

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Project Information:

Assessed By: () Building Type: Maisonette

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 85.98m²

Site Reference: Clarion Richmond College Plot Reference: GF 2B4P Masionette Type 3B

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 16.31 kg/m²
Dwelling Carbon Dioxide Emission Rate (DER) 7.64 kg/m²

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

41.6 kWh/m² 34.8 kWh/m²

ОК

OK

OK

2 Fabric U-values

Element
External wall
Party wall
Floor
Roof
Openings

Average 0.14 (max. 0.30) 0.00 (max. 0.20)

0.13 (max. 0.25) (no roof) 1.23 (max. 2.00) Highest 0.15 (max. 0.70)

0.13 (max. 0.70)

1.27 (max. 3.30)

OK OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

OK

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

None

Hot water Storage:	No cylinder		
ontrols			
Space heating controls	Time and temperature zo	ne control by device in database	0
Hot water controls:	No cylinder		
	No cylinder		_
Boiler interlock:	Yes		0
ow energy lights			
Percentage of fixed lights with	low-energy fittings	100.0%	•
Minimum		75.0%	0
lechanical ventilation			
Continuous supply and extract	system	0.77	
Specific fan power:		0.77	•
Maximum MVHR efficiency:		1.5 87%	0
Minimum		70%	0
ummertime temperature		1070	
Overheating risk (Thames valle	m/).	Medium	0
ed on:	,y).	Wedam	
Overshading:		Average or unknown	
Windows facing: North		1.08m²	
Windows facing: North		3.78m²	
Windows facing: North		1.08m²	
Windows facing: North		2.16m²	
Windows facing: South		3.78m²	
Ventilation rate:		2.50	
Blinds/curtains:			
		Closed 100% of daylight hours	
Koy foatures			
Key features Air permeablility		3.0 m³/m²h	
Doors II-value		1 \M/m²K	

Doors U-value External Walls U-value Party Walls U-value

Photovoltaic array

1 W/m²K 0.13 W/m²K 0 W/m²K

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Project Information:

Assessed By: () Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 66.06m²

Site Reference: Clarion Richmond College Plot Reference: GF 1B2P WCH Type 4

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 18.35 kg/m²
Dwelling Carbon Dioxide Emission Rate (DER) 9.40 kg/m²

9.40 kg/m² **OK**

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

45.4 kWh/m² 41.6 kWh/m²

2 Fabric U-values

Element
External wall
Party wall
Floor
Roof
Openings

Averáge 0.14 (max. 0.30) 0.00 (max. 0.20) 0.13 (max. 0.25) (no roof)

1.21 (max. 2.00)

Highest 0.15 (max. 0.70) -0.13 (max. 0.70) 1.27 (max. 3.30)

OK OK OK

OK

OK

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

Secondary heating system: None

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	Time and temperature z	one control by device in database	OK
Hot water controls:	No cylinder	•	
	No cylinder		
Boiler interlock:	Yes		OK
7 Low energy lights			
Percentage of fixed lights with I	ow-energy fittings	100.0%	
Minimum		75.0%	OK
8 Mechanical ventilation			
Continuous supply and extract	system		
Specific fan power:		0.52	
Maximum		1.5	OK
MVHR efficiency:		90%	
Minimum		70%	OK
9 Summertime temperature			
Overheating risk (Thames valle	y):	Medium	OK
Based on:			
Overshading:		Average or unknown	
Windows facing: North		2.16m²	
Windows facing: North		2.16m ² 3.78m ²	
Windows facing: West Ventilation rate:		3.7611-	
Blinds/curtains:		None	
Billius/Curtairis.		Closed 100% of daylight hours	
		Closed 100 % of daylight flours	
10 Key features			
Air permeablility		3.0 m³/m²h	
Doors U-value		1 W/m²K	
External Walls U-value		0.13 W/m²K	
Party Walls U-value		0 W/m²K	
Photovoltaic array			

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Project Information:

Assessed By: () Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 75m²

Site Reference: Clarion Richmond College Plot Reference: GF 3B5P Type 5

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 16.81 kg/m²
Dwelling Carbon Dioxide Emission Rate (DER) 7.30 kg/m²

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

41.9 kWh/m² 34.9 kWh/m²

ОК

OK

OK

OK

2 Fabric U-values

Element
External wall
Party wall
Floor
Roof
Openings

Average 0.14 (max. 0.30) 0.00 (max. 0.20)

0.13 (max. 0.25) (no roof)

1.23 (max. 2.00)

0.13 (max. 0.70)

1.27 (max. 3.30)

0.15 (max. 0.70)

Highest

ok ok

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

OK

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

None

ylinder insulation Hot water Storage:	No cylinder		
Controls	No cylinder		
Controls			
Space heating controls Hot water controls:	Time and temperature zo No cylinder No cylinder	one control by device in database	0
Boiler interlock:	Yes		0
ow energy lights			
Percentage of fixed lights wi Minimum	th low-energy fittings	100.0% 75.0%	0
lechanical ventilation			
Continuous supply and extra	act system		
Specific fan power: Maximum		0.52 1.5	0
MVHR efficiency: Minimum		90% 70%	0
ummertime temperature		7 0 70	
Overheating risk (Thames va	allev).	Medium	0
ed on:		Modiani	Ū
Overshading: Windows facing: West Windows facing: South Windows facing: West Windows facing: South Ventilation rate: Blinds/curtains:		Average or unknown 2.16m² 4.32m² 2.16m² 3.78m² 3.00 None Closed 100% of daylight hours	
Key features			
Air permeablility Doors U-value		3.0 m³/m²h 1 W/m²K	

Doors U-value
External Walls U-value
Party Walls U-value
Photovoltaic array

1 W/m²K 0.13 W/m²K 0 W/m²K

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Project Information:

Assessed By: () Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 64m²

Site Reference: Clarion Richmond College Plot Reference: GF 1B2P WCH Type 6

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 17.18 kg/m²
Dwelling Carbon Dioxide Emission Rate (DER) 7.89 kg/m²

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

37.5 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE)

33.4 kWh/m²

2 Fabric U-values

| Average | 0.14 (max. 0.30) | Party wall | 0.00 (max. 0.20) | Coor | Co

Highest 0.15 (max. 0.70) -0.13 (max. 0.70) 1.27 (max. 3.30)

OK OK OK

OK

OK

OK

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

Secondary heating system: None

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls Hot water controls:	Time and temperature z No cylinder No cylinder	cone control by device in database	ок
Boiler interlock:	Yes		ок
7 Low energy lights			
Percentage of fixed lights wit Minimum	h low-energy fittings	100.0% 75.0%	ок
8 Mechanical ventilation			
Continuous supply and extra Specific fan power: Maximum	ct system	0.52 1.5	ок
MVHR efficiency:		90%	
Minimum		70%	ок
9 Summertime temperature			
Overheating risk (Thames va	alley):	Medium	ок
Based on: Overshading: Windows facing: South Windows facing: South Ventilation rate: Blinds/curtains:		Average or unknown 2.16m² 3.78m² 2.00 None Closed 100% of daylight hours	
Air permeablility Doors U-value Party Walls U-value Photovoltaic array		3.0 m³/m²h 1 W/m²K 0 W/m²K	

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Project Information:

Assessed By: () Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 73.04m²

Site Reference: Clarion Richmond College Plot Reference: MF 2B4P Type 7

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER)

Dwelling Carbon Dioxide Emission Rate (DER)

16.19 kg/m² 6.28 kg/m²

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

36.6 kWh/m² 28.3 kWh/m²

OK

OK

OK

2 Fabric U-values

Element
External wall
Party wall
Floor
Roof
Openings

Average 0.14 (max. 0.30)

0.00 (max. 0.20)

(no floor) (no roof) 1.22 (max. 2.00) 0.15 (max. 0.70) -

Highest

1.27 (max. 3.30)

ОК

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

OK

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

None

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	Time and temperature zone	ОК	
Hot water controls:	No cylinder		
	No cylinder		
Boiler interlock:	Yes		OK
7 Low energy lights			
Percentage of fixed lights with low-energy fittings		100.0%	
Minimum		75.0%	OK
8 Mechanical ventilation			
Continuous supply and extract	system		
Specific fan power:		0.59	
Maximum		1.5	OK
MVHR efficiency:		89%	
Minimum		70%	ок
9 Summertime temperature			
Overheating risk (Thames valley):		Slight	ок
Based on:			
Overshading:		Average or unknown	
Windows facing: North		4.32m ² 1.08m ²	
Windows facing: South		3.78m²	
Windows facing: South Ventilation rate:		6.00	
Blinds/curtains:		None	
Dill ids/curtains.		Closed 100% of daylight hours	
		Sissed 10078 of daylight hours	
10 Key features			
Air permeablility		3.0 m ³ /m ² h	
Doors U-value		1 W/m²K	
External Walls U-value		0.13 W/m²K	
Party Walls U-value		0 W/m²K	

Photovoltaic array

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Project Information:

Assessed By: () **Building Type:** Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE Total Floor Area: 50.69m²

Plot Reference: Site Reference : Clarion Richmond College MF 1B2P Type 8

, London, TW2 7SJ Address:

Client Details:

Name: Address:

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 17.43 kg/m² Dwelling Carbon Dioxide Emission Rate (DER) 7.71 kg/m²

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) Dwelling Fabric Energy Efficiency (DFEE)

2 Fabric U-values

Element External wall Party wall Floor Roof **Openings**

Average 0.14 (max. 0.30) 0.00 (max. 0.20) (no floor) (no roof) 1.21 (max. 2.00) Highest 0.15 (max. 0.70) 1.27 (max. 3.30)

35.4 kWh/m²

28.4 kWh/m²

OK OK **OK**

OK

OK

OK

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

Air permeability at 50 pascals Maximum

3.00 (design value) 10.0

4 Heating efficiency

Database: (rev 435, product index 017511): Main Heating system:

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

Secondary heating system: None

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	Time and temperature	e zone control by device in database	ок
Hot water controls:	No cylinder	•	
	No cylinder		
Boiler interlock:	Yes		oK
7 Low energy lights			
Percentage of fixed lights with	low-energy fittings	100.0%	
Minimum		75.0%	OK
8 Mechanical ventilation			
Continuous supply and extract	system		
Specific fan power:		0.52	
Maximum		1.5	OK
MVHR efficiency:		90%	
Minimum		70%	ок
9 Summertime temperature			
Overheating risk (Thames valle	ey):	Medium	OK
Based on:			
Overshading:		Average or unknown 2.16m ²	
Windows facing: South Windows facing: South		3.78m ²	
Windows facing: South Windows facing: East		1.89m²	
Ventilation rate:		4.00	
Blinds/curtains:		None	
Dilliad, dariamid.		Closed 100% of daylight hours	
		o.coco too /c o. da.y.i.g.i.c iicaiic	
10 Key features			
Air permeablility		3.0 m³/m²h	
Doors U-value		1 W/m²K	
External Walls U-value		0.13 W/m ² K	
Party Walls U-value		0 W/m²K	
Photovoltaic array			

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Project Information:

Assessed By: () Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 50.33m²

Site Reference: Clarion Richmond College Plot Reference: MF 1B2P Type 9

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 19.53 kg/m²
Dwelling Carbon Dioxide Emission Rate (DER) 9.52 kg/m²

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

47.1 kWh/m² 38.3 kWh/m²

OK

OK

OK

OK

2 Fabric U-values

Element
External wall
Party wall
Floor
Roof
Openings

Averáge 0.15 (max. 0.30) 0.00 (max. 0.20) (no floor) (no roof) 1.23 (max. 2.00) Highest 0.15 (max. 0.70)

1.27 (max. 3.30)

ок

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

OK

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls		one control by device in database	OK
Hot water controls:	No cylinder		
Boiler interlock:	No cylinder Yes		ок
7 Low energy lights	1 65		OK .
Percentage of fixed lights with	low-energy fittings	100.0%	
Minimum	Tiow energy numge	75.0%	ок
8 Mechanical ventilation			
Continuous supply and extract	et system		
Specific fan power:	•	0.52	
Maximum		1.5	ОК
MVHR efficiency:		90%	
Minimum		70%	OK
9 Summertime temperature			
Overheating risk (Thames val	ley):	Slight	OK
Based on: Overshading:		Average or unknown	
Windows facing: North		2.16m ²	
Windows facing: South		3.78m²	
Windows facing: North		1.08m²	
Windows facing: East		2.16m²	
Windows facing: East		2.16m²	
Ventilation rate:		6.00	
Blinds/curtains:		None	
		Close <mark>d 100</mark> % of daylight hour	5
10 Key features			
Air permeablility		3.0 m³/m²h	

Doors U-value
External Walls U-value
Party Walls U-value
Photovoltaic array

1 W/m²K 0.13 W/m²K 0 W/m²K

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Project Information:

Assessed By: () **Building Type:** Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE Total Floor Area: 53.52m²

Plot Reference: MF 1B2P Type 10 Site Reference : Clarion Richmond College

, London, TW2 7SJ Address:

Client Details:

Name: Address:

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 17.24 kg/m² Dwelling Carbon Dioxide Emission Rate (DER) 7.62 kg/m²

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) Dwelling Fabric Energy Efficiency (DFEE)

35.6 kWh/m² 28.6 kWh/m²

2 Fabric U-values

Element **Average** External wall 0.14 (max. 0.30) Party wall 0.00 (max. 0.20) Floor (no floor) Roof (no roof) **Openings** 1.21 (max. 2.00) Highest 0.15 (max. 0.70) 1.27 (max. 3.30)

OK OK **OK**

OK

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

Air permeability at 50 pascals 3.00 (design value)

Maximum **OK** 10.0

4 Heating efficiency

Database: (rev 435, product index 017511): Main Heating system:

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 % OK

Secondary heating system: None

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	Time and temperature	zone control by device in database	OK
Hot water controls:	No cylinder	•	
	No cylinder		
Boiler interlock:	Yes		OK
7 Low energy lights			
Percentage of fixed lights with I	ow-energy fittings	100.0%	
Minimum		75.0%	oK
8 Mechanical ventilation			
Continuous supply and extract :	system		
Specific fan power:		0.52	
Maximum		1.5	OK
MVHR efficiency:		90%	
Minimum		70%	OK
9 Summertime temperature			
Overheating risk (Thames valle	y):	Medium	OK
Based on:			
Overshading:		Average or unknown	
Windows facing: South		2.16m²	
Windows facing: South		3.78m ² 1.89m ²	
Windows facing: West Ventilation rate:			
Blinds/curtains:		4.00 None	
Billius/curtairis.		Closed 100% of daylight hours	
		Closed 100 % of daylight flours	
10 Key features			
Air permeablility		3.0 m³/m²h	
Doors U-value		1 W/m²K	
External Walls U-value		0.13 W/m²K	
Party Walls U-value		0 W/m²K	
Photovoltaic array			

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Project Information:

Assessed By: () Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 70.08m²

Site Reference: Clarion Richmond College Plot Reference: MF 2B4P Type 11

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 17.69 kg/m²
Dwelling Carbon Dioxide Emission Rate (DER) 7.69 kg/m²

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

44.5 kWh/m²

35.6 kWh/m² OK

2 Fabric U-values

Element
External wall
Party wall
Floor
Roof
Openings

Average 0.14 (max. 0.30)

0.00 (max. 0.20) (no floor)

(no roof) 1.23 (max. 2.00)

0.15 (max. 0.70)

Highest

1.27 (max. 3.30) **OK**

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

OK

OK

OK

OK

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

cylinder insulation Hot water Storage:	No cylinder		
Controls	No cylinder		
ontiois			
Space heating controls	Time and temperature zo	one control by device in database	0
Hot water controls:	No cylinder		_
	No cylinder		
Boiler interlock:	Yes		0
ow energy lights			
Percentage of fixed lights wi	th low-energy fittings	100.0%	
Minimum		75.0%	0
lechanical ventilation			
Continuous supply and extra	act system		
Specific fan power:	•	0.52	
Maximum		1.5	0
MVHR efficiency:		90%	
Minimum		70%	0
ummertime temperature			
Overheating risk (Thames v	alley):	Medium	0
ed on:			
Overshading:		Average or unknown	
Windows facing: North		2.16m²	
Windows facing: North		1.08m ²	
Windows facing: West		4.32m²	
Windows facing: North		3.78m²	
Ventilation rate:		4.00	
Blinds/curtain <mark>s:</mark>		None	
		Close <mark>d 100</mark> % of daylight hours	
Key features			
Air permeablility		3.0 m³/m²h	
Doors U-value		1 W/m²K	

Doors U-value
External Walls U-value
Party Walls U-value
Photovoltaic array

3.0 m³/m²h 1 W/m²K 0.13 W/m²K 0 W/m²K

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Project Information:

Assessed By: () Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 70.25m²

Site Reference: Clarion Richmond College Plot Reference: MF 2B4P Type 12

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 15.78 kg/m²
Dwelling Carbon Dioxide Emission Rate (DER) 5.97 kg/m²

kg/m² OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

35.4 kWh/m² 27.7 kWh/m²

OK

OK

OK

OK

2 Fabric U-values

Element
External wall
Party wall
Floor
Roof
Openings

Average 0.15 (max. 0.30)

