

**TESTING LABORATORY**

Report Ref. **20204001453/10**

TEST REPORT

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**APPLIANCE TESTED:** Heat Pump

**TRADE NAME:** MITSUBISHI ELECTRIC

**MODEL:** ATW-ACS-DV200

**SERIAL NUMBER:** 72202000036

**COMMISSION REGULATION (EU)** **No 812/2013 of 18 February 2013** - supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to the energy labelling of water heaters, hot water storage tanks and packages of water heater and solar device.

**No 814/2013 of 2 August 2013** - implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for water heaters and hot water storage tanks.

**STANDARD** **EN 16147: 2017+AC2017** – Heat pumps with electrically driven compressors – Testing and requirements for marking of domestic hot water units. (sections 7.7, 7.8, 7.9, 7.10, 7.12 and 7.13)

**LOAD PROFILE:** L

**HEAT SOURCE:** Outdoor ambient air (inlet dry-bulb: 14 °C / inlet wet-bulb: 13 °C)

**INQUIRER:** MITSUBISHI ELECTRIC

**MANUFACTURER:** Depósitos Coballes  
O Viso Industrial Area  
A Cunchada - CP 36770 - O Rosal  
Pontevedra - Spain

**Date of the reception of the appliance:** 2020-12-14

**Date of the end of the tests:** 2020-12-18

**Date of the report:** 2020-12-21

**CONCLUSION**

Energy efficiency class A++.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor  $k = 2,05$ .

For conformity evaluation, measurement uncertainty is not taken into account.

NOTE:

Technician:



(Ricardo Tavares)

The Technical Responsible:



(Pedro Castro)

**IPAC**  
acreditação

L0009  
ISO/IEC 17025  
Ensaços

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**NOMINAL DATA:**

Storage tank capacity:	200 L
Power supply voltage:	230 V
Frequency:	50 Hz
Type and mass of refrigerant charge:	R134a / 1,2 Kg
Off-peak product:	No
Software Version Indoor Unit:	No information provided
Software Version Outdoor Unit:	-----
Software Version Programming Unit:	-----

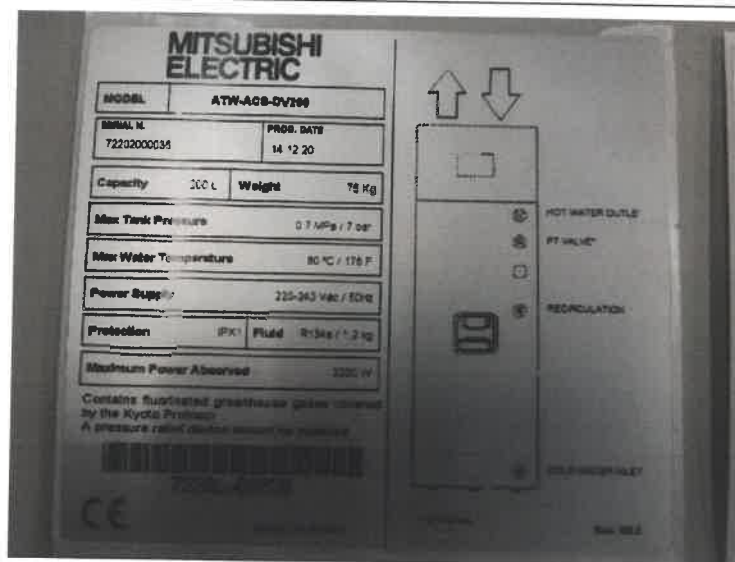
**TEST CONDITIONS:**

Load profile:	L
Installation type:	Vertical
Type of heat source:	Outdoor ambient air
Heat source temperature, inlet dry-bulb:	14 °C
Heat source temperature, inlet wet-bulb:	13 °C
Sanitary cold water temperature, inlet:	10 °C
Set-up temperature:	52 °C
Domestic hot water operation mode:	Economy
Ambient temperature for storage tank:	20 °C

**Notes:**



**Photos a) - Tested sample**



**Photos b) - Tested sample**

Technician:

(Ricardo Tavares)

