

رقم الإصدار: 2	الشركة السعودية للفحص والاختبار	SAITCO Saudi Inspection & Testing Co الشركة السعودية للفحص والاختبار
تاريخ الإصدار: 2020/10/01	SAUDI INSPECTION & TESTING CO. (SAITCO)	
رقم المراجعة: 1	ملحق 7 - أ: ملاحق متطلبات العملية نتائج الاختبارات مختبر الكهرباء	
تاريخ المراجعة: 2020/10/01	Appendix 7-A: LAB process REQ. TEST RESULTS ELECTRICAL Lab	



رمز المنتج بالمختبر: C-138



Laboratory name	Saudi Inspection and Testing Company
Address	First Industrial Area – Street No 4,5,6,7–Riyadh
Country	Saudi Arabia

Date or period of tests	31/ 1 / 2023 – 06 / 2 / 2023
Date of report issue	09/02/2023
Laboratory test report number	S-E-220268-1
Client Reference No.	اتفاقية رقم (11612002E/22) بتاريخ 2022/12/01
Client / Factory / Manufacturer Name & address	Saudi ceramics company PO Box 3893 Riyadh 11481, Kingdom of Saudi Arabia

Product description	Electric Storage Water Heater
Brand name or trademark	AQUAHOT
Model No.	EWB-V50
Country of origin	Saudi Arabia

Product category	Water Heaters - Energy Performance Requirements and Labeling
Standard	SASO 2884:2017 / EN 50440
Conformity to articles tested	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

Test case verdicts	
Test case does not apply to the test object	: N (.A.)
Test item does meet the requirement	: P(ass)
Test item does not meet the requirement	: F(ail)

Note: The result recorded in this document only related to the item tested.

ملاحظة : النتائج المدونة في تقرير التحكم في النتائج لا تمثل إلا العينة المختبرة



**ELECTRICAL LAB
TECHNICAL Dep**

SASO 2884: 2017			
Clause	Requirement – Test	Result - Remark	Verdict

4	Criteria for applying the Minimum Energy Performance Standard (MEPS)		
4.1	Declaration of rated values	-	-
	The declaration of the rated capacity shall be expressed only in terms of liters (l) according to the following rules	-	P
	- rated capacity lower or equal to 14 liters as multiples of 1 liter	-	N
	- rated capacity from 15 liters as multiples of 5 liters	50L	P
	The declaration of the rated power shall be expressed only in terms of watt (W) as multiples of 50 W.	1200W	P
	The rated annual energy as a multiple of 5 kWh	1530kWh	P

4.2	Determining the Minimum Performance																																												
4.2.1	General							-		-																																			
	Minimum energy performance are based on the Water Heating Energy Efficiency							-		P																																			
4.2.2	Declaration of the Load Profile							-		-																																			
	Declared a load profile as described in Annex A							-		N																																			
	Declared load profiles of 3XS, XXS, XS and S							-		N																																			
	3XS shall not exceed 7 litres in capacity							-		N																																			
	XXS and XS shall not exceed 15 litres in capacity							-		N																																			
	S shall not exceed 36 litres in capacity							50L		N																																			
AMD 4	For storage water heaters with declared load profile M,L,XL,XXL,3XL and 4XL, the requirements of mixed water At 40 °C shall be as illustrated in table below							-		-																																			
Declared Load Profile		M	L	XL	XXL	3XL		4XL		P																																			
Mixed Water at 40 °C		65 L	130 L	210 L	300 L	520 L		1040 L																																					
4.2.3	Minimum Energy Performance Standard (MEPS) for Water Heaters										-																																		
	The water heater MEPS values are presented in Table 1.					-					-																																		
	<table><tr><th colspan="11">Table 1 – MINIMUM ENERGY EFFICIENCY (η_{wh}) in %</th></tr><tr><th>Declared load profile</th><th>3XS</th><th>2XS</th><th>XS</th><th>S</th><th>M</th><th>L</th><th>XL</th><th>2XL</th><th>3XL</th><th>4XL</th></tr><tr><td>Water heaters energy efficiency (with or without smart controls)</td><td>53</td><td>55</td><td>63</td><td>63</td><td>73</td><td>73</td><td>79</td><td>79</td><td>79</td><td>79</td></tr></table>										Table 1 – MINIMUM ENERGY EFFICIENCY (η_{wh}) in %											Declared load profile	3XS	2XS	XS	S	M	L	XL	2XL	3XL	4XL	Water heaters energy efficiency (with or without smart controls)	53	55	63	63	73	73	79	79	79	79	-	
Table 1 – MINIMUM ENERGY EFFICIENCY (η_{wh}) in %																																													
Declared load profile	3XS	2XS	XS	S	M	L	XL	2XL	3XL	4XL																																			
Water heaters energy efficiency (with or without smart controls)	53	55	63	63	73	73	79	79	79	79																																			
4.2.4	Minimum Energy Performance Standard (MEPS) for Hot Water Storage Tanks										-																																		
	Minimum energy performance standard (MEPS) requirements for hot water storage tanks with capacities higher or equal to 25 liters are based on the daily thermal losses QPR.							-		N																																			
	The limit values for QPR are expressed in table 2, rounded to 2 decimal places.							-		N																																			
4.2.5	Test Voltage							-		-																																			
AMD 4	The products shall be tested at 230V for single-phase, and shall be at 400V for three phase.							Applied 230V		P																																			