0.00 (max. 0.20) (no floor)

(no roof) 1.23 (max. 2.00) 0.15 (max. 0.70)

Highest

1.27 (max. 3.30)

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

OK

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	Time and temperature zone contr	ol by device in database	OK
Hot water controls:	No cylinder		
	No cylinder		
Boiler interlock:	Yes		OK
7 Low energy lights			
Percentage of fixed lights with I	ow-energy fittings	100.0%	
Minimum		75.0%	OK
8 Mechanical ventilation			
Continuous supply and extract	system		
Specific fan power:		0.52	01/
Maximum		1.5	OK
MVHR efficiency: Minimum		90% 70%	ок
9 Summertime temperature		70%	OK .
		Medium	OK
Overheating risk (Thames valle Based on:	·y):	Wedium	UK
Overshading:		Average or unknown	
Windows facing: West		2.16m ²	
Windows facing: South		3.78m²	
Windows facing: South		4.32m²	
Windows facing: West		2.16m²	
Ventilation rate:		4.00	
Blinds/curtains:		None	
		Close <mark>d 100</mark> % of daylight hours	
10 Key features			
Air permeablility		3.0 m³/m²h	
Doors U-value		1 W/m²K	
Party Walls U-value		0 W/m²K	

Photovoltaic array

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Project Information:

Assessed By: () **Building Type:** Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE Total Floor Area: 70.46m²

Plot Reference: Site Reference : Clarion Richmond College MF 2B4P Type 13

, London, TW2 7SJ Address:

Client Details:

Name: Address:

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 15.14 kg/m² Dwelling Carbon Dioxide Emission Rate (DER) 5.36 kg/m²

1b TFEE and DFEE

2 Fabric U-values

Target Fabric Energy Efficiency (TFEE) Dwelling Fabric Energy Efficiency (DFEE)

Element External wall Party wall

Floor Roof **Openings**

Average

0.15 (max. 0.30) 0.00 (max. 0.20)

(no floor) (no roof)

1.22 (max. 2.00)

Highest

0.15 (max. 0.70)

30.7 kWh/m²

23.8 kWh/m²

OK 1.27 (max. 3.30)

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

Air permeability at 50 pascals Maximum

10.0

3.00 (design value) **OK**

4 Heating efficiency

Database: (rev 435, product index 017511): Main Heating system:

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

OK

OK

OK

OK

OK

Secondary heating system:

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	Time and temperature	e zone control by device in database	ОК
Hot water controls:	No cylinder	·	
	No cylinder		
Boiler interlock:	Yes		OK
7 Low energy lights			
Percentage of fixed lights with	low-energy fittings	100.0%	
Minimum		75.0%	OK
8 Mechanical ventilation			
Continuous supply and extract	t system		
Specific fan power:		0.52	
Maximum		1.5	OK
MVHR efficiency:		90%	
Minimum		70%	ок
9 Summertime temperature			
Overheating risk (Thames vall	ey):	Medium	OK
Based on:			
Overshading:		Average or unknown	
Windows facing: South		4.32m ²	
Windows facing: East		1.08m² 3.78m²	
Windows facing: South Ventilation rate:		4.00	
Blinds/curtains:		None	
Dill 103/ curtains.		Closed 100% of daylight hours	
		olooda 10070 ol daylight flouro	
10 Key features			
Air permeablility		3.0 m³/m²h	
Doors U-value		1 W/m²K	
External Walls U-value		0.13 W/m ² K	
Party Walls U-value		0 W/m²K	
Photovoltaic array			

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Project Information:

Assessed By: () Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 70.02m²

Site Reference: Clarion Richmond College Plot Reference: MF 2B4P Type 14

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 17.33 kg/m²
Dwelling Carbon Dioxide Emission Rate (DER) 7.29 kg/m²

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

41.7 kWh/m²

33.5 kWh/m² OK

2 Fabric U-values

Element
External wall
Party wall
Floor
Roof

Averáge 0.14 (max. 0.30) 0.00 (max. 0.20) (no floor) (no roof)

1.22 (max. 2.00)

0.15 (max. 0.70)

1.27 (max. 3.30)

Highest

ОК

OK

OK

2a Thermal bridging

Openings

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

OK

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	Time and temperature	zone control by device in database	OK
Hot water controls:	No cylinder	•	
	No cylinder		
Boiler interlock:	Yes		ок
7 Low energy lights			
Percentage of fixed lights with	low-energy fittings	100.0%	
Minimum		75.0%	oK
8 Mechanical ventilation			
Continuous supply and extract	system		
Specific fan power:		0.52	
Maximum		1.5	OK
MVHR efficiency:		90%	
Minimum		70%	ok
9 Summertime temperature			
Overheating risk (Thames valled	ey):	Slight	OK
Based on:			
Overshading:		Average or unknown	
Windows facing: North		4.32m ²	
Windows facing: North		3.78m²	
Windows facing: East		1.08m²	
Ventilation rate:		4.00	
Blinds/curtains:		None	
		Close <mark>d 100</mark> % of daylight hours	
10 Key features			
Air permeablility		3.0 m³/m²h	
Doors U-value		1 W/m²K	
External Walls U-value		0.13 W/m²K	
Party Walls U-value		0 W/m²K	
Photovoltaic array			

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Project Information:

Assessed By: () Building Type: Maisonette

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 83.48m²

Site Reference: Clarion Richmond College Plot Reference: TF 2B4P Masionette Type 15

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 15.72 kg/m²
Dwelling Carbon Dioxide Emission Rate (DER) 7.33 kg/m²

7.33 kg/m² **OK**

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

38.8 kWh/m² 33.5 kWh/m²

0.15 (max. 0.70)

OK

2 Fabric U-values

Element
External wall
Party wall
Floor
Roof
Openings

Average 0.14 (max. 0.30) 0.00 (max. 0.20)

0.00 (max. 0.20) (no floor) 0.13 (max. 0.20)

1.23 (max. 2.00)

0.13 (max. 0.35) 1.27 (max. 3.30)

Highest

OK OK

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

OK

OK

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

Secondary heating system: None

Stroma FSAP 2012 Version: 1.0.4.16 (SAP 9.92) - http://www.stroma.com

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating conti	rols Time and temperatur	re zone control by device in database	OK
Hot water controls:	No cylinder		
	No cylinder		
Boiler interlock:	Yes		OK
7 Low energy lights	N. L. and J. C. and J. and J. C. and J. and J. C. and J. and J. C. and J. and J. C. and J. and J. C. and J. And	100.004	
Percentage of fixed Minimum	lights with low-energy fittings	100.0% 75.0%	OK
8 Mechanical ventilation		75.0%	UK
Continuous supply a Specific fan power:	and extract system	0.59	
Maximum		1.5	ок
MVHR efficiency:		89%	O.K
Minimum		70%	OK
9 Summertime tempera	ture		
Overheating risk (TI		Slight	OK
Based on:	•	<u> </u>	
Overshading:		Average or unknown	
Windows facing: No		2.16m²	
Windows facing: So		1.08m ²	
Windows facing: No Windows facing: So		2.16m ² 1.08m ²	
Windows facing: So		3.78m ²	
Windows facing: So		3.78m²	
Ventilation rate:	, and	8.00	
Blinds/curtains:		None	
		Closed 100% of daylight hour	'S

10 Key features

Air permeablility
Doors U-value
External Walls U-value
Party Walls U-value
Photovoltaic array

3.0 m³/m²h 1 W/m²K 0.13 W/m²K 0 W/m²K

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Project Information:

Assessed By: () Building Type: Maisonette

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 90.66m²

Site Reference: Clarion Richmond College Plot Reference: TF 3B5P Masionette Type 16

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER)

17.44 kg/m²

17.45 kg/m²

17.46 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER) 9.29 kg/m²

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

50.5 kWh/m² 42.7 kWh/m²

OK

OK

OK

2 Fabric U-values

 Element
 Average

 External wall
 0.15 (max. 0.30)

 Party wall
 0.00 (max. 0.20)

 Floor
 0.13 (max. 0.25)

 Roof
 0.13 (max. 0.20)

 Openings
 1.24 (max. 2.00)

0.15 (max. 0.70) -0.13 (max. 0.70) 0.13 (max. 0.35)

1.27 (max. 3.30)

Highest

OK OK OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

OK

OK

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

Secondary heating system: None

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	•	zone control by device in database	OK
Hot water controls:	No cylinder		
Deilen interleele	No cylinder		01/
Boiler interlock: 7 Low energy lights	Yes		OK
Percentage of fixed lights with I	ow-energy fittings	100.0%	
Minimum	ow-energy numgs	75.0%	ок
8 Mechanical ventilation		. 6.6 %	
Continuous supply and extract	svstem		
Specific fan power:	,	0.59	
Maximum		1.5	OK
MVHR efficiency:		89%	
Minimum		70%	ОК
9 Summertime temperature			
Overheating risk (Thames valle	y):	Slight	OK
Based on: Overshading:		Average or unknown	
Windows facing: North		2.16m ²	
Windows facing: South		3.78m²	
Windows facing: South		1.08m²	
Windows facing: North		2.16m²	
Windows facing: South		3.78m²	
Windows facing: South		1.08m ² 2.31m ²	
Windows facing: North Windows facing: South		2.31m²	
Ventilation rate:		8.00	
Blinds/curtains:		None	
		Closed 100% of daylight hou	ırs

10 Key features

Air permeablility
Doors U-value
External Walls U-value
Party Walls U-value
Photovoltaic array

3.0 m³/m²h 1 W/m²K 0.13 W/m²K 0 W/m²K

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Project Information:

Assessed By: () Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 72.88m²

Site Reference: Clarion Richmond College Plot Reference: TF 2B4P Type 17

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 17.75 kg/m²
Dwelling Carbon Dioxide Emission Rate (DER) 9.47 kg/m²

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

44.6 kWh/m² 38.0 kWh/m²

2 Fabric U-values

Element
External wall
Party wall
Floor
Roof

Average
0.14 (max. 0.30)
0.00 (max. 0.20)
(no floor)
0.13 (max. 0.20)
1.22 (max. 2.00)

0.15 (max. 0.70)

0.13 (max. 0.35)

1.27 (max. 3.30)

Highest

ок

OK

OK

OK

OK

2a Thermal bridging

Openings

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

OK

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	Time and temperature zone	e control by device in database	ОК
Hot water controls:	No cylinder	•	
	No cylinder		
Boiler interlock:	Yes		OK
7 Low energy lights			
Percentage of fixed lights with	low-energy fittings	100.0%	
Minimum		75.0%	OK
8 Mechanical ventilation			
Continuous supply and extract	system		
Specific fan power:		0.59	
Maximum		1.5	OK
MVHR efficiency:		89%	
Minimum		70%	ок
9 Summertime temperature			
Overheating risk (Thames valled)	ey):	Slight	ок
Based on:			
Overshading:		Average or unknown	
Windows facing: North		4.32m² 1.08m²	
Windows facing: South		3.78m ²	
Windows facing: South Ventilation rate:		6.00	
Blinds/curtains:		None	
Dill ids/curtains.		Closed 100% of daylight hours	
		Closed 100 % of daylight flours	
10 Key features			
Air permeablility		3.0 m ³ /m ² h	
Doors U-value		1 W/m²K	
External Walls U-value		0.13 W/m²K	
Party Walls U-value		0 W/m²K	

Photovoltaic array

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Project Information:

Assessed By: () **Building Type:** Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE Total Floor Area: 50.69m2

TF 1B2P Type 18 Site Reference : Clarion Richmond College Plot Reference:

, London, TW2 7SJ Address:

Client Details:

Name: Address:

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 19.13 kg/m² Dwelling Carbon Dioxide Emission Rate (DER)

11.10 kg/m² OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) Dwelling Fabric Energy Efficiency (DFEE) 44.1 kWh/m² 40.3 kWh/m²

OK

OK

OK

OK

2 Fabric U-values

Element External wall

0.14 (max. 0.30) Party wall 0.00 (max. 0.20)

(no floor)

Average

0.13 (max. 0.20) 1.21 (max. 2.00)

Highest 0.15 (max. 0.70)

0.13 (max. 0.35)

1.27 (max. 3.30)

OK

2a Thermal bridging

Openings

Floor

Roof

Thermal bridging calculated from linear thermal transmittances for each junction

Air permeability at 50 pascals

Maximum

3.00 (design value)

10.0

OK

4 Heating efficiency

Database: (rev 435, product index 017511): Main Heating system:

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	Time and temperature	e zone control by device in database	ок
Hot water controls:	No cylinder	•	
	No cylinder		
Boiler interlock:	Yes		oK
7 Low energy lights			
Percentage of fixed lights with	low-energy fittings	100.0%	
Minimum		75.0%	OK
8 Mechanical ventilation			
Continuous supply and extract	system		
Specific fan power:		0.52	
Maximum		1.5	OK
MVHR efficiency:		90%	
Minimum		70%	ок
9 Summertime temperature			
Overheating risk (Thames valle	ey):	Medium	OK
Based on:			
Overshading:		Average or unknown 2.16m ²	
Windows facing: South Windows facing: South		3.78m ²	
Windows facing: South Windows facing: East		1.89m²	
Ventilation rate:		4.00	
Blinds/curtains:		None	
Dilliad, dariamid.		Closed 100% of daylight hours	
		o.coco too /c o. da.y.i.g.i.c iicaiic	
10 Key features			
Air permeablility		3.0 m³/m²h	
Doors U-value		1 W/m²K	
External Walls U-value		0.13 W/m ² K	
Party Walls U-value		0 W/m²K	
Photovoltaic array			

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Project Information:

Assessed By: () Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 50.33m²

Site Reference: Clarion Richmond College Plot Reference: TF 1B2P Type 19

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 21.3 kg/m²
Dwelling Carbon Dioxide Emission Rate (DER) 13.04 kg/m²

4 kg/m² OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

56.1 kWh/m² 49.1 kWh/m²

ОК

2 Fabric U-values

Element
External wall
Party wall
Floor
Roof
Openings

Average 0.15 (max. 0.30)

0.00 (max. 0.20)

(no floor) 0.13 (max. 0.20) 1.23 (max. 2.00) Highest 0.15 (max. 0.70)

-0.13 (max. 0.35)

1.27 (max. 3.30)

OK OK

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

OK

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	Time and temperature zone	control by device in database	OK
Hot water controls:	No cylinder		
	No cylinder		
Boiler interlock:	Yes		OK
7 Low energy lights	et et	100.004	
Percentage of fixed lights with lo	ow-energy fittings	100.0%	OK
Minimum		75.0%	OK
8 Mechanical ventilation			
Continuous supply and extract s	system	0.50	
Specific fan power: Maximum		0.52 1.5	ок
MVHR efficiency:		90%	UK
Minimum		70%	ок
9 Summertime temperature			
Overheating risk (Thames valley	v):	Medium	ок
Based on:	,,-		
Overshading:		Average or unknown	
Windows facing: North		2.16m²	
Windows facing: North		1.08m²	
Windows facing: South		3.78m²	
Windows facing: East		2.16m²	
Windows facing: East		2.16m²	
Ventilation rate: Blinds/curtains:		5.00 None	
Billius/curtains.		Closed 100% of daylight hours	
		Closed 100 % of daylight flodis	
10 Key features			
Air permeablility		3.0 m³/m²h	

Doors U-value
External Walls U-value

Party Walls U-value Photovoltaic array

1 W/m²K 0.13 W/m²K 0 W/m²K

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Project Information:

Assessed By: () Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 70.02m²

Site Reference: Clarion Richmond College Plot Reference: TF 2B4P Type 20

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 19.03 kg/m²
Dwelling Carbon Dioxide Emission Rate (DER) 11.01 kg/m²

11.01 kg/m² **OK**

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

52.3 kWh/m² 46.4 kWh/m²

/h/m² OK

2 Fabric U-values

Element
External wall
Party wall
Floor
Roof
Openings

Average 0.15 (max. 0.30)

0.00 (max. 0.20)

(no floor) 0.13 (max. 0.20) 1.24 (max. 2.00) 0.15 (max. 0.70)

Highest

0.13 (max. 0.35)

1.27 (max. 3.30)

OK OK

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

OK

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	Time and temperature	zone control by device in database	ok
Hot water controls:	No cylinder	•	
	No cylinder		
Boiler interlock:	Yes		OK
7 Low energy lights			
Percentage of fixed lights with lo	ow-energy fittings	100.0%	
Minimum		75.0%	OK
8 Mechanical ventilation			
Continuous supply and extract s	system		
Specific fan power:		0.59	
Maximum		1.5	OK
MVHR efficiency:		89%	
Minimum		70%	OK
9 Summertime temperature			
Overheating risk (Thames valley	/):	Medium	oK
Based on:			
Overshading:		Average or unknown	
Windows facing: North		7.56m²	
Windows facing: South		3.78m ² 6.48m ²	
Windows facing: South Ventilation rate:		6.00	
Blinds/curtains:		None	
Bill lus/curtains.		Closed 100% of daylight hours	
		Closed 100 % of daylight flodis	
10 Key features			
Air permeablility		3.0 m³/m²h	
Doors U-value		1 W/m²K	
External Walls U-value		0.13 W/m²K	
Party Walls U-value		0 W/m²K	
Photovoltaic array			