**TEST RESULTS:**

Clause	EN 16147:2017			Expanded uncertainty
	Load profile		L	
	Reference energy of the load profile	Qref	11,655 kWh	-
	<b>Filling and heating up period (stage C)</b>			
7.7	Electrical energy consumption during the test duration	Web-HP	1,966 kWh	-
	Heating up time (h:min)	th	4:36	-
	<b>Standby power input (stage D)</b>			
7.8	Total electrical energy consumption during the last on-off-cycle	Wes-HP	0,385 kWh	±0,02 kWh
	Duration of the last on-off-cycle of the heat pump (h:min:ss)	tes	19:05:17	-
	Standby power input	Pes	20,2 W	±0,8 W
	<b>Ambient correction term</b>			
7.12	Conversion coefficient, equal to 2,5	CC	2,5	-
	Coefficient for the determination of ambient correction term	k	0,23	-
	Primary standby heat loss	Pstby	0,050 kW	-
	Ambient correction term	Qcor	-0,278 kWh	±0,01 kWh
	<b>Useful energy</b>			
7.9.1	Useful energy during the whole load profile	Σ QHP-tap	11,545 kWh	±0,002 kWh
	Calculated heat energy produced by electrical resistance heater to reach the required tapping temperature	QEL-LP	0,115 kWh	±0,25 W
	Overall tapping energy of the load profile	QLP	11,660 kWh	-
	<b>Electrical energy consumption</b>			
7.9.2	Load profile time (h:min:ss)	tTTC	34:51:48	-
	Total measured electrical energy consumption	WEL-M-LP	3,276 kWh	-
	Total electrical energy consumption during the whole load profile	WEL-LP	3,135 kWh	±0,039 kWh
	<b>Coefficient of performance</b>			
7.9.3	Coefficient of performance for domestic hot water	COPDHW	3,7198	±0,0009
	<b>Water heating energy efficiency</b>			
7.13.2	Smart control factor	SCF	0,0	-
	Smart control (NO = 0 or YES = 1)	smart	0	-
	Daily electrical energy consumption	Qelec	3,133 kWh	±0,04 kWh
	Water heating energy efficiency (%)	ηwh	154,3%	±0,02 %
	<b>Annual consumption of electric energy</b>			
7.13.3	Annual electrical energy consumption	AEC	664 kWh/a	-
	<b>Other performance</b>			
7.14	Reference hot water temperature	ΘWH	51,9 °C	-
	Maximum volume of mixed water at 40 °C	V40	220,1 L	-
	Rated heat output	Prated	1,7 kW	-

Regulation (EU) nº 812/2013		Energy efficiency class	
Energy efficiency measured	Class	A++	-

Technician:



(Ricardo Tavares)

**Data acquisition**

**Note:** Draw-offs where peak temperature  $T_p$  of 55 °C was not achieved is in grey. The missing temperature difference to the required  $T_p$  was assumed by an additional electrical resistance heater. This peak temperature  $T_p$  of 55 °C cannot always be achieved by the heat pump alone and is not mandatory.

