Heating | TM65 Calculation

PUZ-WM60VAA

CIBSE TM65 Embodied Carbon Mid-level Calculation

Including Operational Carbon Benchmark Estimate

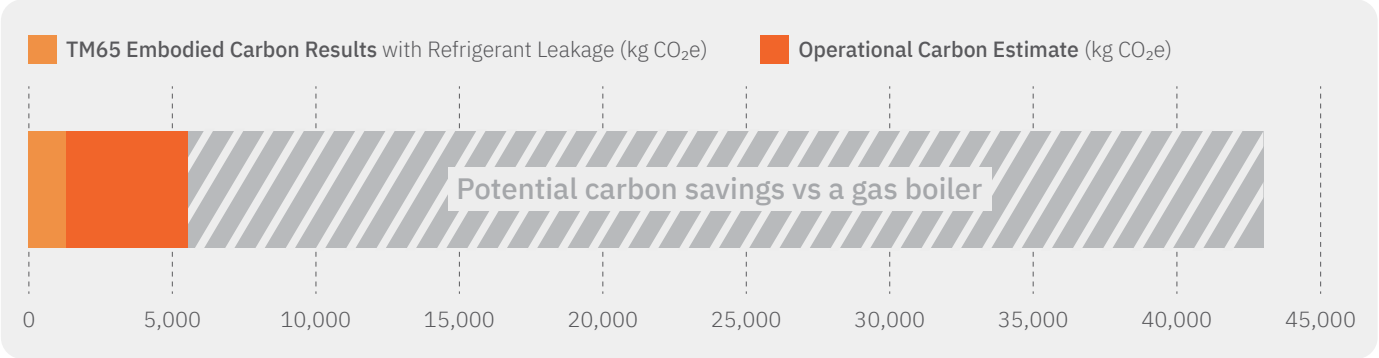
ecodan Renewable Heating Technology

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:
1,362 (kg CO_2e)

Operational Carbon Result:
4,078 (kg CO_2e)

Total = 5,440 (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. 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)**.

PUZ-WM60VAA - Product Information

Type of product	**A2W Heat pump**
Capacity of equipment (kW)	**6**
Product weight (kg)	**95.8**
Material breakdown for at least 95% of the product weight? (Y/N)	**Y**
Service life of the product (years)	**15**
Type of refrigerant	**R32**
Refrigerant GWP	**675**
Refrigerant charge (kg)	**2.2**
Energy consumption of the factory per unit of product (kWh)	**66.66**
Location of manufacture	**UK**
Product Complexity	**Category 3: High**

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Embodied Carbon Results Breakdown (kg CO_2e)	
A1: Material extraction	456
A2: Transport	76
A3: Manufacturing	77
A4: Transport to Site	1
B1: Use	446
B3: Repair	63
C1: Deconstruction	15
C2: Transport	1
C3: Waste Processing	19
C4: Disposal	0

Embodied Carbon Results - without Refrigerant Leakage (kg CO_2e)	
A1-C4 (excluding B1,C1)	693
A1-C4 with Buffer Factor (excluding B1, C1)	901

Embodied Carbon Result - Refrigerant Leakage Only (kg CO_2e)	
B1 (Refrigerant leakage during use) + C1 (Refrigerant leakage end of life)	460

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)	355	371	346	349	327	349	331	305	275	242	203	188	164	136	136	4,078

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

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Telephone: **01707 282880**
email: **heating@meuk.mee.com**
ecodan.co.uk

@Ecodanheating | Mitsubishi Electric Heating UK | @MitsubishiElectricHeatingUK | mitsubishi_electric_heating_uk | Mitsubishi Electric Heating UK | BLOG thehub.mitsubishielectric.co.uk

UNITED KINGDOM Mitsubishi Electric Europe Living Environment Systems Division, Travellers Lane, Hatfield, Hertfordshire, AL10 8XB, England. Telephone: 01707 282880 Fax: 01707 278881
IRELAND Mitsubishi Electric Europe, Westgate Business Park, Ballymount, Dublin 24, Ireland. Telephone: (01) 419 8800 Fax: (01) 419 8890 International code: (003531)

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