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Project Information:

Assessed By: () Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 53.52m²

Site Reference: Clarion Richmond College Plot Reference: TF 1B2P Type 21

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 18.99 kg/m²
Dwelling Carbon Dioxide Emission Rate (DER) 11.04 kg/m²

11.04 kg/m² **OK**

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

44.5 kWh/m²

40.8 kWh/m²

2 Fabric U-values

Element
External wall
Party wall
Floor
Roof
Openings

Average 0.15 (max. 0.30)

0.00 (max. 0.20) (no floor)

0.13 (max. 0.20) 1.25 (max. 2.00) Highest 0.15 (max. 0.70)

0.13 (max. 0.35)

1.27 (max. 3.30)

OK OK

OK

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

OK

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	•	one control by device in database	OK
Hot water controls:	No cylinder		
Deilen interleele	No cylinder		OK
Boiler interlock: 7 Low energy lights	Yes		OK
Percentage of fixed lights with I	ow-energy fittings	100.0%	
Minimum	ow chargy mangs	75.0%	ок
8 Mechanical ventilation			
Continuous supply and extract	svstem		
Specific fan power:	-,	0.52	
Maximum		1.5	OK
MVHR efficiency:		90%	
Minimum		70%	oK
9 Summertime temperature			
Overheating risk (Thames valle	y):	Medium	OK
Based on:		A	
Overshading: Windows facing: West		Average or unknown	
Windows facing: South		2.16m²	
Windows facing: South		3.78m²	
Ventilation rate:		4.00	
Bli <mark>nds/curtains</mark> :		None	
		Close <mark>d 100</mark> % of daylight hours	
10 Key features			
Air permeablility		3.0 m ³ /m ² h	
Party Walls U-value Photovoltaic array		0 W/m²K	
FIIOLOVOITAIC ATTAY			

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Project Information:

Assessed By: () Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 50.61m²

Site Reference: Clarion Richmond College Plot Reference: TF 1B2P Type 22

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 21.23 kg/m²
Dwelling Carbon Dioxide Emission Rate (DER) 12.92 kg/m²

12.92 kg/m² **OK**

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

54.7 kWh/m² 47.0 kWh/m²

ОК

OK

OK

2 Fabric U-values

Element
External wall
Party wall
Floor
Roof
Openings

Average 0.14 (max. 0.30)

0.00 (max. 0.20) (no floor)

0.13 (max. 0.20) 1.26 (max. 2.00) Highest

0.15 (max. 0.70)

0.13 (max. 0.35)

1.27 (max. 3.30)

ок

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

OK

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

Hot water Storage:	No cylinder		
ontrols			
Space heating controls Hot water controls:	Time and temperature zo No cylinder	one control by device in database	O
	No cylinder		
Boiler interlock:	Yes		0
ow energy lights			
Percentage of fixed lights wi	h low-energy fittings	100.0%	
Minimum		75.0%	C
echanical ventilation			
Continuous supply and extra	ct system		
Specific fan power:		0.52	
Maximum		1.5	O
MVHR efficiency:		90%	
Minimum		70%	0
ummertime temperature			
Overheating risk (Thames va	ılley):	Slight	C
ed on:			
Overshading:		Average or unknown 3.78m²	
Windows facing: South		2.16m²	
Windows facing: North Windows facing: North		1.08m ²	
Windows facing: North		1.08m ²	
Ventilation rate:		6.00	
Blinds/curtains:		None	
Dillias/ our tail is.		Closed 100% of daylight hours	
		Sissou 100 /s si day iigiti flodio	
Key features			
Air permeablility		3.0 m³/m²h	
External Walls U-value		0.13 W/m ² K	
5		0.141/ 01/	

 $0 \text{ W/m}^2\text{K}$

Party Walls U-value Photovoltaic array

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Project Information:

Assessed By: () Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 70.25m²

Site Reference: Clarion Richmond College Plot Reference: TF 2B4P Type 23

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 17.52 kg/m²
Dwelling Carbon Dioxide Emission Rate (DER) 10.66 kg/m²

10.66 kg/m² **OK**

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

44.2 kWh/m² 40.1 kWh/m²

OK

OK

OK

2 Fabric U-values

Element
External wall
Party wall
Floor
Roof
Openings

Average 0.15 (max. 0.30)

0.00 (max. 0.20) (no floor)

0.13 (max. 0.20) 1.26 (max. 2.00) Highest

0.15 (max. 0.70)

0.13 (max. 0.35)

1.27 (max. 3.30)

OK OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

OK

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls	rto symmasi		
Space heating controls	Time and temperature zo	one control by device in database	ок
Hot water controls:	No cylinder	·	
	No cylinder		
Boiler interlock:	Yes		OK
7 Low energy lights			
Percentage of fixed lights wit	h low-energy fittings	100.0%	014
Minimum		75.0%	ОК
8 Mechanical ventilation			
Continuous supply and extra	ct system	0.50	
Specific fan power: Maximum		0.52	OK
MVHR efficiency:		1.5 90%	OK
Minimum		70%	ок
9 Summertime temperature			
Overheating risk (Thames va	ılley):	Medium	ок
Based on:	•		
Overshading:		Average or unknown	
Windows facing: South		4.32m²	
Windows facing: South		3.78m²	
Windows facing: West		2.16m ²	
Windows facing: West		2.16m ²	
Ventilation rate:		4.00 None	
Blinds/curtains:		None	
		Closed 100% of daylight hours	
10 Key features			
Air permeablility		3.0 m³/m²h	
Party Walls U-value		0 W/m²K	
D I () ()			

Photovoltaic array

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Project Information:

Assessed By: () **Building Type:** Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE Total Floor Area: 70.46m²

Site Reference : Clarion Richmond College **Plot Reference:** TF 2B4P Type 24

, London, TW2 7SJ Address:

Client Details:

Name: Address:

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 16.85 kg/m² Dwelling Carbon Dioxide Emission Rate (DER) 9.94 kg/m²

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) Dwelling Fabric Energy Efficiency (DFEE)

39.6 kWh/m² 36.3 kWh/m²

2 Fabric U-values

Element **Average** External wall 0.15 (max. 0.30) Party wall 0.00 (max. 0.20) Floor (no floor) Roof 0.13 (max. 0.20) 1.26 (max. 2.00) **Openings**

Highest 0.15 (max. 0.70) 0.13 (max. 0.35) 1.27 (max. 3.30)

OK OK OK OK

OK

OK

OK

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

4 Heating efficiency

Database: (rev 435, product index 017511): Main Heating system:

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

Secondary heating system: None

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	Time and temperature zon	e control by device in database	ок
Hot water controls:	No cylinder	•	
	No cylinder		
Boiler interlock:	Yes		oK
7 Low energy lights			
Percentage of fixed lights with I	ow-energy fittings	100.0%	
Minimum		75.0%	ок
8 Mechanical ventilation			
Continuous supply and extract	system		
Specific fan power:		0.52	
Maximum		1.5	OK
MVHR efficiency:		90%	01/
Minimum		70%	OK
9 Summertime temperature			
Overheating risk (Thames valle	y):	Medium	OK
Based on:		Average or unknown	
Overshading: Windows facing: South		Average or unknown 4.32m²	
Windows facing: South Windows facing: East		1.32m²	
Windows facing: South		3.78m²	
Ventilation rate:		4.00	
Blinds/curtains:		None	
		Closed 100% of daylight hours	
10 Key features			
Air permeablility		3.0 m³/m²h	
External Walls U-value		0.13 W/m ² K	
Party Walls U-value		0 W/m²K	
Photovoltaic array			

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Project Information:

Assessed By: () **Building Type:** Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE Total Floor Area: 81.11m²

Clarion Richmond College Plot Reference: TF 2B4P Type 25 Site Reference :

, London, TW2 7SJ Address:

Client Details:

Name: Address:

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 19.47 kg/m² Dwelling Carbon Dioxide Emission Rate (DER)

10.86 kg/m² OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) 56.4 kWh/m² Dwelling Fabric Energy Efficiency (DFEE) 45.7 kWh/m²

2 Fabric U-values

Element **Average** Highest 0.14 (max. 0.30) External wall 0.15 (max. 0.70) Floor (no floor) 0.13 (max. 0.20) Roof **Openings**

0.13 (max. 0.35) 1.26 (max. 2.00) 1.27 (max. 3.30)

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals 3.00 (design value)

OK Maximum 10.0

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 % OK

Secondary heating system: None **OK**

OK

OK

OK

Cylinder insulation			
Hot water Storage:	No cylinder		
Controls			
Space heating controls Hot water controls:	Time and temperature zo No cylinder No cylinder	one control by device in database	ок
Boiler interlock:	Yes		ок
Low energy lights			
Percentage of fixed lights wi Minimum	th low-energy fittings	100.0% 75.0%	OK
Mechanical ventilation			
Continuous supply and extra	act system		
Specific fan power: Maximum		0.52 1.5	ок
MVHR efficiency: Minimum		90% 70%	OK
Summertime temperature		1078	UK.
Overheating risk (Thames v	alloy):	Medium	OK
sed on:	alley).	Medium	OK.
Overshading: Windows facing: North Windows facing: North Windows facing: West Windows facing: North Ventilation rate: Blinds/curtains:		Average or unknown 2.16m² 1.08m² 4.32m² 3.78m² 4.00 None Closed 100% of daylight hours	
0 Key features		3.0 m³/m²h	
Air permeablility External Walls U-value		0.13 W/m²K	

Photovoltaic array

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Project Information:

Assessed By: () **Building Type:** Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE Total Floor Area: 69.87m²

Clarion Richmond College Plot Reference: TF 2B4P Type 26 Site Reference :

, London, TW2 7SJ Address:

Client Details:

Name: Address:

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

19.54 kg/m² Target Carbon Dioxide Emission Rate (TER)

Dwelling Carbon Dioxide Emission Rate (DER) 12.59 kg/m² OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) 53.5 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE) 45.3 kWh/m²

2 Fabric U-values

Element **Average** Highest 0.14 (max. 0.30) External wall 0.15 (max. 0.70) Floor (no floor) Roof

0.13 (max. 0.20) 0.13 (max. 0.35) **Openings** 1.26 (max. 2.00) 1.27 (max. 3.30)

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals 3.00 (design value)

OK Maximum 10.0

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 % OK

Secondary heating system: None **OK**

OK

OK

OK

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls Hot water controls:	Time and temperature zo No cylinder No cylinder	one control by device in database	ок
Boiler interlock:	Yes		ok
7 Low energy lights			
Percentage of fixed lights with Minimum	n low-energy fittings	100.0% 75.0%	ок
8 Mechanical ventilation			
Continuous supply and extract Specific fan power:	t system	0.52	
Maximum		1.5	OK
MVHR efficiency: Minimum		90% 70%	ОК
9 Summertime temperature		1070	OIX
Overheating risk (Thames val Based on:	ley):	Medium	ОК
Overshading: Windows facing: South Windows facing: East Windows facing: North Ventilation rate: Blinds/curtains:		Average or unknown 4.32m² 2.16m² 3.78m² 4.00 None Closed 100% of daylight hours	
Air permeablility External Walls U-value Photovoltaic array		3.0 m³/m²h 0.13 W/m²K	

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Project Information:

Assessed By: () Building Type: Maisonette

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 82.02m²

Site Reference: Clarion Richmond College Plot Reference: TF 2B4P Masionette Type 27

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER)

18.64 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER)

11.61 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER)

11.61 kg/m²

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

54.5 kWh/m² 47.4 kWh/m²

2 Fabric U-values

Element
External wall
Party wall
Floor
Roof
Openings

Average 0.15 (max. 0.30)

0.00 (max. 0.20) (no floor)

0.13 (max. 0.20) 1.24 (max. 2.00) Highest 0.15 (max. 0.70)

0.13 (max. 0.35) 1.27 (max. 3.30)

OK OK

OK

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

OK

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	Time and temperate	ure zone control by device in database	ok
Hot water controls:	No cylinder	,	
	No cylinder		
Boiler interlock:	Yes		OK
7 Low energy lights			
Percentage of fixed lights with lo	w-energy fittings	100.0%	
Minimum		75.0%	OK
8 Mechanical ventilation			
Continuous supply and extract s	ystem		
Specific fan power:		0.77	
Maximum		1.5	OK
MVHR efficiency:		87%	
Minimum		70%	OK
9 Summertime temperature			
Overheating risk (Thames valley	r):	Slight	OK
Based on:			
Overshading:		Average or unknown 1.08m ²	
Windows facing: North		3.78m ²	
Windows facing: South Windows facing: North		2.16m ²	
Windows facing: North Windows facing: West		2.16m²	
Windows facing: West Windows facing: South		3.78m ²	
Windows facing: West		2.16m²	
Windows facing: North		2.16m²	
Windows facing: North		1.08m²	
Windows facing: East		1.08m²	
Ventilation rate:		8.00	
Blinds/curtains:			
		Closed 100% of daylight hours	

10 Key features

Air permeablility
Doors U-value
External Walls U-value
Party Walls U-value
Photovoltaic array

3.0 m³/m²h 1 W/m²K 0.13 W/m²K 0 W/m²K

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.16 *Printed on 22 November 2018 at 12:45:59*

Project Information:

Assessed By: () Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 75.56m²

Site Reference: Clarion Richmond College Plot Reference: GF 2B3P WCH Type 1

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 17.49 kg/m²
Dwelling Carbon Dioxide Emission Rate (DER) 4.02 kg/m²

4.02 kg/m² **OK**

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

45.0 kWh/m² 39.6 kWh/m²

OK

OK

2 Fabric U-values

Element
External wall
Party wall
Floor
Roof
Openings

Average 0.15 (max. 0.30)

0.00 (max. 0.20)

0.13 (max. 0.25) (no roof) 1.23 (max. 2.00) 0.15 (max. 0.70)

Highest

0.13 (max. 0.70)

1.27 (max. 3.30)

OK OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

OK

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	Time and temperature zone	control by device in database	ок
Hot water controls:	No cylinder	•	
	No cylinder		
Boiler interlock:	Yes		OK
7 Low energy lights			
Percentage of fixed lights with	low-energy fittings	100.0%	
Minimum		75.0%	OK
8 Mechanical ventilation			
Continuous supply and extract	t system		
Specific fan power:		0.52	
Maximum		1.5	ок
MVHR efficiency:		90%	
Minimum		70%	ок
9 Summertime temperature			
Overheating risk (Thames valled	ey):	Medium	ок
Based on:			
Overshading:		Average or unknown	
Windows facing: East		1.08m ²	
Windows facing: North		3.78m ²	
Windows facing: North		2.16m ²	
Windows facing: East Windows facing: North		1.08m ²	
Ventilation rate:		3.00	
Blinds/curtains:		None	
Dill ids/curtairis.		Closed 100% of daylight hours	
		Olossa 100 /0 of daylight floure	
10 Key features			
Air permeablility		3.0 m³/m²h	
Doors U-value		1 W/m²K	

 $0 \text{ W/m}^2\text{K}$

Party Walls U-value

Photovoltaic array

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.16 Printed on 22 November 2018 at 12:45:58

Project Information:

Assessed By: () Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 73.37m²

Site Reference: Clarion Richmond College Plot Reference: GF 2B4P Type 2

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 17.31 kg/m²
Dwelling Carbon Dioxide Emission Rate (DER) 8.21 kg/m²

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

42.1 kWh/m² 36.5 kWh/m²

ОК

OK

OK

OK

2 Fabric U-values

Element
External wall
Party wall
Floor
Roof
Openings

Average 0.15 (max. 0.30) 0.00 (max. 0.20)

0.13 (max. 0.25) (no roof)

1.21 (max. 2.00)

0.13 (max. 0.70)

0.15 (max. 0.70)

1.27 (max. 3.30)

Highest

OK OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

OK

4 Heating efficiency

Main Heating system: Datab

Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

ylinder insulation Hot water Storage:	No cylinder		
Controls	No cylinder		
ontrois			
Space heating controls Hot water controls:	Time and temperature zo No cylinder No cylinder	one control by device in database	0
Boiler interlock:	Yes		0
ow energy lights			
Percentage of fixed lights w Minimum	th low-energy fittings	100.0% 75.0%	0
lechanical ventilation			
Continuous supply and extra	act system		
Specific fan power: Maximum	·	0.59 1.5	0
MVHR efficiency: Minimum		89% 70%	0
ummertime temperature		7070	
Overheating risk (Thames v	allev):	Slight	0
ed on:	aney).	Slight	O
Overshading: Windows facing: South Windows facing: South Windows facing: North Windows facing: North Ventilation rate: Blinds/curtains:		Average or unknown 1.08m² 3.78m² 1.08m² 2.16m² 3.00 None Closed 100% of daylight hou	ırs
Key features		0.0 2/ 3/	
Air permeablility Doors U-value		3.0 m³/m²h 1 W/m²K	