Clause	Requirement – Test	Result - Remark	Verdict
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4.3	Acceptance Criteria for Labelling and Market Surveillance					-
	<i>The energy label shall be accepted as valid when a sample unit(s) tested meets the following criteria:</i>					-
	TABLE: Acceptance Criteria for Labelling and Market Surveillance					-
	Measured Point	Acceptance Criteria	Rated	Limit	Measured Value	Verdict
	a.) Tested Power (W)	$\geq 0.90 \times \text{rated power}$	1200W	1080W	1133W	P
	b) Tested Power (W)	$\leq 1.05 \times \text{rated power}$		1260W		
	c) Tested thermal losses (QPR)	$\leq 1.05 \text{ rated QPR, rated}$	-	-	-	N
	d) Tested Standing loss power (S)	$\leq 1.05 \text{ rated S}$	-	-	-	N
AMD 3	e.) Capacity (L)	$\geq 0.95 \times \text{rated Capacity}$	50L	$\geq 47.5L$	50L	P
	f.) Mixed quantity of water (V_{40})	$\geq 0.97 \times \text{rated } V_{40}$	74L	$\geq 71.78L$	82.14L	P
	g.) Tested Energy (any type)	$\leq 1.05 \times \text{rated annual energy}$	1530kWh	$\leq 1606.5kWh$	1599kWh	P
	h) Tested Collector Aperture (m^2)	$\geq 0.98 \times \text{rated value}$	-	-	-	N
	i) Tested Standby Power $P_{sol;stby}$	$\leq 1.03 \text{ rated } P_{sol;stby}$	-	-	-	N
	j) Tested Pump power consumption $P_{sol;pump}$	$\leq 1.03 \text{ rated } P_{sol;pump}$	-	-	-	N
	Qelec	-	7.161	-	7.53kWh	-

6	Marking and instructions		
6.1	General information		
	The following information shall be marked on the nameplate of the water-heater in English or Arabic and English	English	P
	The marking shall not be on a detachable part of the unit and shall be indelible, durable and easily legible	Durable	P
	Any information related to energy performance added on any part of the water heater unit or packaging shall not have any ambiguity or lead to misunderstanding of the performance of the unit	-	P
6.2	Nameplate information		
	The nameplate information shall include , for conformity to this standard the following information:	-	-
	• Manufacturer's name and/or trademark	AQUAHOT	P
	• Country of origin	Saudi Arabia	P
	• Manufacturer's model or type reference and serial number of the unit	EW-H-V50	P
	• Rated voltage or rated voltage range in volts (V)	220-240V	P
	• Rated frequency in hertz (Hz)	50/60Hz	P
	• Rated power input in Watt (W) or kiloWatts (kW)	1200W	P
	• Rated Capacity	50L	P

