

TESTING LABORATORY

Report Ref. **20204001453/30**

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: 2 °C / inlet wet-bulb: 1 °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: 2020-12-27

Date of the report: 2021-01-04

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)



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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:	-----

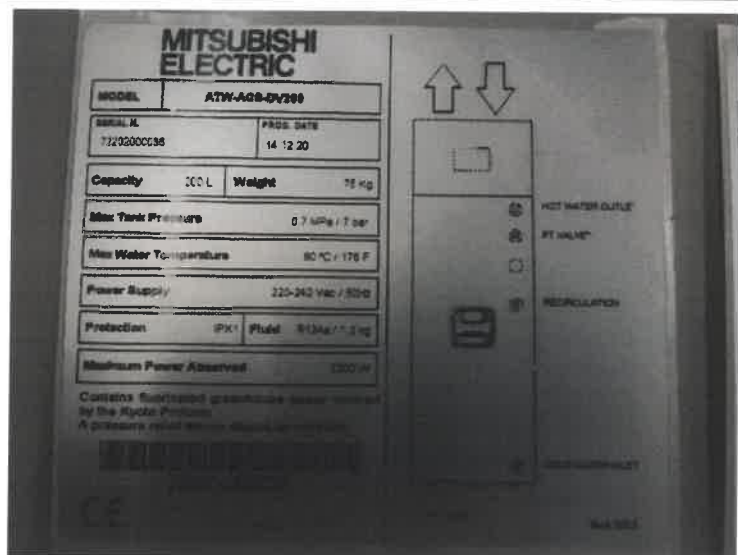
TEST CONDITIONS:

Load profile:	L
Installation type:	Vertical
Type of heat source:	Outdoor ambient air
Heat source temperature, inlet dry-bulb:	2 °C
Heat source temperature, inlet wet-bulb:	1 °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	-
	Filling and heating up period (stage C)			
7.7	Electrical energy consumption during the test duration	Weh-HP	2,857 kWh	-
	Heating up time (h:min)	th	7:17	-
	Standby power input (stage D)			
7.8	Total electrical energy consumption during the last on-off-cycle	Wes-HP	0,431 kWh	±0,009 kWh
	Duration of the last on-off-cycle of the heat pump (h:min:ss)	tes	15:37:24	-
	Standby power input	Pes	27,6 W	±0,6 W
	Ambient correction term			
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	0,069 kW	-
	Ambient correction term	Qcor	-0,381 kWh	±0,007 kWh
	Useful energy			
7.9.1	Useful energy during the whole load profile	Σ QHP-tap	11,544 kWh	±0,002 kWh
	Calculated heat energy produced by electrical resistance heater to reach the required tapping temperature	QEL-LP	0,116 kWh	±0,25 W
	Overall tapping energy of the load profile	QLP	11,660 kWh	-
	Electrical energy consumption			
7.9.2	Load profile time (h:min:ss)	tTTC	36:28:39	-
	Total measured electrical energy consumption	WEL-M-LP	4,590 kWh	-
	Total electrical energy consumption during the whole load profile	WEL-LP	4,313 kWh	±0,054 kWh
	Coefficient of performance			
7.9.3	Coefficient of performance for domestic hot water	COPDHW	2,7033	±0,0006
	Water heating energy efficiency			
7.13.2	Smart control factor	SCF	0,0	-
	Smart control (NO = 0 or YES = 1)	smart	0	-
	Daily electrical energy consumption	Qelec	4,311 kWh	±0,055 kWh
	Water heating energy efficiency (%)	ηwh	112,1%	±0,01 %
	Annual consumption of electric energy			
7.13.3	Annual electrical energy consumption	AEC	913 kWh/a	-
	Other performance			
7.14	Reference hot water temperature	θ ^{WH}	51,8 °C	-
	Maximum volume of mixed water at 40 °C	V40	218,4 L	-
	Rated heat output	Prated	1,0 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	0,1053	0,1050	0,1053	0,0000	3	2,9	-	51,3	51,9	9,7
Cycle 2	7:05:01	0:04:58	1,400	1,4003	1,5050	1,5056	0,0000	6	5,9	-	51,9	51,9	9,7
Cycle 3	7:30:02	0:00:48	0,105	0,1053	1,6100	1,6109	0,0000	3	2,9	-	51,5	51,7	10,2
Cycle 4	7:45:01	0:00:49	0,105	0,1052	1,7150	1,7160	0,0000	3	2,9	-	51,5	51,7	10,1
Cycle 5	8:05:01	0:07:39	3,605	3,6058	5,3200	5,3219	0,0000	10	9,9	-	51,3	51,6	9,6
Cycle 6	8:25:02	0:00:51	0,105	0,1053	5,4250	5,4272	0,0000	3	2,8	-	50,6	50,9	9,7
Cycle 7	8:30:02	0:00:50	0,105	0,1050	5,5300	5,5322	0,0000	3	2,8	-	50,6	50,7	10,0
Cycle 8	8:45:03	0:00:50	0,105	0,1053	5,6350	5,6375	0,0000	3	2,9	-	50,3	50,5	9,8
Cycle 9	9:00:02	0:00:52	0,105	0,1051	5,7400	5,7427	0,0000	3	2,9	-	50,1	50,3	9,7
Cycle 10	9:30:03	0:00:59	0,105	0,1052	5,8450	5,8478	0,0000	3	2,8	-	49,5	49,8	9,9
Cycle 11	10:30:03	0:01:06	0,105	0,1052	5,9500	5,9530	0,0000	3	2,8	40	48,5	48,9	9,7
Cycle 12	11:30:03	0:01:25	0,105	0,1051	6,0550	6,0581	0,0000	3	2,9	-	47,6	48,0	10,0
Cycle 13	11:45:03	0:00:56	0,105	0,1051	6,1600	6,1632	0,0000	3	2,9	-	47,8	48,1	10,0
Cycle 14	12:45:04	0:01:56	0,315	0,2908	6,4750	6,4784	0,0244	4	3,9	55	51,1	51,4	9,9
Cycle 15	14:30:04	0:00:49	0,105	0,1053	6,5800	6,5838	0,0000	3	2,9	-	50,6	50,9	9,9
Cycle 16	15:30:04	0:00:49	0,105	0,1051	6,6850	6,6889	0,0000	3	2,9	-	50,4	50,7	10,1
Cycle 17	16:30:04	0:00:51	0,105	0,1053	6,7900	6,7941	0,0000	3	2,9	-	50,1	50,4	10,2
Cycle 18	18:00:04	0:00:52	0,105	0,1051	6,8950	6,8992	0,0000	3	2,9	-	49,7	50,0	10,2
Cycle 19	18:15:05	0:00:50	0,105	0,1051	7,0000	7,0043	0,0000	3	2,8	-	49,8	50,0	10,0
Cycle 20	18:30:05	0:00:51	0,105	0,1052	7,1050	7,1095	0,0000	3	2,8	-	49,7	49,9	10,1
Cycle 21	19:00:05	0:00:51	0,105	0,1051	7,2100	7,2146	0,0000	3	2,9	-	49,6	49,8	10,2
Cycle 22	20:30:05	0:03:38	0,735	0,6435	7,9450	7,9501	0,0920	4	3,9	55	49,3	49,4	10,0
Cycle 23	21:00:05	0:08:10	3,605	3,6056	11,5500	11,5557	0,0000	10	9,9	40	48,7	49,3	9,7
Cycle 24	21:30:05	0:00:57	0,105	0,1052	11,6550	11,6609	0,0000	3	2,9	-	45,7	46,0	10,1

* "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;

