



Sunlight House | Manchester

Mechanical Services Design Criteria

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1 INTRODUCTION

This design criteria details the requirements against which the Mechanical Services design will be developed around.

The project comprises of a Grade 2 listed office refurb:

- Landlords core areas
- Retail Units (not part of this phase)
- Tenant Office Spaces
- Photovoltaic Installation

This document aims to provide clear direction for early client team sign off so any conflict or discrepancy is ironed out early prior to development of the design.

2 MECHANICAL DESIGN CRITERIA

2.1 BUILDING REQUIREMENTS

Regulations/Guidance	
Building Regulations	Part L 2021
EPC Rating	Not Applicable – EPC B being targeted
CO2 Target	Not Applicable - although 65% reduction is suggested.
BREEAM Rating	2014 Refurbishment & Fitout - Excellent
NABERS	4 Stars

2.2 FAÇADE PERFORMANCE

Building Fabric Requirements		
Element	U Value Required (W/m2K)	
External Walls	1.70 1.34	All walls forming the thermal envelope. (above ground)
Ground Contact Walls (basement)	0.34	All walls forming the thermal envelope. (below ground)
Internal Partitions	1.68	
Floor	1.00 0.22	Basement slab.
Internal Floors	1.09	
Roof	1.40 2.30	
Doors	5.80	
Windows	U Value: 5.2 W/m2K G value: 0.37 0.80 LT Value: 0.70	U-Value is overall average, inc glass and frame.
Rooflight	U Value: 5.2 W/m2K G value: 0.55 LT Value: 0.70	U-Value is overall average, inc glass and frame.
Thermal Bridging Coefficient	0.040 W/m2K (TBC)	Non-repeating thermal bridging

The above data has been taken from Yonder NABERS Design for Performance rev 03 & the amended figures from Flatts EPC Modelling version 1

2.3 AIR PERMEABILITY

Air Permeability Requirements		
Air Permeability	9.0 10.0m ³ /h.m ² @50Pa.	To be tested upon completion.

The above data has been taken from Yonder NABERS Design for Performance rev 03 & the amended figures from Flatts EPC Modelling version 1

2.4 EXTERNAL CONDITIONS

External design for Manchester

Design Condition	Summer	Winter
Design Sizing and Load Calculations	28°C db, 20°Cwb	-5°C/100% saturated
Sizing of Equipment	35°C db, 20°C wb (condensers)	

The above data has been taken from Kings Specification pg 19

2.5 INTERNAL DESIGN CRITERIA

Type of Area	Winter	Summer
Office	21°C	24°C
Entrance Reception Area	21°C	24°C
Toilets	19°C	N/A
Showers	23°C	N/A
Staircases & Circulation	18°C	N/A
Comms Room	20°C (+2°C)	20°C (+2°C)

Relative humidity is not controlled.

The above data has been taken from Kings Specification pg 19

2.6 INTERNAL GAINS (ASSOCIATED WITH COOLING CALCULATIONS)

Equipment Gains			
Area	Source	Gain (W/m2)	Comments
Office Floor Plate – terminal sizing	Equipment	5	As per BCO Briefing Note 2023
Comms Room	Equipment	7kW (per notional tenancy of around 1000m ²)	As per BCO Briefing Note 2023

Occupancy Gains				
Area	Source	Sensible (W)	Latent (W)	Comments
Office	Occupants	75	75	As per Kings Specification and based on 1 person/10m ² .

Lighting Gains			
Area	Source	Gain (W/m2)	Comments
Office Floor Plate – terminal sizing	Lighting	5.5	As per BCO Briefing Note 2023

2.7 VENTILATION

Space	Ventilation
Office	Natural Ventilation via openable windows.
Entrance Reception Area	Via infiltration
Toilets and Showers	6ac/h or a minimum of 15l/s - extract only
Cleaners	6ac/h extract

The above data has been taken from Kings Specification pg 20

2.8 VENTILATION SYSTEM CRITERIA

Fan SFP (Maximum)	0.5 w/l/s (Yonder NABERS Design for Performance rev 03)

Design Margins	10% on air volume, 20% on pressure
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2.9 NOISE CRITERIA

Space	Noise Rating
Entrance Lobby and Circulation Space	Not to exceed NR 40
Toilets	Not to exceed NR 45
Office Area (Open Plan)	Not to exceed NR 38
External limits	Refer to Hann Tucker Associates report

The above data has been taken from **BCO Guide 2019**
The overall acoustic strategy will be developed by (TBC)

2.10 HEATING/COMFORT COOLING SYSTEM CRITERIA

Infiltration	0.40 ac/h in winter (perimeter zones only) 0.25 ac/h in summer (perimeter zones only) As per CIBSE Guide A 2019, Table 4.19
Lighting, Occupancy and Equipment gains	Assume zero for heating design.
Condensers & BC boxes	each rated at 100% of duty. 20% spare connections on BC boxes.
Fan Coil Unit (SFP)	0.32w/l/s maximum (TBC)
DX Systems	Heating Mode = SCOP 3.77 minimum (4.20 Expected) Cooling Mode = EER 4.0minimum Cooling Mode = SEER 4.47minimum (6.76 Expected)

2.11 RENEWABLES

Photovoltaics – Panel output	TBC
Panel Efficiency	85%
Array Size (m ²)	Approximately 72m ² (14,703kWh annual yield)
Inverter Efficiency	95% (TBC)

Final PV yield subject to SBEM modelling.

2.12 HOT & COLD WATER SYSTEM CRITERIA

	Capacity
Cold Water Storage capacity	13.3 l/p/d as per Kings Specification clause 3.13
Storage allowance	8hrs
Loading Units (Office)	WC 2 Shower 3 Wash Hand Basin 2 Sink 2 As per IoP, Table 15 & CIBSE Guide G, Table 2.18
Hot Water Storage Capacity	Local hot water storage sized to meet demand
Mixed water temperature	38-43°C
Water Velocity	1.0m/s maximum

2.13 SANITATION AND DRAINAGE SYSTEM CRITERIA

Sanitation and Drainage		
Discharge Units (Office) Usage Factor $0.5\sqrt{\sum DU}$	WC	1.5
	Shower	0.4
	Wash Hand Basin	0.3
	Sink	1.3

The above data has been taken from IoP, Table 5 and CIBSE Guide G, Table 3.1

Foul Drainage Velocity 0.75 – 1.0m/s
Foul water drainage pipework roughness factor k 0.7mm
Maximum proportional depth 0.75 d/D
Filling factor (stacks) - 0.33