Doors U-value
External Walls U-value
Party Walls U-value
Photovoltaic array

3.0 m³/m²h 1 W/m²K 0.13 W/m²K 0 W/m²K

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.16 Printed on 22 November 2018 at 12:45:58

Project Information:

Assessed By: () Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 72.75m²

Site Reference: Clarion Richmond College Plot Reference: GF 2B3P WCH Type 3

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 18.04 kg/m²
Dwelling Carbon Dioxide Emission Rate (DER) 8.93 kg/m²

8.93 kg/m² **OK**

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

46.8 kWh/m² 41.4 kWh/m²

ОК

2 Fabric U-values

Element
External wall
Party wall
Floor
Roof
Openings

Average 0.14 (max. 0.30)

0.00 (max. 0.20)

0.13 (max. 0.25) (no roof) 1.22 (max. 2.00) Highest 0.15 (max. 0.70)

0.13 (max. 0.70)

1.27 (max. 3.30)

OK OK

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

OK

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	Time and temperature z	zone control by device in database	OK
Hot water controls:	No cylinder		
	No cylinder		
Boiler interlock:	Yes		ОК
7 Low energy lights			
Percentage of fixed lights with	low-energy fittings	100.0%	01/
Minimum		75.0%	ОК
8 Mechanical ventilation			
Continuous supply and extrac	t system		
Specific fan power:		0.52	01/
Maximum		1.5	OK
MVHR efficiency:		90%	OK
Minimum		70%	OK
9 Summertime temperature			214
Overheating risk (Thames val	ley):	Medium	ОК
Based on:		Average or unknown	
Overshading: Windows facing: North		Average or unknown 2.16m²	
Windows facing: West		3.78m²	
Windows facing: North		1.08m²	
Windows facing: West		1.08m²	
Windows facing: West		2.16m²	
Ventilation rate:		3.00	
Blinds/curtains:		None	
		Close <mark>d 100</mark> % of daylight hours	
10 Key features			
Air permeablility		3.0 m³/m²h	

Doors U-value
External Walls U-value

Party Walls U-value

Photovoltaic array

1 W/m²K 0.13 W/m²K 0 W/m²K

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.16 *Printed on 22 November 2018 at 12:45:57*

Project Information:

Assessed By: () Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 72.75m²

Site Reference: Clarion Richmond College Plot Reference: GF 2B3P WCH Type 4

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 16.79 kg/m²
Dwelling Carbon Dioxide Emission Rate (DER) 7.91 kg/m²

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

40.3 kWh/m² 36.8 kWh/m²

wn/m² OK

2 Fabric U-values

Element
External wall
Party wall
Floor
Roof
Openings

Average 0.15 (max. 0.30)

0.00 (max. 0.20)

0.13 (max. 0.25) (no roof) 1.22 (max. 2.00) Highest 0.15 (max. 0.70)

0.13 (max. 0.70)

1.27 (max. 3.30)

OK OK

OK

OK

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

OK

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	Time and temperature zone co	ontrol by device in database	OK
Hot water controls:	No cylinder		
	No cylinder		
Boiler interlock:	Yes		OK
7 Low energy lights			
Percentage of fixed lights with	low-energy fittings	100.0%	014
Minimum		75.0%	ок
8 Mechanical ventilation			
Continuous supply and extract	t system	0.50	
Specific fan power: Maximum		0.52 1.5	ОК
MVHR efficiency:		90%	OK
Minimum		70%	ок
9 Summertime temperature		1070	
Overheating risk (Thames vall	ev).	Medium	ок
Based on:	<i>-</i> ,,.		
Overshading:		Average or unknown	
Windows facing: West		2.16m²	
Windows facing: West		2.16m²	
Windows facing: South		1.08m²	
Windows facing: West		3.78m²	
Windows facing: South		0.6m²	
Ventilation rate: Blinds/curtains:		3.00	
Biinds/curtains.		Closed 100% of daylight hours	
		Closed 100 % of daylight flours	
10 Key features			
Air permeablility		3.0 m³/m²h	
Doors U-value		1 W/m²K	

 $0 \text{ W/m}^2\text{K}$

Party Walls U-value

Photovoltaic array

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.16 *Printed on 22 November 2018 at 12:45:56*

Project Information:

Assessed By: () Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 77.55m²

Site Reference: Clarion Richmond College Plot Reference: GF 2B4P Type 5

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 17.07 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER) 8.65 kg/m²

kg/m² OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

42.6 kWh/m² 39.6 kWh/m²

OK

OK

OK

2 Fabric U-values

Element
External wall
Party wall
Floor
Roof
Openings

Average 0.15 (max. 0.30)

0.00 (max. 0.20) 0.13 (max. 0.25)

(no roof) 1.22 (max. 2.00) **Highest** 0.15 (max. 0.70)

0.13 (max. 0.70)

1.27 (max. 3.30)

OK OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

OK

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	Time and temperature zone con	itrol by device in database	OK
Hot water controls:	No cylinder		
	No cylinder		
Boiler interlock:	Yes		OK
7 Low energy lights			
Percentage of fixed lights with	low-energy fittings	100.0%	014
Minimum		75.0%	ок
8 Mechanical ventilation			
Continuous supply and extract	t system	0.50	
Specific fan power: Maximum		0.59 1.5	ОК
MVHR efficiency:		89%	OK
Minimum		70%	ок
9 Summertime temperature		1070	
Overheating risk (Thames vall	ev).	Medium	ОК
Based on:			
Overshading:		Average or unknown	
Windows facing: East		1.08m²	
Windows facing: East		3.78m²	
Windows facing: East		2.16m²	
Windows facing: South		1.32m²	
Windows facing: South		0.6m²	
Ventilation rate:		2.00	
Blinds/curtains:		Closed 100% of devilight hours	
		Closed 100% of daylight hours	
10 Key features			
Air permeablility	<u> </u>	3.0 m³/m²h	
Doors U-value		1 W/m²K	

 $0 \text{ W/m}^2\text{K}$

Party Walls U-value

Photovoltaic array

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.16 Printed on 22 November 2018 at 12:45:56

Project Information:

Assessed By: () **Building Type:** Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE Total Floor Area: 93.64m²

Plot Reference: Site Reference : Clarion Richmond College MF 3B5P Type 6

, London, TW2 7SJ Address:

Client Details:

Name: Address:

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

15.54 kg/m² Target Carbon Dioxide Emission Rate (TER) Dwelling Carbon Dioxide Emission Rate (DER)

5.96 kg/m² OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) Dwelling Fabric Energy Efficiency (DFEE) 40.2 kWh/m² 31.2 kWh/m²

2 Fabric U-values

Element External wall Party wall Floor Roof **Openings**

Average 0.14 (max. 0.30) 0.00 (max. 0.20) (no floor) (no roof) 1.23 (max. 2.00) Highest 0.15 (max. 0.70) 1.27 (max. 3.30)

OK OK **OK**

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

Air permeability at 50 pascals Maximum

3.00 (design value)

OK 10.0

4 Heating efficiency

Database: (rev 435, product index 017511): Main Heating system:

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

Secondary heating system: None OK

Hatatan Otanana.	Maria dia dan		
Hot water Storage:	No cylinder		
ontrols			
Space heating controls Hot water controls:	No cylinder	ne control by device in database	0
Doiles interlegic	No cylinder Yes		0
Boiler interlock: ow energy lights	res		0
Percentage of fixed lights wi	th low-energy fittings	100.0%	
Minimum	ar low energy mangs	75.0%	0
lechanical ventilation			
Continuous supply and extra	act system		
Specific fan power:		0.59	
Maximum		1.5	0
MVHR efficiency:		89%	
Minimum		70%	0
ummertime temperature			
Overheating risk (Thames v	alley):	Slight	0
ed on:			
Overshading:		Average or unknown	
Windows facing: North		1.08m²	
Windows facing: North		2.16m²	
Windows facing: South		2.16m²	
Windows facing: East		2.14m²	
Windows facing: South		1.08m²	
Windows facing: East		2.16m²	
Windows facing: Fast		2.16m²	
Ventilation rate:		6.00	
Blinds/curtains:		None	

10 Key features

Air permeablility
Doors U-value
External Walls U-value
Party Walls U-value
Photovoltaic array

3.0 m³/m²h 1 W/m²K 0.13 W/m²K 0 W/m²K

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.16 Printed on 22 November 2018 at 12:45:55

Project Information:

Assessed By: () **Building Type:** Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE Total Floor Area: 74.77m²

Plot Reference: Site Reference : Clarion Richmond College MF 2B4P Type 7

, London, TW2 7SJ Address:

Client Details:

Name: Address:

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) Dwelling Carbon Dioxide Emission Rate (DER) 16.23 kg/m² 6.34 kg/m²

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) Dwelling Fabric Energy Efficiency (DFEE) 37.1 kWh/m² 28.8 kWh/m²

OK

2 Fabric U-values

Element External wall Party wall

0.15 (max. 0.30) Floor (no floor) Roof (no roof)

0.00 (max. 0.20)

0.15 (max. 0.70)

1.27 (max. 3.30)

Highest

OK OK

2a Thermal bridging

Openings

Thermal bridging calculated from linear thermal transmittances for each junction

1.18 (max. 2.00)

Average

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

OK

OK

4 Heating efficiency

Database: (rev 435, product index 017511): Main Heating system:

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	Time and temperature zone cont	rol by device in database	ОК
Hot water controls:	No cylinder		
	No cylinder		
Boiler interlock:	Yes		OK
7 Low energy lights			
Percentage of fixed lights with	low-energy fittings	100.0%	
Minimum		75.0%	ок
8 Mechanical ventilation			
Continuous supply and extract	system		
Specific fan power:		0.59	
Maximum		1.5	OK
MVHR efficiency:		89%	01/
Minimum		70%	OK
9 Summertime temperature			
Overheating risk (Thames valle	ey):	Slight	OK
Based on:		Average or unknown	
Overshading: Windows facing: North		Average or unknown 2.16m²	
Windows facing: North		1.32m²	
Windows facing: North		3.78m²	
Windows facing: South		1.68m²	
Ventilation rate:		6.00	
Blinds/curtains:		None	
		Closed 100% of daylight hours	
10 Key features			
Air permeablility		3.0 m³/m²h	
Doors U-value		1 W/m²K	
Party Walls U-value		0 W/m²K	

Photovoltaic array

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.16 Printed on 22 November 2018 at 12:45:55

Project Information:

Assessed By: () **Building Type:** Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE Total Floor Area: 55.3m²

Plot Reference: Site Reference : Clarion Richmond College MF 1B2P Type 8

, London, TW2 7SJ Address:

Client Details:

Name: Address:

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

18.46 kg/m² Target Carbon Dioxide Emission Rate (TER) Dwelling Carbon Dioxide Emission Rate (DER) 8.53 kg/m²

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) Dwelling Fabric Energy Efficiency (DFEE) 42.4 kWh/m²

34.0 kWh/m²

OK

OK

OK

OK

2 Fabric U-values

Element External wall Party wall Floor Roof **Openings**

Average 0.14 (max. 0.30)

0.00 (max. 0.20) (no floor)

(no roof) 1.21 (max. 2.00) 0.15 (max. 0.70)

Highest

1.27 (max. 3.30)

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

OK

4 Heating efficiency

Database: (rev 435, product index 017511): Main Heating system:

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

Cylinder insulation			
Hot water Storage:	No cylinder		
Controls			
Space heating controls Hot water controls:	Time and temperature zo No cylinder No cylinder	one control by device in database	ок
Boiler interlock:	Yes		OK
Low energy lights			
Percentage of fixed lights wit Minimum	h low-energy fittings	100.0% 75.0%	ок
Mechanical ventilation			
Continuous supply and extra Specific fan power:	ct system	0.52	
Maximum		1.5	ок
MVHR efficiency:		90%	_
Minimum		70%	OK
Summertime temperature			
Overheating risk (Thames va	ılley):	Medium	OK
sed on:			
Overshading:		Average or unknown	
Windows facing: North		3.78m ² 2.16m ²	
Windows facing: North Windows facing: North		1.08m ²	
Windows facing: West		1.08m²	
Ventilation rate:		4.00	
Blinds/curtains:		None Closed 100% of daylight hou	urs
0 Key features			
Air permeablility		3.0 m ³ /m ² h	
Doors U-value		1 W/m²K	

Doors U-value
External Walls U-value
Party Walls U-value
Photovoltaic array

3.0 m³/m²h 1 W/m²K 0.13 W/m²K 0 W/m²K

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Project Information:

Assessed By: () **Building Type:** Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE Total Floor Area: 72.75m²

Plot Reference: Site Reference : Clarion Richmond College MF 2B4P Type 9

, London, TW2 7SJ Address:

Client Details:

Name: Address:

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

16.88 kg/m² Target Carbon Dioxide Emission Rate (TER) Dwelling Carbon Dioxide Emission Rate (DER) 6.99 kg/m²

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) Dwelling Fabric Energy Efficiency (DFEE) 41.8 kWh/m²

33.4 kWh/m²

2 Fabric U-values

Element External wall Party wall Floor Roof

Average 0.15 (max. 0.30) 0.00 (max. 0.20)

(no floor) (no roof)

1.23 (max. 2.00)

0.15 (max. 0.70)

Highest

OK 1.27 (max. 3.30)

2a Thermal bridging

Openings

Thermal bridging calculated from linear thermal transmittances for each junction

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

OK

OK

OK

OK

OK

4 Heating efficiency

Database: (rev 435, product index 017511): Main Heating system:

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

Cylinder insulation Hot water Storage:	No cylinder		<u> </u>
	No cyllidei		
Controls			
On and booting controls	T:	an anatoni la da	01
Space heating controls	·	ne control by device in database	0
Hot water controls:	No cylinder		
Boiler interlock:	No cylinder Yes		0
ow energy lights	res		U
	h lavy an army fitting an	400.00/	
Percentage of fixed lights with Minimum	n low-energy fittings	100.0% 75.0%	•
<u> </u>		75.0%	0
lechanical ventilation			
Continuous supply and extra	ct system		
Specific fan power:		0.59	_
Maximum		1.5	0
MVHR efficiency:		89%	•
Minimum		70%	0
ummertime temperature			
Overheating risk (Thames va	lley):	Medium	0
ed on:			
Overshading:		Average or unknown 2.16m²	
Windows facing: North			
Windows facing: North		1.08m ² 3.78m ²	
Windows facing: West		1.08m ²	
Windows facing: West		4.32m ²	
Windows facing: West Ventilation rate:			
		4.00 None	
Blinds/curtains:		None	
		Closed 100% of daylight hours	
Key features			
Air permeablility		3.0 m³/m²h	
Doors U-value		1 W/m²K	
Doors O-value		1 VV/111-TX	

 $0 \text{ W/m}^2\text{K}$

Party Walls U-value

Photovoltaic array

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Project Information:

Assessed By: () Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 72.75m²

Site Reference: Clarion Richmond College Plot Reference: MF 2B4P Type 10

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 17.1 kg/m²
Dwelling Carbon Dioxide Emission Rate (DER) 7.28 kg/m²

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

33.6 kWh/m²

2 Fabric U-values

Element
External wall
Party wall
Floor
Roof

Average 0.15 (max. 0.30) 0.00 (max. 0.20) (no floor) (no roof)

1.22 (max. 2.00)

0.15 (max. 0.70) -

1.27 (max. 3.30)

Highest

41.7 kWh/m²

OK OK

OK

OK

2a Thermal bridging

Openings

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

OK

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	Time and temperature zo	ne control by device in database	OK
Hot water controls:	No cylinder		
	No cylinder		
Boiler interlock:	Yes		OK
7 Low energy lights			
Percentage of fixed lights with	n low-energy fittings	100.0%	
Minimum		75.0%	OK
8 Mechanical ventilation			
Continuous supply and extra	ct system		
Specific fan power:		0.59	01/
Maximum		1.5	OK
MVHR efficiency: Minimum		89% 70%	ок
9 Summertime temperature		1078	<u> </u>
	llov).	Medium	OK
Overheating risk (Thames va Based on:	ney).	Wedium	UK
Overshading:		Average or unknown	
Windows facing: West		4.32m ²	
Windows facing: West		3.78m²	
Windows facing: West		1.08m²	
Ventilation rate:		4.00	
Bli <mark>nds/curtains</mark> :		None	
		Close <mark>d 100</mark> % of daylight hours	
10 Key features			
Air permeablility		3.0 m ³ /m ² h	
Doors U-value		1 W/m²K	
Party Walls U-value		0 W/m²K	
Photovoltaic array			

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Project Information:

Assessed By: () **Building Type:** Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE Total Floor Area: 54.06m²

Clarion Richmond College Plot Reference: MF 1B2P Type 11 Site Reference :

, London, TW2 7SJ Address:

Client Details:

Name: Address:

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 19.58 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER) 9.77 kg/m²