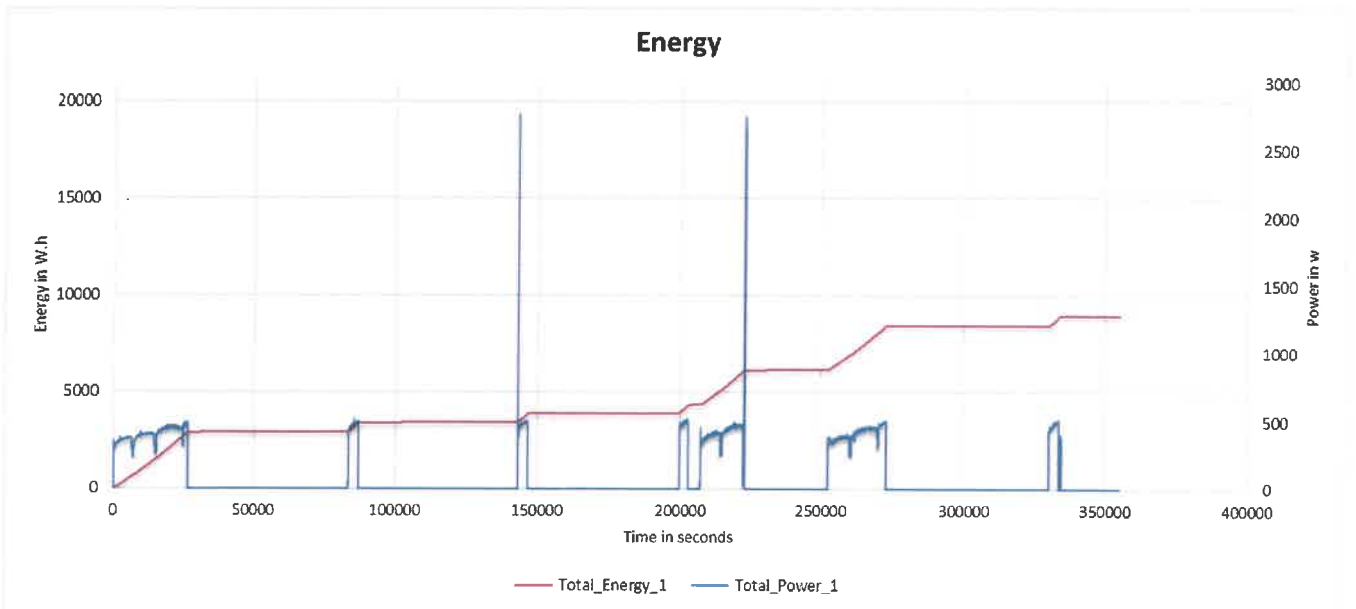
*** maximum outlet temperature registered during the water draw-off;

Technician:

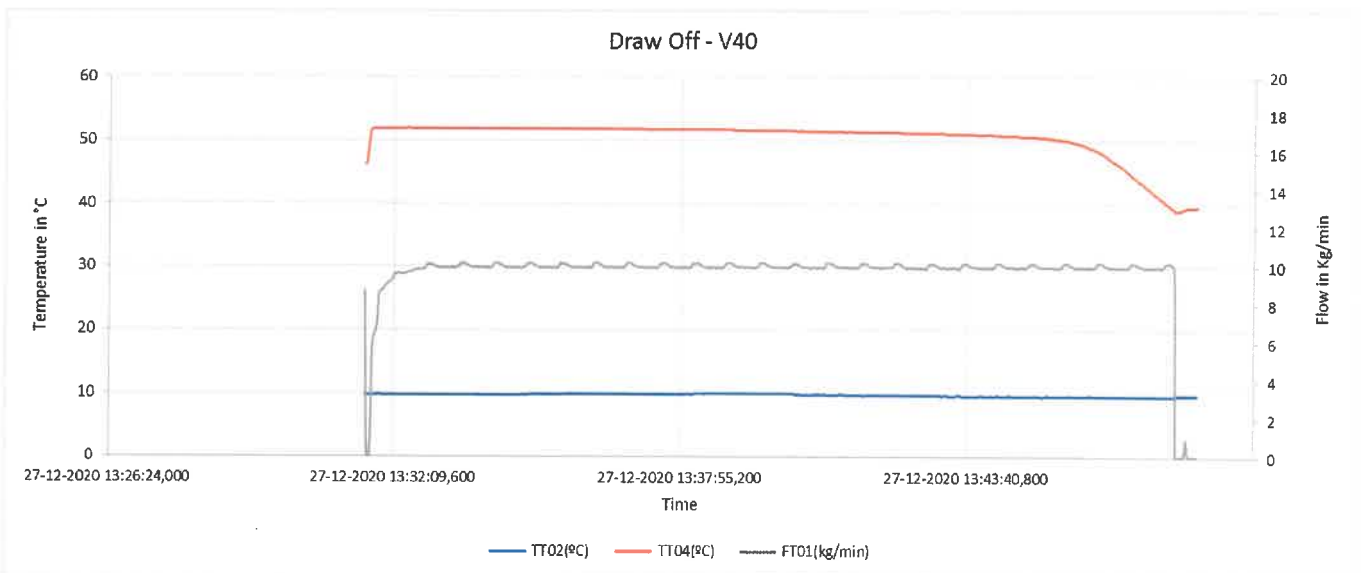
(Ricardo Tavares)

Data acquisition

Energy



V40



Technician:



(Ricardo Tavares)