

# THERMA V AIR-TO-WATER HEAT PUMP

Please find below the required data for the SEAI Heat Pump Tool for DEAP 2016:

\*Where information is blank, please enter project specific information.

LG declares compliance to the following EU Directives:

811/2013/EU

813/2013/EU

## Section 4 – Heat Pump Data

|  |                                    |
|--|------------------------------------|
| Manufacturer of the installed heat pump(s) | LG Electronics                     |
| Model of the installed heat pump(s)        | HU161MRB.U30                       |
| Type of Heat Pump                          | Air to water                       |
| Temperature control                        | Variable Outlet                    |
| Does the installation provide              | Space Heating & Domestic Hot water |
| Space Heating Test Standard                | I.S. EN 14825                      |
| Water Heating Test Standard                | I.S. EN 16147                      |
| Operation Limit Temperature                | -15.00                             |
| Heating water operating Limit Temperature  | 65°C                               |

## Section 5 – Heating

|   |                        |
|---|------------------------|
| Annual space heating requirement taken from DEAP                                |                        |
| Is there a fixed secondary heater present?                                      |                        |
| Is there a CHP present?   |                        |
| Fraction of main space and water from CHP                                       |                        |
| Annual space heating provided by Heat Pump                                      |                        |
| Design Outdoor Temperature  | -3                     |
| Indoor Design Temperature (Mean internal Temperature)                           |                        |
| Heat emission type served by Heat Pump within the dwelling                      | Select all that apply: |
| 1 or more Radiators   |                        |
| 1 or more Fan Coil Units  |                        |
| Underfloor Heating  |                        |
| Air used as Emitter (to Air Units)  | No                     |
| Design Flow Temperature   |                        |
| Use "Default Supply Temperature" unless other evidence available                |                        |
| Exponent n, characterising type of emission system                              | 1.2                    |
| Emitter Temperature Drop  | 10                     |
| Return Temperature at design conditions   |                        |
| No of hours per day Heat Pump in operation                                      | 24                     |
| Cut-out hours   | 8                      |
| Electricity Primary Energy Factor   | 2.08                   |
| Is a Back Up Space Heater Present within Dwelling                               | No                     |
| Back Up Space Heater Fuel   |                        |
| Primary Energy Factor for Back Up Space Heater                                  |                        |
| Efficiency of Back Up Space Heater  |                        |
| Adjusted efficiency of Back Up Space Heater relative to Direct Electric Heating |                        |
| Is there a water heater installed as back up for the Heat Pump?                 | No                     |
| Back up Water Heater Fuel   |                        |
| Primary Energy Factor for Back Up Water Heater                                  |                        |
| Efficiency of Back up Water Heater  |                        |
| Adjusted efficiency of Back Up Water Heater relative to Direct Electric Heating |                        |

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## Section 6 – Domestic Hot Water

|   |          |
|---|----------|
| Output from Main Water Heater                                 |          |
| Type of DHW   | Integral |
| Annual water heating provided by main water heating system    |          |
| Cold Water Inlet Temperature                                  | 10       |
| Required Flow Temperature from Heat Pump to Hot Water Storage | 60       |
| Volume of DHW Storage   | 300      |

## Section 6 – Product Performance Data

|   |                                    |         |         |         |                       |          |
|---|------------------------------------|---------|---------|---------|-----------------------|----------|
| Test Condition EN 14825:2013                            |                                    |         |         |         |                       |          |
| Additional Test Points available at:                    |                                    |         |         |         | Low Temperature       | Yes      |
|   |                                    |         |         |         | Medium Temperature    | No       |
|   |                                    |         |         |         | Very High Temperature | No       |
| Maximum Test Temperature allowed for in EN14825 testing |                                    |         |         |         |                       | 55       |
| Low Temperature Application (35°C)                      | Test Conditions EN 14825:2013      | A (88%) | B (54%) | C (35%) | D (15%)               | E (100%) |
|   | Source                             | A-7     | A2      | A7      | A12                   | A-15     |
| EN 14825:2013 – Table 12 (ASHP) or Table 24 (GSHP)      | Sink                               | W34     | W30     | W27     | W24                   | W35      |
|   | Heating Capacity (kW)              | 10.9    | 6.7     | 5.0     | 5.3                   | 12.3     |
|   | Coefficient of Performance (kW/kW) | 2.88    | 4.45    | 5.97    | 8.11                  | 2.56     |
| High Temperature Application (55°C)                     | Source                             | A-7     | A2      | A7      | A12                   | A-15     |
|   | Sink                               | W52     | W42     | W36     | W30                   | W55      |
| EN 14825:2013 – Table 18 (ASHP) or Table 30 (GSHP)      | Heating Capacity (kW)              | 10.6    | 6.5     | 5.2     | 4.6                   | 11.1     |
|   | Coefficient of Performance (kW/kW) | 2.15    | 3.34    | 4.65    | 6.58                  | 1.85     |