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

47.4 kWh/m² Dwelling Fabric Energy Efficiency (DFEE) 39.4 kWh/m²

2 Fabric U-values

Element **Average**

0.15 (max. 0.30) External wall Floor (no floor) Roof (no roof)

Openings 1.21 (max. 2.00) 1.27 (max. 3.30)

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals 3.00 (design value)

OK Maximum 10.0

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

Highest

0.15 (max. 0.70)

Secondary heating system: None OK

OK

OK

OK

OK

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	Time and temperature zo	one control by device in database	ок
Hot water controls:	No cylinder		
B 11	No cylinder		01/
Boiler interlock: 7 Low energy lights	Yes		OK
Percentage of fixed lights wit	h low-energy fittings	100.0%	
Minimum	ir low-energy littings	75.0%	ок
8 Mechanical ventilation			
Continuous supply and extra	ct system		
Specific fan power:	•	0.52	
Maximum		1.5	OK
MVHR efficiency:		90%	OK
Minimum 9 Summertime temperature		70%	OK
Overheating risk (Thames va	llov):	Medium	OK
Based on:	iicy).	Medium	OK
Overshading:		Average or unknown	
Windows facing: East		2.16m²	
Windows facing: East		3.78m²	
Windows facing: East Ventilation rate:		1.08m ²	
Blinds/curtains:		4.00 None	
Dill'ido, oditali io.		Closed 100% of daylight hours	
		, ,	
10 Key features			
Air permeablility		3.0 m³/m²h	
Doors U-value		1 W/m²K	
Photovoltaic array			

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Project Information:

Assessed By: () Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 50.72m²

Site Reference: Clarion Richmond College Plot Reference: MF 1B2P Type 12

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 19.35 kg/m²
Dwelling Carbon Dioxide Emission Rate (DER) 9.57 kg/m²

kg/m² **OK**

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

45.5 kWh/m²
37.0 kWh/m²
OK

2 Fabric U-values

Element
External wall
Party wall
Floor
Roof
Openings

Average 0.14 (max. 0.30) 0.00 (max. 0.20) (no floor) (no roof) 1.21 (max. 2.00) Highest 0.15 (max. 0.70) -1.27 (max. 3.30) ок ок

OK

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

Secondary heating system: None

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	Time and temperature z	zone control by device in database	ОК
Hot water controls:	No cylinder	·	
	No cylinder		
Boiler interlock:	Yes		OK
7 Low energy lights			
Percentage of fixed lights with lo	ow-energy fittings	100.0%	
Minimum		75.0%	OK
8 Mechanical ventilation			
Continuous supply and extract s	system		
Specific fan power:		0.52	
Maximum		1.5	OK
MVHR efficiency:		90%	
Minimum		70%	ОК
9 Summertime temperature			
Overheating risk (Thames valle	y):	Medium	OK
Based on:		A	
Overshading:		Average or unknown 2.16m ²	
Windows facing: North Windows facing: East		3.78m²	
Windows facing: East Windows facing: East		2.16m²	
Ventilation rate:		4.00	
Blinds/curtains:		None	
		Closed 100% of daylight hours	
10 Key features			
Air permeablility		3.0 m³/m²h	
Doors U-value		1 W/m²K	
External Walls U-value		0.13 W/m²K	
Party Walls U-value		0 W/m²K	
Photovoltaic array			

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Project Information:

Assessed By: () Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 72.75m²

Site Reference: Clarion Richmond College Plot Reference: MF 2B4P Type 13

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 16.41 kg/m²
Dwelling Carbon Dioxide Emission Rate (DER) 6.72 kg/m²

kg/m² OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

38.2 kWh/m²
30.5 kWh/m²
OK

2 Fabric U-values

Element
External wall
Party wall
Floor
Roof
Openings

Average 0.15 (max. 0.30) 0.00 (max. 0.20) (no floor) (no roof)

1.22 (max. 2.00)

Highest 0.15 (max. 0.70) -1.27 (max. 3.30) ОК

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value) 10.0

.0 **OK**

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

Secondary heating system: None

OK

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	Time and temperature zor	ne control by device in database	ок
Hot water controls:	No cylinder		
	No cylinder		
Boiler interlock:	Yes		OK
7 Low energy lights			
Percentage of fixed lights with	low-energy fittings	100.0%	
Minimum		75.0%	OK
8 Mechanical ventilation			
Continuous supply and extract	system		
Specific fan power:		0.59	
Maximum		1.5	OK
MVHR efficiency:		89%	01/
Minimum		70%	OK
9 Summertime temperature	<u> </u>	• • •	
Overheating risk (Thames valle Based on:	ey):	Medium	OK
Overshading:		Average or unknown	
Windows facing: West		Average or unknown 4.32m ²	
Windows facing: West		1.08m²	
Windows facing: West		3.78m²	
Ventilation rate:		4.00	
Blinds/curtains:		None	
		Closed 100% of daylight hours	
10 Key features			
Air permeablility		3.0 m ³ /m ² h	
Doors U-value		1 W/m²K	
Party Walls U-value		0 W/m²K	
Photovoltaic array			

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Project Information:

Assessed By: () Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 72.82m²

Site Reference: Clarion Richmond College Plot Reference: MF 2B4P Type 14

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 15.96 kg/m²
Dwelling Carbon Dioxide Emission Rate (DER) 6.24 kg/m²

· kg/m² OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

36.4 kWh/m² 28.7 kWh/m²

ОК

2 Fabric U-values

Element
External wall
Party wall
Floor
Roof
Openings

Average 0.15 (max. 0.30)

0.00 (max. 0.20) (no floor)

(no floor) (no roof) 1.22 (max. 2.00) 0.15 (max. 0.70)

Highest

1.27 (max. 3.30)

ОК

OK

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

OK

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	Time and temperature zone contr	ol by device in database	OK
Hot water controls:	No cylinder		
	No cylinder		
Boiler interlock:	Yes		ОК
7 Low energy lights			
Percentage of fixed lights with I	ow-energy fittings	100.0%	
Minimum		75.0%	OK
8 Mechanical ventilation			
Continuous supply and extract	system		
Specific fan power:		0.59	01/
Maximum		1.5	OK
MVHR efficiency: Minimum		89% 70%	ок
9 Summertime temperature		70%	<u> </u>
		Medium	OK
Overheating risk (Thames valle Based on:	·y).	Wedium	OK
Overshading:		Average or unknown	
Windows facing: West		1.08m ²	
Windows facing: West		3.78m²	
Windows facing: West		4.32m²	
Windows facing: North		1.32m²	
Ventilation rate:		4.00	
Bli <mark>nds/curtain</mark> s:		None	
		Close <mark>d 100</mark> % of daylight hours	
10 Key features			
Air permeablility		3.0 m ³ /m ² h	
Doors U-value		1 W/m²K	
Party Walls U-value		0 W/m²K	

Photovoltaic array

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Project Information:

Assessed By: () **Building Type:** Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE Total Floor Area: 50.72m²

Plot Reference: MF 1B2P Type 15 Site Reference : Clarion Richmond College

, London, TW2 7SJ Address:

Client Details:

Name: Address:

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 18.17 kg/m² Dwelling Carbon Dioxide Emission Rate (DER)

8.40 kg/m² OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) Dwelling Fabric Energy Efficiency (DFEE) 38.9 kWh/m² 31.8 kWh/m²

OK

2 Fabric U-values

Element External wall Party wall Floor Roof **Openings**

Average 0.14 (max. 0.30) 0.00 (max. 0.20) (no floor)

(no roof) 1.21 (max. 2.00) Highest 0.15 (max. 0.70)

1.27 (max. 3.30)

OK OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

OK

OK

4 Heating efficiency

Database: (rev 435, product index 017511): Main Heating system:

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

Cylinder insulation			
Hot water Storage:	No cylinder		
Controls			
Space heating controls	Time and temperature zo	ne control by device in database	OK
Hot water controls:	No cylinder		
	No cylinder		
Boiler interlock:	Yes		OK
Low energy lights			
Percentage of fixed lights with le	ow-energy fittings	100.0%	
Minimum		75.0%	OK
Mechanical ventilation			
Continuous supply and extract s	system		
Specific fan power:		0.52	-11
Maximum		1.5	OK
MVHR efficiency: Minimum		90%	OK
·		70%	ОК
Summertime temperature	`	 15	014
Overheating risk (Thames valle ased on:	y):	Medium	OK
Overshading:		Avorage or unknown	
Windows facing: North		Average or unknown	
Windows facing: East		2.16m²	
Windows facing: East		3.78m²	
Ventilation rate:		4.00	
Blinds/curtains:		None	
Bii ras, sartairis.		Closed 100% of daylight hours	
		Slosed 100 % of daylight flours	
0 Key features			
0 Key features Air permeablility		$3.0 \text{ m}^3/\text{m}^2\text{h}$	
Air permeablility		3.0 m³/m²h 1 W/m²K	
		3.0 m ³ /m ² h 1 W/m ² K 0 W/m ² K	

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Proiect Information:

Assessed By: () Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 72.76m²

Site Reference: Clarion Richmond College Plot Reference: MF 2B4P Type 16

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 15.81 kg/m²
Dwelling Carbon Dioxide Emission Rate (DER) 6.11 kg/m²

6.11 kg/m² OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

35.1 kWh/m² 27.6 kWh/m²

OK

OK

OK

OK

2 Fabric U-values

Element
External wall
Party wall
Floor
Roof
Openings

Average 0.15 (max. 0.30) 0.00 (max. 0.20)

0.00 (max. 0.20) (no floor)

(no floor) (no roof) 1.22 (max. 2.00) 0.15 (max. 0.70)

Highest

1.27 (max. 3.30)

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

OK

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	Time and temperature zo	one control by device in database	ок
Hot water controls:	No cylinder	•	
	No cylinder		
Boiler interlock:	Yes		oK
7 Low energy lights			
Percentage of fixed lights with	low-energy fittings	100.0%	
Minimum		75.0%	OK
8 Mechanical ventilation			
Continuous supply and extrac	t system		
Specific fan power:		0.59	
Maximum		1.5	OK
MVHR efficiency:		89%	01/
Minimum		70%	OK
9 Summertime temperature	,	-	-14
Overheating risk (Thames vall	ey):	Slight	OK
Based on:		Avorago or unknown	
Overshading: Windows facing: West		Average or unknown 4.32m²	
Windows facing: Fast		3.78m²	
Windows facing: East		1.08m²	
Ventilation rate:		6.00	
Blinds/curtains:		None	
		Closed 100% of daylight hours	
10 Key features			
Air permeablility		3.0 m³/m²h	
Doors U-value		1 W/m²K	
Party Walls U-value		0 W/m²K	
Photovoltaic array			

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Project Information:

Assessed By: () **Building Type:** Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE Total Floor Area: 54.06m²

Plot Reference: Site Reference : Clarion Richmond College MF 1B2P Type 17

, London, TW2 7SJ Address:

Client Details:

Name: Address:

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 19.01 kg/m² Dwelling Carbon Dioxide Emission Rate (DER) 9.34 kg/m²

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) Dwelling Fabric Energy Efficiency (DFEE)

2 Fabric U-values

Element **Average** External wall 0.14 (max. 0.30) Party wall 0.00 (max. 0.20) Floor (no floor) Roof (no roof) **Openings** 1.21 (max. 2.00) Highest 0.15 (max. 0.70) 1.27 (max. 3.30)

44.4 kWh/m²

36.9 kWh/m²

OK OK **OK**

OK

OK

OK

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

4 Heating efficiency

Database: (rev 435, product index 017511): Main Heating system:

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

Secondary heating system: None

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	Time and temperature zon	e control by device in database	OK
Hot water controls:	No cylinder		
	No cylinder		
Boiler interlock:	Yes		OK
7 Low energy lights	et et	100.004	
Percentage of fixed lights with I	ow-energy fittings	100.0%	01/
Minimum		75.0%	OK
8 Mechanical ventilation			
Continuous supply and extract	system	0.52	
Specific fan power: Maximum		0.52 1.5	ок
MVHR efficiency:		90%	OI.
Minimum		70%	ок
9 Summertime temperature			
Overheating risk (Thames valle	y):	Medium	ок
Based on:	,		
Overshading:		Average or unknown	
Windows facing: East		1.92m²	
Windows facing: East		1.08m²	
Windows facing: East		3.78m²	
Ventilation rate: Blinds/curtains:		4.00 None	
Biinus/curtains.		Closed 100% of daylight hours	
		Closed 100 % of daylight flours	
10 Key features			
Air permeablility		3.0 m ³ /m ² h	
Doors U-value		1 W/m²K	
Party Walls U-value		0 W/m²K	
Photovoltaic array			

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Project Information:

Assessed By: () Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 73.4m²

Site Reference: Clarion Richmond College Plot Reference: MF 2B4P Type 18

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 16.19 kg/m²
Dwelling Carbon Dioxide Emission Rate (DER) 6.52 kg/m²

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

37.8 kWh/m² 30.3 kWh/m²

2 Fabric U-values

Element
External wall
Party wall
Floor
Roof

Average 0.14 (max. 0.30) 0.00 (max. 0.20) (no floor) (no roof) 1.22 (max. 2.00) Highest 0.15 (max. 0.70) -1.27 (max. 3.30) ок ок

OK

OK

2a Thermal bridging

Openings

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

OK

OK

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

None

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	Time and temperature zone cont	rol by device in database	OK
Hot water controls:	No cylinder		
	No cylinder		
Boiler interlock:	Yes		OK
7 Low energy lights			
Percentage of fixed lights with	low-energy fittings	100.0%	01/
Minimum		75.0%	OK
8 Mechanical ventilation			
Continuous supply and extract	system	0.50	
Specific fan power: Maximum		0.59 1.5	ок
MVHR efficiency:		1.5 89%	UK
Minimum		70%	ок
9 Summertime temperature		7 0 70	<u> </u>
Overheating risk (Thames valle	σΛ).	Medium	OK
Based on:		Wedam	O.K
Overshading:		Average or unknown	
Windows facing: West		4.32m²	
Windows facing: West		3.78m²	
Windows facing: West		1.08m²	
Windows facing: South		1.32m²	
Ventilation rat <mark>e</mark> :		4.00	
Blinds/curtains:		None	
		Close <mark>d 100</mark> % of daylight hours	
10 Key features		0.03/3	
Air permeablility		3.0 m ³ /m ² /	
Doors U-value Party Walls U-value		1 W/m²K 0 W/m²K	
raity vvalis U-value		O VV/IIITI	

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Project Information:

Assessed By: () **Building Type:** Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE Total Floor Area: 86.39m²

Site Reference : Clarion Richmond College **Plot Reference:** TF 3B5P Type 19

, London, TW2 7SJ Address:

Client Details:

Name: Address:

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 17.63 kg/m² Dwelling Carbon Dioxide Emission Rate (DER) 9.53 kg/m²

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) Dwelling Fabric Energy Efficiency (DFEE)

48.8 kWh/m² 41.3 kWh/m² **OK**

2 Fabric U-values

Element **Average** Highest External wall 0.15 (max. 0.30) 0.15 (max. 0.70) Party wall 0.00 (max. 0.20) Floor (no floor) Roof 0.13 (max. 0.20) 1.23 (max. 2.00) **Openings**

OK 0.13 (max. 0.35) OK 1.27 (max. 3.30) OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

Air permeability at 50 pascals 3.00 (design value) Maximum 10.0

4 Heating efficiency

Database: (rev 435, product index 017511): Main Heating system:

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 % OK

Secondary heating system: None OK

OK

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	Time and temperatur	re zone control by device in database	OK
Hot water controls:	No cylinder		
	No cylinder		
Boiler interlock:	Yes		ОК
7 Low energy lights	41.01		
Percentage of fixed lights with I	ow-energy fittings	100.0%	OK
Minimum		75.0%	OK
8 Mechanical ventilation			
Continuous supply and extract	system	0.50	
Specific fan power: Maximum		0.59 1.5	ок
MVHR efficiency:		89%	OK
Minimum		70%	ок
9 Summertime temperature		1070	
Overheating risk (Thames valle	v).	Slight	ОК
Based on:	<i>y</i> /·	Ong.n.	
Overshading:		Average or unknown	
Windows facing: North		2.16m²	
Windows facing: South		1.08m ²	
Windows facing: East		2.14m²	
Windows facing: East		2.16m²	
Windows facing: East		2.16m²	
Windows facing: South		2.16m²	
Ventilation rate:		6.00	
Blinds/curtains:		None	
		Closed 100% of daylight hours	

10 Key features

Air permeablility Doors U-value Party Walls U-value Photovoltaic array 3.0 m³/m²h 1 W/m²K 0 W/m²K

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Project Information:

Assessed By: () Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 74.84m²

Site Reference: Clarion Richmond College Plot Reference: TF 2B4P Type 20

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER)

Dwelling Carbon Dioxide Emission Rate (DER)

8.70 kg/m² **OK**

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

40.8 kWh/m²

16.94 kg/m²

35.5 kWh/m²

2 Fabric U-values

Element
External wall
Party wall
Floor
Roof

Average 0.15 (max. 0.30)