Cycle	Virtual Time	Tapping duration	QHP-tap (kWh)		QHP-tap total (kWh)		QEL-tap (kWh)	Flow (kg/min)		Outlet Temp. (°C)			Average Inlet Temp. (°C)
			Req.	Mesured	Req.	Mesured		Req.	Mesured Average	Req. $T_p$ *	Mesured Average **	Maximum ***	
Cycle 1	7:00:01	0:01:16	0,105	0,1054	0,1050	0,1054	0,0000	3	2,9	-	51,1	51,7	10,1
Cycle 2	7:05:01	0:05:02	1,400	1,4006	1,5050	1,5060	0,0000	6	5,9	-	51,7	51,7	10,1
Cycle 3	7:30:02	0:00:43	0,105	0,1052	1,6100	1,6112	0,0000	3	3,1	-	51,4	51,6	10,1
Cycle 4	7:45:01	0:00:46	0,105	0,1051	1,7150	1,7163	0,0000	3	3,0	-	51,3	51,5	10,1
Cycle 5	8:05:01	0:07:42	3,605	3,6053	5,3200	5,3216	0,0000	10	9,9	-	51,2	51,4	9,9
Cycle 6	8:25:02	0:00:49	0,105	0,1051	5,4250	5,4267	0,0000	3	2,9	-	50,4	50,5	10,2
Cycle 7	8:30:02	0:00:48	0,105	0,1052	5,5300	5,5318	0,0000	3	3,1	-	50,4	50,5	10,4
Cycle 8	8:45:03	0:00:47	0,105	0,1051	5,6350	5,6369	0,0000	3	3,2	-	50,1	50,2	9,9
Cycle 9	9:00:02	0:00:49	0,105	0,1054	5,7400	5,7423	0,0000	3	3,0	-	49,8	50,0	9,9
Cycle 10	9:30:03	0:01:01	0,105	0,1051	5,8450	5,8474	0,0000	3	3,1	-	49,3	49,6	10,1
Cycle 11	10:30:03	0:01:29	0,105	0,1052	5,9500	5,9525	0,0000	3	3,0	40	48,1	48,5	10,3
Cycle 12	11:30:03	0:01:06	0,105	0,1053	6,0550	6,0579	0,0000	3	3,1	-	51,4	51,8	10,3
Cycle 13	11:45:03	0:00:45	0,105	0,1051	6,1600	6,1629	0,0000	3	3,0	-	51,5	51,8	10,4
Cycle 14	12:45:03	0:01:38	0,315	0,2903	6,4750	6,4783	0,0251	4	3,8	55	51,4	51,6	10,1
Cycle 15	14:30:04	0:00:46	0,105	0,1052	6,5800	6,5835	0,0000	3	3,0	-	50,8	51,1	10,2
Cycle 16	15:30:04	0:00:48	0,105	0,1050	6,6850	6,6885	0,0000	3	2,9	-	50,6	50,9	10,0
Cycle 17	16:30:04	0:00:49	0,105	0,1051	6,7900	6,7936	0,0000	3	2,9	-	50,3	50,6	10,0
Cycle 18	18:00:04	0:00:50	0,105	0,1053	6,8950	6,8989	0,0000	3	3,0	-	49,9	50,3	9,9
Cycle 19	18:15:05	0:00:46	0,105	0,1052	7,0000	7,0041	0,0000	3	3,0	-	50,0	50,2	9,8
Cycle 20	18:30:05	0:00:46	0,105	0,1052	7,1050	7,1092	0,0000	3	3,1	-	50,0	50,1	9,8
Cycle 21	19:00:05	0:00:45	0,105	0,1050	7,2100	7,2142	0,0000	3	3,1	-	49,8	50,0	10,0
Cycle 22	20:30:05	0:03:37	0,735	0,6455	7,9450	7,9496	0,0898	4	3,9	55	49,5	49,6	10,1
Cycle 23	21:00:06	0:08:06	3,605	3,6052	11,5500	11,5547	0,0000	10	9,9	40	48,8	49,5	9,7
Cycle 24	21:30:05	0:00:56	0,105	0,1052	11,6550	11,6599	0,0000	3	3,1	-	45,5	45,9	10,0

\* "Peak temperature ( $T_p$ ) means the minimum water temperature, expressed in degrees Celsius, to be achieved during water draw-off, (...). The peak temperature  $T_p$  shall be calculated as a mean value over the water draw-offs with a minimum value as specified in the tapping cycles." in Guidelines accompanying Regulations (EU) No 811 & 812/2013 and Regulations (EU) No 813 & 814/2013 - 2018.

\*\* average outlet temperature registered during the water draw-off;

\*\*\* maximum outlet temperature registered during the water draw-off;