## Test Condition EN 16147:2017

|                                       |                                      |
|---------------------------------------|--------------------------------------|
| Source of data                        | Water heating energy efficiency, nwh |
| Water heating energy efficiency, nwh  | 105.3%                               |
| Equivalent Coefficient of Performance |                                      |
| Reference Hot Water Temperature       | 52°C                                 |
| Required Source Temperature           | N/A                                  |
| Capacity of Heat Pump                 | 12                                   |
| Declared Load Profile                 | XL                                   |
| Standby Heat Loss (kW)                | 2.09                                 |
| Volume of DHW accounted for in test   | 300                                  |

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Technical parameters for heat pump space heaters and heat pump combination heaters

|                                       |                             |    |
|---------------------------------------|-----------------------------|----|
| Model(s):                             | HU161MRB U30 / HN1600MB NK0 |    |
| Air-to-water heat pump:               | YES                         | NO |
| Water-to-water heat pump:             | YES                         | NO |
| Brine-to-water heat pump:             | YES                         | NO |
| Low-temperature heat pump:            | YES                         | NO |
| Equipped with a supplementary heater: | YES                         | NO |
| Heat pump combination heater:         | YES                         | NO |

Parameters shall be declared for medium-temperature application, except for low-temperature heat pumps.  
For low-temperature heat pumps, parameters shall be declared for low-temperature application.  
Parameters shall be declared for average climate conditions.

## Low temperature application

| Item   | Symbol      | Value | Unit |
|--|-------------|-------|------|
| Rated heat output (*)  | $P_{rated}$ | 12    | kW   |
| Declared capacity for heating for part load at indoor temperature 20 °C and outdoor temperature Tj |             |       |      |
| Tj = -7 °C   | $P_{dh}$    | 10.9  | kW   |
| Tj = +2 °C   | $P_{dh}$    | 6.7   | kW   |
| Tj = +7 °C   | $P_{dh}$    | 5.0   | kW   |
| Tj = +12 °C  | $P_{dh}$    | 5.3   | kW   |
| Tj = bivalent temperature  | $P_{dh}$    | 12.3  | kW   |
| Tj = operation limit temperature   | $P_{dh}$    | 12.3  | kW   |
| For air-to-water heat pumps:<br>Tj=-15°C (if TOL < -20°C)  | $P_{dh}$    | x,x   | kW   |
| Bivalent temperature   | $T_{biv}$   | -10   | °C   |
| Cycling interval capacity for heating  | $P_{cych}$  | x,x   | kW   |
| Degradation co-efficient(**)   | $C_{dh}$    | 0.9   |      |

| Item   | Symbol           | Value | Unit |
|--|------------------|-------|------|
| Seasonal space heating energy efficiency   | $\eta_s$         | 179%  |      |
| Declared coefficient of performance or primary energy ratio for part load at indoor temperature 20 °C and outdoor temperature Tj |                  |       |      |
| Tj = -7 °C   | COPd or PERd     | 2.88  | or % |
| Tj = +2 °C   | COPd or PERd     | 4.45  | or % |
| Tj = +7 °C   | COPd or PERd     | 5.97  | or % |
| Tj = +12 °C  | COPd or PERd     | 8.11  | or % |
| Tj = bivalent temperature  | COPd or PERd     | 2.56  | or % |
| Tj = operation limit temperature   | COPd or PERd     | 2.56  | or % |
| For air-to-water heat pumps:<br>Tj=-15°C (if TOL < -20°C)  | COPd or PERd     | x,xx  | or % |
| Cycling interval efficiency  | COPcyc or PERcyc | x,xx  | or % |
| Heating water operating limit temperature  | WTOL             | 65    | °C   |