0.00 (max. 0.20) (no floor)

0.13 (max. 0.20) 1.22 (max. 2.00) Highest

0.15 (max. 0.70)

0.13 (max. 0.35)

1.27 (max. 3.30)

ОК

2a Thermal bridging

Openings

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

OK

OK

OK

OK

OK

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

None

Cylinder insulation			
Hot water Storage:	No cylinder		
Controls			
Space heating controls	•	ne control by device in database	OK
Hot water controls:	No cylinder		
	No cylinder		
Boiler interlock:	Yes		OK
Low energy lights			
Percentage of fixed lights with	th low-energy fittings	100.0%	216
Minimum		75.0%	OK
Mechanical ventilation			
Continuous supply and extra	ct system		
Specific fan power:		0.59	-11
Maximum		1.5	OK
MVHR efficiency: Minimum		89% 70%	OK
		70%	OK
Summertime temperature	н. У	Ollista	01/
Overheating risk (Thames va sed on:	alley):	Slight	OK
Overshading:		Average or unknown	
Windows facing: North		1.56m ²	
Windows facing: North		3.78m²	
Windows facing: South		2.16m ²	
Windows facing: North		1.32m²	
Ventilation rate:		6.00	
Blinds/curtains:		None	
		Close <mark>d 100</mark> % of daylight hours	
Key features			
Air permeablility		3.0 m³/m²h	
Doors U-value		1 W/m²K	
Party Walls U-value		0 W/m²K	

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Project Information:

Assessed By: () **Building Type:** Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE Total Floor Area: 55.43m²

Site Reference : Clarion Richmond College Plot Reference: TF 1B2P Type 21

, London, TW2 7SJ Address:

Client Details:

Name: Address:

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 18.01 kg/m² Dwelling Carbon Dioxide Emission Rate (DER)

10.03 kg/m² OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) Dwelling Fabric Energy Efficiency (DFEE) 39.7 kWh/m² 36.6 kWh/m²

OK

OK

OK

2 Fabric U-values

Element External wall Party wall Floor Roof **Openings**

Average 0.14 (max. 0.30)

0.00 (max. 0.20)

1.21 (max. 2.00)

(no floor) 0.13 (max. 0.20) 0.13 (max. 0.35)

1.27 (max. 3.30)

0.15 (max. 0.70)

Highest

OK OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

OK

4 Heating efficiency

Database: (rev 435, product index 017511): Main Heating system:

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

None

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	Time and temperature	zone control by device in database	ОК
Hot water controls:	No cylinder	•	
	No cylinder		
Boiler interlock:	Yes		ОК
7 Low energy lights			
Percentage of fixed lights with	low-energy fittings	100.0%	
Minimum		75.0%	OK
8 Mechanical ventilation			
Continuous supply and extract	system		
Specific fan power:		0.52	
Maximum		1.5	OK
MVHR efficiency:		90%	
Minimum		70%	OK
9 Summertime temperature			
Overheating risk (Thames valled	ey):	Medium	OK
Based on:			
Overshading:		Average or unknown	
Windows facing: South		2.16m²	
Windows facing: South		1.08m²	
Windows facing: South		3.78m²	
Ventilation rate:		4.00	
Blinds/curtains:		None	
		Close <mark>d 100</mark> % of daylight hours	
10 Key features		0 0 0 0	
Air permeablility		3.0 m ³ /m ² h	
Doors U-value		1 W/m²K	
External Walls U-value		0.13 W/m²K	
Party Walls U-value		0 W/m²K	
Photovoltaic array			

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Project Information:

Assessed By: () Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 72.68m²

Site Reference: Clarion Richmond College Plot Reference: TF 2B4P Type 22

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 17.73 kg/m²
Dwelling Carbon Dioxide Emission Rate (DER) 9.62 kg/m²

ng Carbon Dioxide Emission Rate (DER) 9.62 kg/m² OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

46.1 kWh/m² 40.5 kWh/m²

2 Fabric U-values

Element
External wall
Party wall
Floor
Roof
Openings

Average 0.15 (max. 0.30) 0.00 (max. 0.20) (no floor) 0.13 (max. 0.20) 1.23 (max. 2.00)

0.15 (max. 0.70) -0.13 (max. 0.35) 1.27 (max. 3.30)

Highest

OK OK OK

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0 **OK**

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 % OK

Secondary heating system: None

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	Time and temperature zone	e control by device in database	OK
Hot water controls:	No cylinder		
	No cylinder		
Boiler interlock:	Yes		OK
7 Low energy lights			
Percentage of fixed lights with	low-energy fittings	100.0%	014
Minimum		75.0%	ок
8 Mechanical ventilation			
Continuous supply and extrac	t system	0.50	
Specific fan power: Maximum		0.59 1.5	ОК
MVHR efficiency:		89%	UK
Minimum		70%	ок
9 Summertime temperature		1070	
Overheating risk (Thames vall	ev).	Medium	ОК
Based on:			
Overshading:		Average or unknown	
Windows facing: West		4.32m²	
Windows facing: West		3.78m²	
Windows facing: South		2.16m²	
Windows facing: South		1.08m ²	
Windows facing: West		1.08m ²	
Ventilation rate:		4.00	
Blinds/curtains:		None	
		Closed 100% of daylight hours	
10 Key features			
Air permeablility		3.0 m³/m²h	
Doors U-value		1 W/m²K	

 $0 \text{ W/m}^2\text{K}$

Party Walls U-value

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Project Information:

Assessed By: () Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 96.34m²

Site Reference: Clarion Richmond College Plot Reference: TF 3B5P Type 23

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 16.64 kg/m²
Dwelling Carbon Dioxide Emission Rate (DER) 8.58 kg/m²

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

47.1 kWh/m²

40.5 kWh/m²

OK

OK

OK

OK

2 Fabric U-values

Element
External wall
Party wall
Floor
Roof
Openings

Average 0.15 (max. 0.30)

0.00 (max. 0.20) (no floor)

0.13 (max. 0.20) 1.26 (max. 2.00) Highest 0.15 (max. 0.70)

0.13 (max. 0.35)

1.27 (max. 3.30)

ок

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

OK

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

None

Hot water Storage:	No cylinder		
ontrols			
Space heating controls	Time and temperature 76	and control by dovice in detabage	Ol
Hot water controls:	No cylinder	one control by device in database	O.
riot water controls.	No cylinder		
Boiler interlock:	Yes		Ol
ow energy lights			
Percentage of fixed lights w	rith low-energy fittings	100.0%	
Minimum		75.0%	Ol
lechanical ventilation			
Continuous supply and extr	act system		
Specific fan power:		0.59	
Maximum		1.5	OI
MVHR efficiency:		89%	
Minimum		70%	OI
ummertime temperature			
Overheating risk (Thames v	valley):	Medium	OI
ed on:			
Overshading:		Average or unknown	
Windows facing: South		3.78m ²	
Windows facing: South		1.08m ²	
Windows facing: West		3.78m ²	
Windows facing: West		3.24m²	
Windows facing: West		2.16m ² 1.32m ²	
Windows facing: North			
Ventilation rate:		6.00	
Blinds/curtains:		None Closed 100% of daylight hou	

10 Key features

Air permeablility Party Walls U-value Photovoltaic array $3.0~\text{m}^3/\text{m}^2\text{h}$ $0~\text{W/m}^2\text{K}$

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Project Information:

Assessed By: () Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 50.72m²

Site Reference: Clarion Richmond College Plot Reference: TF 1B2P Type 24

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 19.93 kg/m²
Dwelling Carbon Dioxide Emission Rate (DER) 11.62 kg/m²

11.62 kg/m² **OK**

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

48.0 kWh/m² 42.2 kWh/m²

OK

OK

OK

2 Fabric U-values

Element
External wall
Party wall
Floor
Roof
Openings

Average 0.14 (max. 0.30)

0.00 (max. 0.20) (no floor)

0.13 (max. 0.20) 1.25 (max. 2.00) Highe<mark>st</mark>

0.15 (max. 0.70)

0.13 (max. 0.35) 1.27 (max. 3.30) ОК

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

OK

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

None

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls Hot water controls:	Time and temperature zo No cylinder No cylinder	one control by device in database	ок
Boiler interlock:	Yes		ок
7 Low energy lights			
Percentage of fixed lights with Minimum	th low-energy fittings	100.0% 75.0%	ок
8 Mechanical ventilation			
Continuous supply and extra Specific fan power: Maximum MVHR efficiency:	ct system	0.52 1.5 90%	ок
Minimum		70%	ок
9 Summertime temperature			
Overheating risk (Thames values assed on: Overshading: Windows facing: East Windows facing: North Windows facing: East Ventilation rate: Blinds/curtains:	alley):	Average or unknown 3.78m² 1.32m² 2.16m² 4.00 None Closed 100% of daylight hours	ОК
Air permeablility Party Walls U-value Photovoltaic array		3.0 m³/m²h 0 W/m²K	

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Project Information:

Assessed By: () Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 72.75m²

Site Reference: Clarion Richmond College Plot Reference: TF 2B4P Type 25

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 17.56 kg/m²
Dwelling Carbon Dioxide Emission Rate (DER) 9.29 kg/m²

kg/m² OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

38.0 kWh/m² OK

2 Fabric U-values

Element
External wall
Party wall
Floor
Roof
Openings

Averáge 0.15 (max. 0.30) 0.00 (max. 0.20) (no floor) 0.13 (max. 0.20) 1.26 (max. 2.00)

0.15 (max. 0.70) -0.13 (max. 0.35) 1.27 (max. 3.30)

Highest

44.0 kWh/m²

OK OK OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0 **OK**

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

Secondary heating system: None

OK

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	•	one control by device in database	OK
Hot water controls:	No cylinder No cylinder		
Boiler interlock:	Yes		ок
7 Low energy lights			
Percentage of fixed lights with	low-energy fittings	100.0%	
Minimum		75.0%	ок
8 Mechanical ventilation			
Continuous supply and extrac	t system		
Specific fan power: Maximum		0.59 1.5	ОК
MVHR efficiency:		89%	UK
Minimum		70%	ок
9 Summertime temperature			
Overheating risk (Thames val	ey):	Slight	ок
Based on:			
Overshading:		Average or unknown	
Windows facing: East		1.08m² 3.78m²	
Windows facing: East Windows facing: West		4.32m ²	
Ventilation rate:		6.00	
Blinds/curtains:		None	
		Closed 100% of daylight hours	
10 Key features			
Air permeablility		3.0 m ³ /m ² h	
Party Walls U-value		0 W/m²K	
Photovoltaic array			

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Project Information:

Assessed By: () **Building Type:** Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE Total Floor Area: 73.25m2

Site Reference : Clarion Richmond College Plot Reference: TF 2B4P Type 26

, London, TW2 7SJ Address:

Client Details:

Name: Address:

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 18.01 kg/m² Dwelling Carbon Dioxide Emission Rate (DER) 9.79 kg/m²

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) 46.9 kWh/m² Dwelling Fabric Energy Efficiency (DFEE) 40.9 kWh/m²

2 Fabric U-values

Element External wall Party wall Floor Roof

Average 0.14 (max. 0.30) 0.00 (max. 0.20) (no floor) 0.13 (max. 0.20) 1.26 (max. 2.00) **Openings** 2a Thermal bridging

Highest 0.15 (max. 0.70)

0.13 (max. 0.35) 1.27 (max. 3.30)

3.00 (design value)

OK OK OK

OK

OK

OK

OK

OK

Thermal bridging calculated from linear thermal transmittances for each junction

Air permeability at 50 pascals Maximum

10.0

4 Heating efficiency

Database: (rev 435, product index 017511): Main Heating system:

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

Secondary heating system: None

Stroma FSAP 2012 Version: 1.0.4.16 (SAP 9.92) - http://www.stroma.com

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	Time and temperature zon	ne control by device in database	ok
Hot water controls:	No cylinder		
Boiler interlock:	No cylinder Yes		ок
7 Low energy lights	res		UK
Percentage of fixed lights with I	ow-energy fittings	100.0%	
Minimum	- · · · · · · · · · · · · · · · · · · ·	75.0%	ок
8 Mechanical ventilation			
Continuous supply and extract	system		
Specific fan power:		0.59	
Maximum MVHR efficiency:		1.5 89%	OK
Minimum		70%	ок
9 Summertime temperature			
Overheating risk (Thames valle	y):	Medium	ок
Based on:	• •		
Overshading:		Average or unknown	
Windows facing: South Windows facing: West		1.32m² 4.32m²	
Windows facing: West		3.78m ²	
Windows facing: West		1.08m²	
Ventilation rate:		4.00	
Blinds/curtains:		None	
		Closed 100% of daylight hours	
10 Key features			
Air permeablility		3.0 m³/m²h	
Party Walls U-value		0 W/m²K	

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Project Information:

Assessed By: () Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 72.75m²

Site Reference: Clarion Richmond College Plot Reference: TF 2B4P Type 27

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 18.51 kg/m²
Dwelling Carbon Dioxide Emission Rate (DER) 10.35 kg/m²

10.35 kg/m² **OK**

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

50.2 kWh/m² 42.8 kWh/m²

OK

OK

OK

2 Fabric U-values

Element
External wall
Party wall
Floor
Roof
Openings

Average 0.15 (max. 0.30)

0.00 (max. 0.20) (no floor)

(no floor) 0.13 (max. 0.20) 1.26 (max. 2.00) Highest 0.15 (max. 0.70)

0.13 (max. 0.35)

1.27 (max. 3.30)

ок

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

OK

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

None

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	Time and temperature zone contr	ol by device in database	OK
Hot water controls:	No cylinder		
5	No cylinder		-11
Boiler interlock:	Yes		ОК
7 Low energy lights	and the second s	400.007	
Percentage of fixed lights with leading to the Minimum	ow-energy fittings	100.0% 75.0%	ОК
8 Mechanical ventilation		75.0%	OK .
	ovetom		
Continuous supply and extract s Specific fan power:	system	0.59	
Maximum		1.5	ок
MVHR efficiency:		89%	
Minimum		70%	ок
9 Summertime temperature			
Overheating risk (Thames valle	y):	Medium	ок
Based on:			
Overshading:		Average or unknown	
Windows facing: North		2.16m²	
Windows facing: North		1.08m ² 4.32m ²	
Windows facing: West Windows facing: West		3.78m ²	
Windows facing: West		1.08m ²	
Ventilation rate:		4.00	
Blinds/curtains:		None	
		Closed 100% of daylight hours	
		, ,	
10 Key features			
Air permeablility		3.0 m³/m²h	
Party Walls U-value		0 W/m²K	

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Project Information:

Assessed By: () Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 54.06m²

Site Reference: Clarion Richmond College Plot Reference: TF 1B2P Type 28

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER)

20.76 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER)

13.72 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER) 13.72 kg/m² OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) 53.5 kWh/m²
Dwelling Fabric Energy Efficiency (DFEE) 46.2 kWh/m²

welling Fabric Energy Efficiency (DFEE) 46.2 kWn/m²

2 Fabric U-values

 Element
 Average

 External wall
 0.14 (max. 0.30)

 Party wall
 0.00 (max. 0.20)

 Floor
 (no floor)

 Roof
 0.13 (max. 0.20)

 Openings
 1.25 (max. 2.00)

0.13 (max. 0.35) 1.27 (max. 3.30)

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals

3.00 (design value)

Maximum 10.0 **OK**

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 % OK

Highest

0.15 (max. 0.70)

Secondary heating system: None

OK

OK

OK

OK

OK

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls Hot water controls:	Time and temperature z No cylinder No cylinder	zone control by device in database	ок
Boiler interlock:	Yes		ок
7 Low energy lights			
Percentage of fixed lights with Minimum	h low-energy fittings	100.0% 75.0%	ок
8 Mechanical ventilation			
Continuous supply and extra Specific fan power: Maximum	ct system	0.52 1.5	ок
MVHR efficiency: Minimum		90% 70%	ОК
9 Summertime temperature		70%	UK
Overheating risk (Thames va	allow):	Medium	ОК
Based on:	illey).	Mediam	OK
Overshading: Windows facing: East Windows facing: East		Average or unknown 1.08m ² 2.16m ²	
Windows facing: East Ventilation rate: Blinds/curtains:		3.78m² 4.00 None	
10 Key features		Closed 100% of daylight hours	
Air permeablility		3.0 m³/m²h	
Party Walls U-value Photovoltaic array		0 W/m²K	

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Project Information:

Assessed By: () Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 72.75m²

Site Reference: Clarion Richmond College Plot Reference: GF 2B3P WCH Type 29

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER)

Dwelling Carbon Dioxide Emission Rate (DER)

9.58 kg/m² OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

46.5 kWh/m² 43.9 kWh/m²

18 kg/m²

OK

2 Fabric U-values

Element
External wall
Party wall
Floor
Roof
Openings

Average 0.15 (max. 0.30) 0.00 (max. 0.20)

0.00 (max. 0.20) 0.13 (max. 0.25) (no roof)

1.22 (max. 2.00)