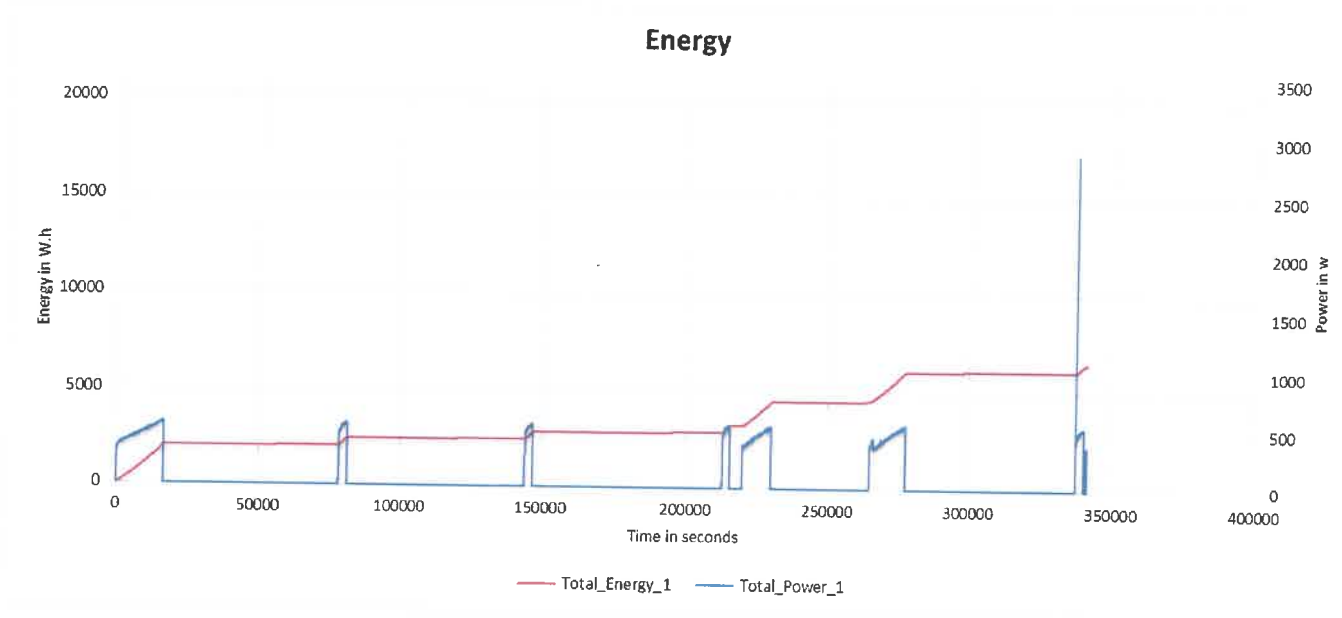
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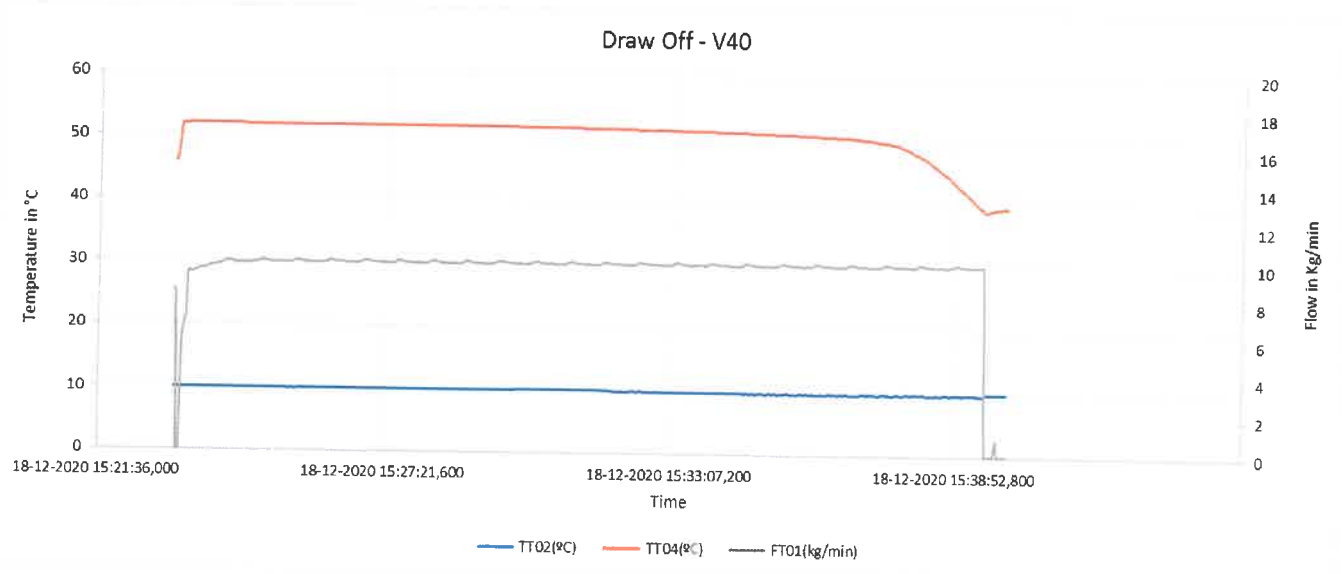
(Ricardo Tavares)

Data acquisition

Energy



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Technician:  (Ricardo Tavares)