## Medium temperature application

| Item   | Symbol      | Value | Unit |
|--|-------------|-------|------|
| Rated heat output (*)  | $P_{rated}$ | 12    | kW   |
| Declared capacity for heating for part load at indoor temperature 20 °C and outdoor temperature Tj |             |       |      |
| Tj = -7 °C   | $P_{dh}$    | 10.6  | kW   |
| Tj = +2 °C   | $P_{dh}$    | 6.5   | kW   |
| Tj = +7 °C   | $P_{dh}$    | 5.2   | kW   |
| Tj = +12 °C  | $P_{dh}$    | 4.6   | kW   |
| Tj = bivalent temperature  | $P_{dh}$    | 10.6  | kW   |
| Tj = operation limit temperature   | $P_{dh}$    | 11.1  | kW   |
| For air-to-water heat pumps:<br>Tj=-15°C (if TOL < -20°C)  | $P_{dh}$    | x,x   | kW   |
| Bivalent temperature   | $T_{biv}$   | -7    | °C   |
| Cycling interval capacity for heating  | $P_{cych}$  | x,x   | kW   |
| Degradation co-efficient(**)   | $C_{dh}$    | 0.9   |      |

| Item   | Symbol           | Value | Unit |
|--|------------------|-------|------|
| Seasonal space heating energy efficiency   | $\eta_s$         | 135%  |      |
| Declared coefficient of performance or primary energy ratio for part load at indoor temperature 20 °C and outdoor temperature Tj |                  |       |      |
| Tj = -7 °C   | COPd or PERd     | 2.15  | or % |
| Tj = +2 °C   | COPd or PERd     | 3.34  | or % |
| Tj = +7 °C   | COPd or PERd     | 4.65  | or % |
| Tj = +12 °C  | COPd or PERd     | 6.58  | or % |
| Tj = bivalent temperature  | COPd or PERd     | 2.15  | or % |
| Tj = operation limit temperature   | COPd or PERd     | 1.85  | or % |
| For air-to-water heat pumps:<br>Tj=-15°C (if TOL < -20°C)  | COPd or PERd     | x,xx  | or % |
| For air-to-water heat pumps:<br>Operation limit temperature  | TOL              | -15   | °C   |
| Cycling interval efficiency  | COPcyc or PERcyc | x,xx  | or % |
| Heating water operating limit temperature  | WTOL             | 65    | °C   |

| Power consumption in modes other than active mode |           |       |    |
|---|-----------|-------|----|
| Off mode  | $P_{OFF}$ | 0.060 | kW |
| Thermostat-off mode                               | $P_{TO}$  | 0.060 | kW |
| Standby mode                                      | $P_{SB}$  | 0.060 | kW |
| Crankcase heater mode                             | $P_{CK}$  | 0.000 | kW |

| Supplementary heater  |           |     |    |
|-----------------------|-----------|-----|----|
| Rated heat output (*) | $P_{sup}$ | 5.2 | kW |
| Type of energy input  | Electric  |     |    |

| Other items                               |                  |      |     |
|---|------------------|------|-----|
| Capacity control                          | Variable         |      |     |
| Sound power level, indoors/outdoors       | $L_{WA,indoor}$  | 44   | dB  |
|   | $L_{WA,outdoor}$ | 63   | dB  |
| Annual electricity consumption (Low Temp) | Q HE, (Low Temp) | 5586 | kWh |
| Annual electricity consumption (Mid Temp) | Q HE (Mid Temp)  | 7187 | kWh |

|  |      |                   |
|--|------|-------------------|
| For air-to-water heat pumps:<br>Rated air flow rate, outdoors (Low Temp)                           | 7279 | m <sup>3</sup> /h |
| For air-to-water heat pumps:<br>Rated air flow rate, outdoors (Mid. Temp)                          | 4578 | m <sup>3</sup> /h |
| For water-/brine-to-water heat pumps:<br>Rated brine or water flow rate,<br>outdoor heat exchanger | x    |                   |
| Water Pump EEI   | ≤    | 0.23              |
| *The benchmark for the most efficient circulators is EEI ≤ 0,20.*;                                 |      |                   |

| For heat pump combination heater |       |       |     |
|----------------------------------|-------|-------|-----|
| Declared load profile            | x     |       |     |
| Daily electricity consumption    | Qelec | x,xxx | kWh |
| Annual electricity consumption   | AEC   | x     | kWh |

|                                 |             |       |     |
|---------------------------------|-------------|-------|-----|
| Water heating energy efficiency | $\eta_{wh}$ | x     | %   |
| Daily fuel consumption          | Qfuel       | x,xxx | kWh |
| Annual fuel consumption         | AFC         | x     | GJ  |

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(\*) For heat pump space heaters and heat pump combination heaters, the rated heat output  $P_{rated}$  is equal to the design load for heating  $P_{design}$ , and the rated heat output of a supplementary heater  $P_{sup}$  is equal to the supplementary capacity for heating  $sup(Tj)$ .

(\*\*) If  $C_{dh}$  is not determined by measurement then the default degradation coefficient is  $C_{dh} = 0,9$ .

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