0.13 (max. 0.70)

0.15 (max. 0.70)

1.27 (max. 3.30)

Highest

OK OK OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

OK

OK

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester

Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

None

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	Time and temperature zone control	ol by device in database	OK
Hot water controls:	No cylinder		
	No cylinder		
Boiler interlock:	Yes		ОК
7 Low energy lights			
Percentage of fixed lights with I	ow-energy fittings	100.0%	01/
Minimum		75.0%	ОК
8 Mechanical ventilation			
Continuous supply and extract	system		
Specific fan power: Maximum		0.52	OK
MVHR efficiency:		1.5 90%	OK
Minimum		70%	ок
9 Summertime temperature		1070	O.C
Overheating risk (Thames valle	w/)·	Medium	ок
Based on:	,,),-	Wediam	OK
Overshading:		Average or unknown	
Windows facing: North		1.32m²	
Windows facing: West		3.78m²	
Windows facing: West		2.16m²	
Windows facing: West		2.16m²	
Windows facing: North		0.6m ²	
Ventilation rate:		2.00	
Blinds/curtains:			
		Closed 100% of daylight hours	
10 Key features			
Air permeablility		3.0 m³/m²h	
Doors U-value		1 W/m²K	

 $0 \text{ W/m}^2\text{K}$

Party Walls U-value

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Project Information:

Assessed By: () Building Type: End-terrace House

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 117.98m²

Site Reference: Clarion Richmond College Plot Reference: Terrace 1 House 4B6P Type 30

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 16.06 kg/m²
Dwelling Carbon Dioxide Emission Rate (DER) 10.58 kg/m²

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) 50.9 kWh/m²
Dwelling Fabric Energy Efficiency (DFEE) 42.5 kWh/m²

2 Fabric U-values

Element **Average** Highest External wall 0.15 (max. 0.30) 0.15 (max. 0.70) OK Party wall 0.00 (max. 0.20) **OK** Floor 0.13 (max. 0.25) 0.13 (max. 0.70) OK Roof 0.13 (max. 0.20) 0.13 (max. 0.35) OK **Openings** 1.25 (max. 2.00) 1.27 (max. 3.30) OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals

Maximum

3.00 (design value)

10.0

OK

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 % OK

Secondary heating system: None

OK

OK

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	Time and temperature a	zone control by device in database	OK
Hot water controls:	No cylinder		
Dailar interleak	No cylinder		ок
Boiler interlock: 7 Low energy lights	Yes		UK
Percentage of fixed lights with lo	w-anaray fittings	100.0%	
Minimum	Jw-energy mungs	75.0%	ОК
8 Mechanical ventilation		1 0.0 /0	
Continuous supply and extract s	system		
Specific fan power:	yotom	1	
Maximum		1.5	OK
MVHR efficiency:		86%	
Minimum		70%	OK
9 Summertime temperature			
Overheating risk (Thames valley	<i>י</i>):	Slight	OK
Based on:			
Overshading:		Average or unknown	
Windows facing: East		1.08m² 1.08m²	
Windows facing: East Windows facing: East		1.08m²	
Windows facing: East		2.04m²	
Windows facing: South		1.08m²	
Windows facing: South		2.16m²	
Windows facing: East		3.36m²	
Windows facing: South		2.52m²	
Windows facing: West		1.08m²	
Windows facing: West		3.57m²	
Windows facing: West		1.08m² 2.04m²	
Windows facing: West Windows facing: West		2.04m²	
Windows facing: West		1.08m²	
Ventilation rate:		8.00	
Blinds/curtains:		None	
		Closed 100% of daylight hours	
10 Koy foatures			
10 Key features Air permeablility		3.0 m³/m²h	
All porthodollity		0.0 111 /111 11	

1 W/m²K

0 W/m²K

Doors U-value

Party Walls U-value

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Proiect Information:

Assessed By: () Building Type: End-terrace House

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 122.15m²

Site Reference: Clarion Richmond College Plot Reference: Terrace 2 House 4B6P Type 31

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER)

16.03 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER)

11.66 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER)

11.66 kg/m²

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

5

Dwelling Fabric Energy Efficiency (DFEE)

4

51.5 kWh/m² 42.4 kWh/m² OK

2 Fabric U-values

 Element
 Average

 External wall
 0.15 (max. 0.30)

 Party wall
 0.00 (max. 0.20)

 Floor
 0.13 (max. 0.25)

 Roof
 0.13 (max. 0.20)

 Openings
 1.25 (max. 2.00)

Highest 0.15 (max. 0.70) -0.13 (max. 0.70) 0.15 (max. 0.35) 1.27 (max. 3.30)

OK OK OK

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value) 10.0

OK

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 % OK

Secondary heating system: None

Hot water Storage: No cylinder Space heating controls Time and temperature zone control by device in database OK Hot water controls: No cylinder No cylinder Boiler interlock: Yes OK Percentage of fixed lights with low-energy fittings 100.0% Minimum 75.0% OK Mechanical ventilation Continuous supply and extract system Specific fan power: 1 1	5 Cylinder insulation			
Space heating controls Hot water controls: No cylinder No cylinder Boiler interlock: Yes OK 7 Low energy lights Percentage of fixed lights with low-energy fittings Minimum M	Hot water Storage:	No cylinder		
Hot water controls: No cylinder No cylinder No cylinder Solier interlock: Yes OK 7 Low energy lights Percentage of fixed lights with low-energy fittings 100.0% Minimum 75.0% OK 8 Mechanical ventilation Continuous supply and extract system Specific fan power: 1 Maximum 1.5 OK MVHR efficiency: 86% Minimum 70% OK 9 Summertime temperature Overheating risk (Thames valley): Slight OK Based on: Overshading: East Windows facing: East Windows facing: South Windows facing: South Windows facing: South Windows facing: South Windows facing: North Windows facing: West 1.08m² Windows facing: North 2.04m² Windows facing: North 1.08m² Windows facing: No	6 Controls			
Hot water controls: No cylinder No cylinder No cylinder Solier interlock: Yes OK 7 Low energy lights Percentage of fixed lights with low-energy fittings 100.0% Minimum 75.0% OK 8 Mechanical ventilation Continuous supply and extract system Specific fan power: 1 Maximum 1.5 OK MVHR efficiency: 86% Minimum 70% OK 9 Summertime temperature Overheating risk (Thames valley): Slight OK Based on: Overshading: East Windows facing: East Windows facing: South Windows facing: South Windows facing: South Windows facing: South Windows facing: North Windows facing: West 1.08m² Windows facing: North 2.04m² Windows facing: North 1.08m² Windows facing: No				
Hot water controls: No cylinder No cylinder No cylinder Solier interlock: Yes OK 7 Low energy lights Percentage of fixed lights with low-energy fittings Alinium 75.0% OK 8 Mechanical ventilation Continuous supply and extract system Specific fan power: 1 Maximum 1.5 OK MVHR efficiency: 86% Minimum 70% OK 9 Summertime temperature Overheating risk (Thames valley): Slight OK Based on: Overshading: East Windows facing: East Windows facing: South Windows facing: South Windows facing: South Windows facing: South Windows facing: North Windows facing: North Windows facing: North Windows facing: North Unidows f	Space heating controls	Time and temperature zone conf	trol by device in database	ок
Boiler interlock: Yes 7 Low energy lights Percentage of fixed lights with low-energy fittings 100.0% Minimum 75.0% OK 8 Mechanical ventilation Continuous supply and extract system Specific fan power: 1 Maximum 1.5 OK MVHR efficiency: 86% Minimum 70% OK 9 Summertime temperature Overheating risk (Thames valley): Slight OK Based on: Overshading: Average or unknown Windows facing: East Windows facing: East Windows facing: Est Windows facing: South Windows facing: South Windows facing: South Windows facing: North Undows facing: Worth Undows facing: North Windows facing: North Undows facing: South Undows fa		•	·	
Percentage of fixed lights with low-energy fittings Minimum 75.0% 8 Mechanical ventilation Continuous supply and extract system Specific fan power: Maximum 1.5 OK MVHR efficiency: B86% Minimum 70% OK 9 Summertime temperature Overheating risk (Thames valley): Based on: Overshading: Windows facing: East Windows facing: East Windows facing: East Windows facing: South Windows facing: South Windows facing: South Windows facing: South Windows facing: North Windows facing: South Windows facing: North Undows facing: North Undows facing: North Undows facing: South Windows facing: North Undows facing: South Windows facing: South Windows facing: South Windows facing: South Windows facing: South Undows facing: North Undows facing: South Windows facing: South Windows facing: South Undows facing: South Undows facing: South Windows facing: South Undows facing: South Windows facing: South Undows fac		No cylinder		
Percentage of fixed lights with low-energy fittings Minimum 75.0% 8 Mechanical ventilation Continuous supply and extract system Specific fan power: Maximum 1.5 OK MVHR efficiency: Minimum 70% OK 9 Summertime temperature Overheating risk (Thames valley): Based on: Overshading: Windows facing: East Windows facing: East Windows facing: East Windows facing: East Windows facing: South Windows facing: South Windows facing: South Windows facing: South Windows facing: North Windows facing: South Vindows facing: South Ventilation rate: Blinds/curtains: Closed 100% of daylight hours		Yes		ok
Minimum 75.0% OK 8 Mechanical ventilation Continuous supply and extract system Specific fan power:	7 Low energy lights			
S Mechanical ventilation Continuous supply and extract system Specific fan power: Maximum 1.5 OK MVHR efficiency: 86% Minimum 70% OK S Summertime temperature Overheating risk (Thames valley): Based on: Overshading: Windows facing: East Windows facing: East Windows facing: East Windows facing: South Windows facing: South Windows facing: South Windows facing: South Windows facing: North 1.08m² Windows facing: North Windows facing: North 1.08m² Windows facing: North 1.08m² Windows facing: North 1.08m² Windows facing: South Vindows facing: So		ow-energy fittings		
Continuous supply and extract system Specific fan power: Maximum 1.5 OK MVHR efficiency: Minimum 70% OK 9 Summertime temperature Overheating risk (Thames valley): Slight OK Based on: Overshading: Windows facing: East Windows facing: East Windows facing: East Windows facing: East Windows facing: South Windows facing: North 1.08m² Windows facing: North Nord Windows facing: North 1.08m² Windows facing: North 1.08m² Windows facing: South 1.08m² Vindows facing: South 1.08m² Vindows facing: South 1.08m² Ventilation rate: 8.00 Blinds/curtains: Closed 100% of daylight hours			75.0%	OK
Specific fan power: Maximum Maximum MYHR efficiency: Minimum MYHR efficiency: Minimum MYHR efficiency: Minimum MYHR efficiency: Minimum MYHR efficiency: More and MYHR efficie	8 Mechanical ventilation			
Maximum MVHR efficiency: Minimum Minim	Continuous supply and extract s	ystem		
MVHR efficiency: Minimum 70% OK Summertime temperature Overheating risk (Thames valley): Based on: Overshading: Windows facing: East Windows facing: East Windows facing: East Windows facing: Bast Windows facing: South Windows facing: South Windows facing: South Windows facing: North Undows facing: North 1.08m² 2.16m² 1.08m² 2.16m² 1.08m² 2.04m² 1.08m² 4.08m² 1.08m² Windows facing: North 1.08m² Windows facing: South 1.08m² Windows facing: South 1.08m² Ventilation rate: 8.00 Blinds/curtains: None Closed 100% of daylight hours	·			
Minimum 70% OK 9 Summertime temperature Overheating risk (Thames valley): Based on: Overshading: Windows facing: East Windows facing: East Windows facing: East Windows facing: South Windows facing: South Windows facing: South Windows facing: South Windows facing: North Windows facing: North Undows facing: North Windows facing: North Undows facing: North Windows facing: North Undows				oK
Overheating risk (Thames valley): Based on: Overshading: Windows facing: East Windows facing: East Windows facing: East Windows facing: East Windows facing: South Windows facing: South Windows facing: South Windows facing: North Windows facing: North Undows	•			01/
Overheating risk (Thames valley): Based on: Overshading: Windows facing: East Windows facing: East Windows facing: East Windows facing: East Windows facing: South Windows facing: North Windows facing: North Uindows facing: North Windows facing: North Windows facing: West Windows facing: West Windows facing: South None Closed 100% of daylight hours			70%	OK
Based on: Overshading: Windows facing: East Windows facing: East Windows facing: East Windows facing: Sat Windows facing: South Windows facing: South Windows facing: South Windows facing: North Windows facing: West Windows facing: West Windows facing: South Windows facing: West Windows facing: South Windows facing: West Windows facing: North Roof windows facing: South Ventilation rate: Blinds/curtains: Closed 100% of daylight hours	-			
Overshading: Windows facing: East Windows facing: South Windows facing: South Windows facing: South Windows facing: North Vindows facing: North Vindows facing: North 1.08m² Windows facing: North Vindows facing: West Windows facing: North 1.08m² Windows facing: North 1.08m² Vindows facing: North 1.08m² Vindows facing: South Ventilation rate: 8.00 None Closed 100% of daylight hours	<u> </u>	v):	Slight	ok
Windows facing: East Windows facing: East Windows facing: East Windows facing: East Windows facing: South Windows facing: South Windows facing: South Windows facing: North Windows facing: North 1.08m² 204m² Windows facing: North 1.08m² Windows facing: South Ventilation rate: 8.00 Blinds/curtains: None Closed 100% of daylight hours			A	
Windows facing: East Windows facing: East Windows facing: East Windows facing: South Windows facing: South Windows facing: South Windows facing: South Windows facing: North Uindows facing: North Windows facing: North Uindows facing: North Uindows facing: West Windows facing: West Windows facing: South Windows facing: North Uindows facing: North Uindows facing: West Uindows facing: North Uindows facing: Nort				
Windows facing: East Windows facing: South Windows facing: North Windows facing: North Windows facing: North Windows facing: North Windows facing: North Uindows f	_			
Windows facing: East Windows facing: South Windows facing: South Windows facing: South Windows facing: North Windows facing: North 1.08m² 1.08m² 1.08m² 1.08m² 1.08m² 1.08m² Windows facing: West 1.08m² Windows facing: South Ventilation rate: 8.00 Blinds/curtains: None Closed 100% of daylight hours				
Windows facing: South Windows facing: South Windows facing: North Windows facing: North 1.08m² Windows facing: West Windows facing: West Windows facing: North 1.08m² Windows facing: North 1.08m² Windows facing: South Ventilation rate: 8.00 Blinds/curtains: None Closed 100% of daylight hours			1.08m²	
Windows facing: South Windows facing: North Windows facing: West Windows facing: West Windows facing: North 1.08m² Windows facing: North 1.08m² Windows facing: South Ventilation rate: 8.00 Blinds/curtains: None Closed 100% of daylight hours			3.78m²	
Windows facing: North Windows facing: West Windows facing: West Windows facing: North Roof windows facing: South Ventilation rate: Blinds/curtains: 1.08m² 1.08m² 1.08m² 1.08m² 8.00 None Closed 100% of daylight hours			1.08m²	
Windows facing: North Windows facing: North Windows facing: North Windows facing: North Windows facing: West Windows facing: North Roof windows facing: South Ventilation rate: Blinds/curtains: Windows facing: North 1.08m² 1.08m² 1.08m² 8.00 Roof Closed 100% of daylight hours	Windows facing: South		2.16m²	
Windows facing: North Windows facing: North Windows facing: West Windows facing: North 1.08m² Windows facing: North 1.08m² Roof windows facing: South Ventilation rate: 8.00 Blinds/curtains: None Closed 100% of daylight hours	Windows facing: North			
Windows facing: North Windows facing: West Windows facing: North Roof windows facing: South Ventilation rate: Blinds/curtains: 1.08m² 1.08m² 1.08m² 1.08m² 8.00 Closed 100% of daylight hours	S S		2.04m ²	
Windows facing: West Windows facing: North Roof windows facing: South Ventilation rate: Blinds/curtains: 1.08m² 1.08m² 1.08m² 8.00 None Closed 100% of daylight hours	<u> </u>			
Windows facing: North Roof windows facing: South Ventilation rate: Blinds/curtains: 1.08m² 8.00 None Closed 100% of daylight hours	_			
Roof windows facing: South Ventilation rate: Blinds/curtains: 1.08m² 8.00 None Closed 100% of daylight hours				
Ventilation rate: Blinds/curtains: None Closed 100% of daylight hours	_			
Blinds/curtains: None Closed 100% of daylight hours				
Closed 100% of daylight hours				
	Dillius/Guitallis.			
			Closed 100 /0 of daylight flours	
10 Key features	10 Key features			

3.0 m³/m²h

1 W/m²K

 $0 \text{ W/m}^2\text{K}$

Stroma FSAP 2012 Version: 1.0.4.16 (SAP 9.92) - http://www.stroma.com

Air permeablility

Party Walls U-value

Photovoltaic array

Doors U-value

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.16 Printed on 22 November 2018 at 12:49:03

Project Information:

Assessed By: () **Building Type:** End-terrace House

Dwelling Details:

NEW DWELLING DESIGN STAGE Total Floor Area: 97.42m²

Plot Reference: Site Reference : Clarion Richmond College Terrace 3 House 3B5P Type 32

, London, TW2 7SJ Address:

Client Details:

Name: Address:

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 17 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER) 11.21 kg/m² OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) 48.7 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE) 41.0 kWh/m²

2 Fabric U-values

Element **Average** External wall 0.15 (max. 0.30) Party wall 0.00 (max. 0.20) Floor

Roof 0.13 (max. 0.20) **Openings**

0.13 (max. 0.25) 0.13 (max. 0.70) 0.15 (max. 0.35) 1.24 (max. 2.00) 1.27 (max. 3.30)

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

Air permeability at 50 pascals 3.00 (design value)

Maximum **OK** 10.0

4 Heating efficiency

Database: (rev 435, product index 017511): Main Heating system:

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 % OK

Highest

0.15 (max. 0.70)

Secondary heating system: None **OK**

OK

OK

OK

OK

OK

Cylinder insulation			
Hot water Storage:	No cylinder		
Controls			
Space heating controls	Time and temperature zo	ne control by device in database	OK
Hot water controls:	No cylinder		
	No cylinder		
Boiler interlock:	Yes		OK
Low energy lights			
Percentage of fixed lights with	low-energy fittings	100.0%	
Minimum		75.0%	ОК
Mechanical ventilation			
Continuous supply and extrac	t system		
Specific fan power:		0.77	
Maximum		1.5	ОК
MVHR efficiency: Minimum		87% 70%	OK
Summertime temperature		70%	OK
	\.	Climba	ОК
Overheating risk (Thames vall sed on:	ey):	Slight	UK
Overshading:		Average or unknown	
Windows facing: West		1.08m ²	
Windows facing: South		3.78m²	
Windows facing: South		1.08m²	
Windows facing: South		2.16m²	
Windows facing: North		1.08m²	
Windows facing: North		2.04m²	
Windows facing: North		1.08m²	
Windows facing: North		1.08m²	
Roof windows facing: South		1.08m ²	
Ventilation rate:		8.00	
Blinds/curtains:		None	
		Closed 100% of daylight ho	ours

10 Key features

Air permeablility 3.0 m³/m²h
Doors U-value 1 W/m²K
Party Walls U-value 0 W/m²K
Photovoltaic array

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.16 Printed on 22 November 2018 at 12:49:02

Project Information:

Assessed By: () **Building Type:** End-terrace House

Dwelling Details:

NEW DWELLING DESIGN STAGE Total Floor Area: 117.98m²

Site Reference : Clarion Richmond College **Plot Reference:** Terrace 1 House 4B6P Type 33

, London, TW2 7SJ Address:

Client Details:

Name: Address:

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 16.74 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER) 11.18 kg/m² OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) 54.2 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE) 44.7 kWh/m²

2 Fabric U-values

Element **Average** Highest External wall 0.15 (max. 0.30) 0.15 (max. 0.70) OK Party wall 0.00 (max. 0.20) **OK** Floor 0.13 (max. 0.25) 0.13 (max. 0.70) OK Roof 0.13 (max. 0.20) 0.13 (max. 0.35) OK

2a Thermal bridging

Openings

Thermal bridging calculated from linear thermal transmittances for each junction

1.25 (max. 2.00)

Air permeability at 50 pascals 3.00 (design value)

Maximum **OK** 10.0

4 Heating efficiency

Database: (rev 435, product index 017511): Main Heating system:

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 % OK

1.27 (max. 3.30)

Secondary heating system: None **OK**

OK

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	Time and temperature z	one control by device in database	ок
Hot water controls:	No cylinder		
Dailar interleak	No cylinder		ок
Boiler interlock: 7 Low energy lights	Yes		UK
Percentage of fixed lights with lo	w-energy fittings	100.0%	
Minimum	w-energy mangs	75.0%	ок
8 Mechanical ventilation		. 6.6 %	
Continuous supply and extract s	vstem		
Specific fan power:	yotom	1	
Maximum		1.5	ОК
MVHR efficiency:		86%	
Minimum		70%	OK
9 Summertime temperature			
Overheating risk (Thames valley	'):	Slight	OK
Based on:			
Overshading:		Average or unknown 1.08m²	
Windows facing: East Windows facing: East		1.08m²	
Windows facing: East Windows facing: East		1.08m²	
Windows facing: East		2.04m²	
Windows facing: North		1.08m²	
Windows facing: North		2.16m²	
Windows facing: East		3.36m²	
Windows facing: North		2.52m²	
Windows facing: West		1.08m²	
Windows facing: West		3.57m² 1.08m²	
Windows facing: West Windows facing: West		2.04m²	
Windows facing: West		2.04m²	
Windows facing: West		1.08m²	
Ventilation rate:		8.00	
Blinds/curtains:		None	
		Closed 100% of daylight hours	
10 Koy foatures			
10 Key features Air permeablility		3.0 m³/m²h	
All porthodollity		0.0 III /III II	

1 W/m²K

0 W/m²K

Doors U-value

Party Walls U-value

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Project Information:

Assessed By: () Building Type: Mid-terrace House

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 117.98m²

Site Reference: Clarion Richmond College Plot Reference: Terrace 1 House 4B6P Type 34

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 14.77 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER) 9.01 kg/m²

9.01 kg/m² **OK**

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

36.5 kWh/m² OK

2 Fabric U-values

 Element
 Average

 External wall
 0.15 (max. 0.30)

 Party wall
 0.00 (max. 0.20)

 Floor
 0.13 (max. 0.25)

 Roof
 0.13 (max. 0.20)

 Openings
 1.25 (max. 2.00)

Highest
0.15 (max. 0.70)
0.13 (max. 0.70)
0.13 (max. 0.35)
1.27 (max. 3.30)

43.8 kWh/m²

OK OK OK

OK

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 % OK

Secondary heating system: None

Cylinder insulation			
Hot water Storage:	No cylinder		
Controls			
Space heating controls	Time and temperature zo	ne control by device in database	ок
Hot water controls:	No cylinder		
	No cylinder		
Boiler interlock:	Yes		OK
ow energy lights		100.004	
Percentage of fixed lights with	h low-energy fittings	100.0%	01/
Minimum		75.0%	OK
lechanical ventilation			
Continuous supply and extra Specific fan power:	ct system	1	
Maximum		1 1.5	ОК
MVHR efficiency:		86%	O.
Minimum		70%	ОК
Summertime temperature			
Overheating risk (Thames va	ılley):	Slight	OK
ed on:	•	Ğ	
Overshading:		Average or unknown	
Windows facing: East		1.08m²	
Windows facing: East		1.08m²	
Windows facing: East		1.08m ² 2.04m ²	
Windows facing: East Windows facing: East		3.36m ²	
Windows facing: North		2.52m²	
Windows facing: West		1.08m²	
Windows facing: West		3.57m²	
Windows facing: West		1.08m²	
Windows facing: West		2.04m²	
Windows facing: West		2.04m²	
Windows facing: West		1.08m²	
Ventilation rate:		8.00	
Blinds/curtains:		None Closed 100% of daylight ho	uro
		Closed 100% of daylight no	urs
Key features			
Air permeablility		3.0 m³/m²h	
Doors U-value		1 W/m²K	

 $0 \text{ W/m}^2\text{K}$

Party Walls U-value

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Proiect Information:

Assessed By: () Building Type: End-terrace House

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 119.45m²

Site Reference: Clarion Richmond College Plot Reference: Terrace 2 House 4B6P Type 35

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 16.07 kg/m²
Dwelling Carbon Dioxide Emission Rate (DER) 11.58 kg/m²

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

48.8 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE)

39.7 kWh/m²

2 Fabric U-values

Element **Average** Highest External wall 0.15 (max. 0.30) 0.15 (max. 0.70) OK Party wall 0.00 (max. 0.20) **OK** Floor 0.13 (max. 0.25) 0.13 (max. 0.70) OK Roof 0.13 (max. 0.20) 0.15 (max. 0.35) OK 1.24 (max. 2.00) **Openings** 1.27 (max. 3.30) OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals

Maximum

3.00 (design value)
10.0

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 % OK

Secondary heating system: None

OK

OK

OK

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	Time and temperature z	cone control by device in database	ок
Hot water controls:	No cylinder		
	No cylinder		
Boiler interlock:	Yes		OK
7 Low energy lights			
Percentage of fixed lights with lo	w-energy fittings	100.0%	
Minimum		75.0%	OK
8 Mechanical ventilation			
Continuous supply and extract s	ystem		
Specific fan power:		1	
Maximum		1.5	OK
MVHR efficiency:		86%	01/
Minimum		70%	ОК
9 Summertime temperature			
Overheating risk (Thames valley	'):	Slight	ОК
Based on:		Average or under over	
Overshading: Windows facing: West		Average or unknown 1.08m ²	
Windows facing: West Windows facing: South		3.78m²	
Windows facing: South		1.08m²	
Windows facing: South		2.16m²	
Windows facing: North		1.08m²	
Windows facing: North		2.04m²	
Windows facing: North		1.08m²	
Windows facing: North		1.08m²	
Roof windows facing: South		1.08m²	
Ventilation rate:		8.00	
Blinds/curtains:		None	
		Closed 100% of daylight hours	5
10 Vov footures			

10 Key features

Air permeablility 3.0 m³/m²h
Doors U-value 1 W/m²K
Party Walls U-value 0 W/m²K
Photovoltaic array

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.16 Printed on 22 November 2018 at 12:49:01

Project Information:

Assessed By: () **Building Type:** Mid-terrace House

Dwelling Details:

NEW DWELLING DESIGN STAGE Total Floor Area: 119.45m²

Site Reference : Clarion Richmond College **Plot Reference:** Terrace 2 House 4B6P Type 36

, London, TW2 7SJ Address:

Client Details:

Name: Address:

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

14.36 kg/m² Target Carbon Dioxide Emission Rate (TER) Dwelling Carbon Dioxide Emission Rate (DER) 9.66 kg/m²

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) Dwelling Fabric Energy Efficiency (DFEE)

32.8 kWh/m²

2 Fabric U-values

Element **Average** External wall 0.15 (max. 0.30) Party wall 0.00 (max. 0.20) Floor 0.13 (max. 0.25) Roof 0.13 (max. 0.20) 1.24 (max. 2.00) **Openings**

Highest 0.15 (max. 0.70) 0.13 (max. 0.70) 0.15 (max. 0.35) 1.27 (max. 3.30)

40.0 kWh/m²

OK **OK** OK OK OK

OK

OK

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

4 Heating efficiency

Database: (rev 435, product index 017511): Main Heating system:

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 % OK

Secondary heating system: None

5 Cylinder insulation			
Hot water Storage:	No cylinder		
6 Controls			
Space heating controls	Time and temperature z	cone control by device in database	ок
Hot water controls:	No cylinder		
	No cylinder		
Boiler interlock:	Yes		OK
7 Low energy lights			
Percentage of fixed lights with lo	w-energy fittings	100.0%	
Minimum		75.0%	OK
8 Mechanical ventilation			
Continuous supply and extract s	ystem		
Specific fan power:		1	
Maximum		1.5	OK
MVHR efficiency:		86%	01/
Minimum		70%	ОК
9 Summertime temperature			
Overheating risk (Thames valley	'):	Slight	ОК
Based on:		Average or under over	
Overshading: Windows facing: West		Average or unknown 1.08m ²	
Windows facing: West Windows facing: South		3.78m²	
Windows facing: South		1.08m²	
Windows facing: South		2.16m²	
Windows facing: North		1.08m²	
Windows facing: North		2.04m²	
Windows facing: North		1.08m²	
Windows facing: North		1.08m²	
Roof windows facing: South		1.08m²	
Ventilation rate:		8.00	
Blinds/curtains:		None	
		Closed 100% of daylight hours	5
10 Vov footures			

10 Key features

Air permeablility 3.0 m³/m²h
Doors U-value 1 W/m²K
Party Walls U-value 0 W/m²K
Photovoltaic array

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.16 *Printed on 22 November 2018 at 12:49:01*

Proiect Information:

Assessed By: () Building Type: End-terrace House

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 97.42m²

Site Reference: Clarion Richmond College Plot Reference: Terrace 3 House 3B5P Type 37

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER)

17 kg/m²

11 31 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER) 11.21 kg/m² OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

48.7 kWh/m²

41.0 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE)

41.0 kWh/m²

OK

2 Fabric U-values

Element **Average** Highest External wall 0.15 (max. 0.30) 0.15 (max. 0.70) OK Party wall 0.00 (max. 0.20) **OK** Floor 0.13 (max. 0.25) 0.13 (max. 0.70) OK Roof 0.13 (max. 0.20) 0.15 (max. 0.35) OK 1.24 (max. 2.00) **Openings** 1.27 (max. 3.30) OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals 3.00 (design value)

Maximum 10.0 **OK**

4 Heating efficiency

Main Heating system: Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 % OK

Secondary heating system: None

Cylinder insulation			
Hot water Storage:	No cylinder		
Controls			
Space heating controls	Time and temperature zo	ne control by device in database	OK
Hot water controls:	No cylinder		
	No cylinder		
Boiler interlock:	Yes		OK
Low energy lights			
Percentage of fixed lights with	low-energy fittings	100.0%	
Minimum		75.0%	ОК
Mechanical ventilation			
Continuous supply and extrac	t system		
Specific fan power:		0.77	
Maximum		1.5	ОК
MVHR efficiency: Minimum		87% 70%	OK
Summertime temperature		70%	OK
	\.	Climba	ОК
Overheating risk (Thames vall sed on:	ey):	Slight	UK
Overshading:		Average or unknown	
Windows facing: West		1.08m ²	
Windows facing: South		3.78m²	
Windows facing: South		1.08m²	
Windows facing: South		2.16m²	
Windows facing: North		1.08m²	
Windows facing: North		2.04m²	
Windows facing: North		1.08m²	
Windows facing: North		1.08m²	
Roof windows facing: South		1.08m ²	
Ventilation rate:		8.00	
Blinds/curtains:		None	
		Closed 100% of daylight ho	ours

10 Key features

Air permeablility 3.0 m³/m²h
Doors U-value 1 W/m²K
Party Walls U-value 0 W/m²K
Photovoltaic array

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.16 *Printed on 22 November 2018 at 12:49:01*

Project Information:

Assessed By: () Building Type: Mid-terrace House

Dwelling Details:

NEW DWELLING DESIGN STAGETotal Floor Area: 97.42m²

Site Reference: Clarion Richmond College Plot Reference: Terrace 3 House 3B5P Type 38

Address: , London, TW2 7SJ

Client Details:

Name: Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER)

Dwelling Carbon Dioxide Emission Rate (DER)

15.31 kg/m² 9.35 kg/m²

kg/m² OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

Dwelling Fabric Energy Efficiency (DFEE)

40.2 kWh/m² 34.1 kWh/m²

ОК

OK

OK

2 Fabric U-values

Element
External wall
Party wall
Floor
Roof
Openings

Average 0.15 (max. 0.30) 0.00 (max. 0.20)

0.00 (max. 0.20) 0.13 (max. 0.25) 0.13 (max. 0.20)

1.24 (max. 2.00)

0.13 (max. 0.70) 0.15 (max. 0.35)

1.27 (max. 3.30)

0.15 (max. 0.70)

Highest

OK OK OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals Maximum

3.00 (design value)

10.0

OK

4 Heating efficiency

Main Heating system: Database: (re

Database: (rev 435, product index 017511):

Boiler systems with radiators or underfloor heating - mains gas Brand name: Worcester

Model: Greenstar

Model qualifier: 28CDi Compact ErP

(Combi)

Efficiency 89.8 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

None

Cylinder insulation			
Hot water Storage:	No cylinder		
Controls			
Space heating controls	Time and temperature zo	ne control by device in database	OK
Hot water controls:	No cylinder		
	No cylinder		
Boiler interlock:	Yes		OK
Low energy lights			
Percentage of fixed lights with	low-energy fittings	100.0%	
Minimum		75.0%	ОК
Mechanical ventilation			
Continuous supply and extrac	t system		
Specific fan power:		0.77	
Maximum		1.5	ОК
MVHR efficiency: Minimum		87% 70%	OK
Summertime temperature		70%	OK
	\.	Climba	ОК
Overheating risk (Thames vall sed on:	ey):	Slight	UK
Overshading:		Average or unknown	
Windows facing: West		1.08m ²	
Windows facing: South		3.78m²	
Windows facing: South		1.08m²	
Windows facing: South		2.16m²	
Windows facing: North		1.08m²	
Windows facing: North		2.04m²	
Windows facing: North		1.08m²	
Windows facing: North		1.08m²	
Roof windows facing: South		1.08m ²	
Ventilation rate:		8.00	
Blinds/curtains:		None	
		Closed 100% of daylight ho	ours

10 Key features

Air permeablility 3.0 m³/m²h
Doors U-value 1 W/m²K
Party Walls U-value 0 W/m²K
Photovoltaic array