Heating | TM65 Calculation

QUHZ-W40VA

CIBSE TM65 Embodied Carbon Mid-level Calculation

Including Operational Carbon Benchmark Estimate

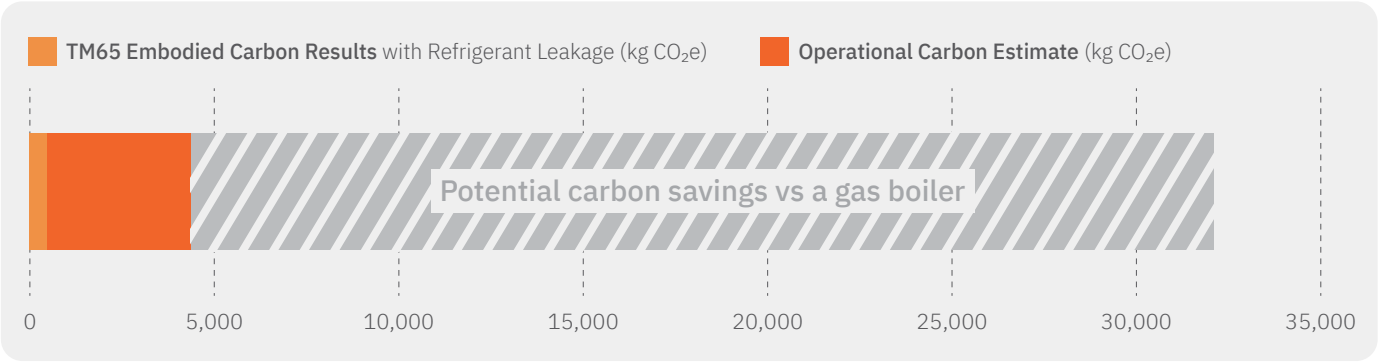
ecodan Renewable Heating Technology

Assessment date:	29th of September 2021
Assessor:	Residential Product Marketing
Organisation:	Mitsubishi Electric
Contact:	embodied.carbon@meuk.mee.com

Embodied Carbon Result with 'Mid-level TM65 Calculation' Method:
618 (kg CO_2e)

Operational Carbon Result:
3,756 (kg CO_2e)

Total = 4,374 (kg CO_2e)



Operational carbon data for heating requirements, according to heat pump **ErP fiche** at medium temperature (55°C), average climate conditions and equivalent boiler heat output. (Does not include thermal store data). Gas boiler assumptions: embodied carbon of 300kg CO_2e, efficiency of 93%, service life of 15 years.

Carbon factors sources:
Electrical grid according to Greenbook forecast for residential use. **(source: gov.uk, IAG spreadsheet toolkit for valuing changes in greenhouse gas emissions, sheet conversion CO_2)**. Gas network according to SAP 10.1 carbon emissions factor **(source: BRE Group, SAP-10.1-01-10-2019, Page 171)**.

QUHZ-W40VA - Product Information

Type of product	**A2W Heat pump**
Capacity of equipment (kW)	**4**
Product weight (kg)	**55.85**
Material breakdown for at least 95% of the product weight? (Y/N)	**Y**
Service life of the product (years)	**15**
Type of refrigerant	**R744**
Refrigerant GWP	**1**
Refrigerant charge (kg)	**1.15**
Energy consumption of the factory per unit of product (kWh)	**14.08**
Location of manufacture	**Asia**
Product Complexity	**Category 3: High**

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Embodied Carbon Results Breakdown (kg CO_2e)	
A1: Material extraction	323
A2: Transport	44
A3: Manufacturing	47
A4: Transport to Site	12
B1: Use	0
B3: Repair	43
C1: Deconstruction	0
C2: Transport	1
C3: Waste Processing	4
C4: Disposal	0

Embodied Carbon Results - without Refrigerant Leakage (kg CO_2e)	
A1-C4 (excluding B1,C1)	475
A1-C4 with Buffer Factor (excluding B1, C1)	617

Embodied Carbon Result - Refrigerant Leakage Only (kg CO_2e)	
B1 (Refrigerant leakage during use) + C1 (Refrigerant leakage end of life)	0.36

Assumptions	
A1: Material carbon coefficient source	TM65 Table 2.1 & The ICE Database
B1: Refrigerant annual leakage rate (%)	2 (TM65 Assumption)
C1: Refrigerant end of life recovery rate (%)	99 (TM65 Assumption)
B3: Materials replaced as part of repair (%)	10 (TM65 Assumption)
C4: Percentage of product going to landfill (%)	30 (TM65 Assumption)

Operational Carbon

Year*1	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Cumulative Total
Heat Pump (kg CO_2e)	327	342	319	322	302	322	305	281	253	223	187	174	151	125	125	3,756

Note: kg CO_2e calculation results are rounded to the nearest whole number. *1 Y1 = starting from 2022

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Changes for the Better

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Note: The fuse rating is for guidance only. Please refer to the relevant databook for detailed specification. It is the responsibility of a qualified electrician/electrical engineer to select the correct cable size and fuse rating based on current regulation and site specific conditions. Mitsubishi Electric's air conditioning equipment and heat pump systems contain a fluorinated greenhouse gas, R410A (GWP:2088), R32 (GWP:675), R407C (GWP:1774), R134a (GWP:1430), R513A (GWP:631), R454B (GWP:466), R1234ze (GWP:7) or R1234yf (GWP:4). *These GWP values are based on Regulation (EU) No 517/2014 from IPCC 4th edition. In case of Regulation (EU) No.626/2011 from IPCC 3rd edition, these are as follows. R410A (GWP:1975), R32 (GWP:550), R407C (GWP:1650) or R134a (GWP:1300).

Effective as of November 2021

Green Gateway greengateway.mitsubishielectric.co.uk