SASO 2884: 2017			
Clause	Requirement – Test	Result - Remark	Verdict
	<ul style="list-style-type: none"> Annual standby losses (kWh/year) or daily standby losses (kWh/24h), when applicable 	-	N
6.3	Instruction sheet	-	-
	An instruction sheet or manual in both Arabic and English shall be delivered with each water heater	Arabic and English	P
	Tables, drawings and circuit diagrams may be depicted in English only	See instruction manual	P
	The instruction sheet or manual shall include the following information as a minimum:	-	-
	a) Supplier's name or trade mark	AQUAHOT	P
	b) Supplier's model number	EWB-V50	P
	c) Declared load profile	M	P
	d) Energy Efficiency Class of the model	E	P
	e) Water heating energy efficiency in %	85.1%	P
	f) Annual electricity consumption in kWh under average climatic condition for Saudi Arabia	1530kWh	P
	g) If applicable, other load profiles for which the water heater is suitable to use and the corresponding water heating energy efficiency and annual electricity consumption as set out in points (e) and (f)	-	N
	h) Thermostat temperature setting	65°C	P
	i) specific precautions that shall be taken when the water heater is assembled, installed or maintained	See instruction manual	P
	j) Where Smart Control Compliance is declared as being enabled	-	N
	k) annual electricity consumption in kWh (or mass of butane equivalent when applicable)	-	N
	l)) Collector aperture area in m ²	-	N
	m) zero-loss efficiency	-	N
	n) First-order coefficient (W/(m ² . K ²))	-	N
	o) Second-order coefficient (W/(m ² . K ²))	-	N
	p) Incidence angle modifier (I _{am})	-	N
	q) Storage Capacity in Liters	50L	P
	r) pump power consumption in W	-	N
	s) standby power consumption in W,	-	N
	t) Annual non-solar heat contribution Q _{nonsol} in kWh	-	N
	u) Annual auxiliary electricity consumption Q _{aux}		
	In addition, for solar water heaters, the instruction sheet or manual shall include the following:	Electric storage water heater	-
	• The information specified in clause 6.2 and Table 6	-	N
	• Dimensions of the unit	-	N
	• Instruction for mounting and connection to the pipes	-	N
	• Instruction for connection to the electrical installation	-	N
	• Instructions necessary for the correct operation of the unit and any special precautions to be observed to ensure its safe use and maintenance	-	N
	• Instruction for packing and unpacking the unit	-	N
	• Instructions on unit handling and rigging	-	N
	• Net weight of the unit (empty)	-	N

Clause	Requirement – Test	Result - Remark	Verdict
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ANNEX C		Calculation of the Energy Efficiency					
C.3		Calculation of the Energy Efficiency Coefficient η_{wh}					
C3.1		Conventional Water Heaters and HeatPump Water Heaters					
$\eta_{wh} = \frac{Q_{ref}}{(Q_{fuel} + CC \cdot Q_{elec})(1 - SCF_{smart}) + Q_{cor}}$		Q_{ref}	Q_{fuel}	CC	Q_{elec}	SCF _{smart}	Q_{cor}
		5.85	0	1.00	7.53	0	-0.39
		$\eta_{wh} = 81.91\%$					

C.5	Determination of the Ambient Correction Term Q_{cor}						
(a) for conventional water heaters using electricity:		Q_{elec}	Q_{fuel}	Q_{ref}	SCF. smart	CC	k
$Q_{cor} = -k \cdot (CC \cdot (Q_{elec} \cdot (1 - SCF.smart) - Q_{ref}))$		7.53	0	5.85	0	1.00	0.23
		$Q_{cor} = -0.39$					
Where the k values are given in Table C1 for each load profile					M		-

C.6	Determination of the mixed quantity of water V_{40}
$V_{40} = V_{40;exp} \times \frac{(\theta_p - 15)}{(40 - 15)}$	<p>The normalized value of the average temperature θ_p 61.94°C</p> <p>Corresponds to the quantity of water delivered at least 40°C during test. $V_{40;exp}$ 43.75L</p> <p>$V_{40} = 82.14L$</p>

ANNEX D	Calculation of the Annual Energy Consumption				
D.1	Principle for Calculation of the Annual Energy Consumption (AEC_{WH})		-	-	
	The annual energy is based on the energy efficiency ratio AEC_{WH} used for Classification and the reference energy Q _{ref} used to characterize the water heaters.		1599kWh/y	P	
D.2	Weather Data for Saudi Arabia		-	-	
	the following data are applied, in addition to the data used for test of the water heaters and water storage tanks (tables D1 and D2)		See table	P	
D.3	Calculation and Presentation of the Annual Energy Consumption (AEC_{WH})			-	
D.3.1	For Conventional Water Heaters			-	
AEC_{WH} = 220 x Q_{ref}/η_{wh};KSA		Q_{ref}	η_{wh};KSA	-	
		5.85	80.48%	-	
		AEC_{WH} = 1599kWh/y		-	
η_{WH};KSA = $\frac{1}{1 + \left(\frac{1 - \eta_{WH}}{\eta_{WH}}\right) \times \left(\frac{65 - \vartheta_{amb;test}}{65 - \vartheta_{amb;KSA}}\right)}$		η_{wh}	ϑ_{amb;test}	ϑ_{amb;KSA}	-
		81.91%	20°C	24°C	-
		η_{wh};KSA = 80.48%			-
	Ambient temperature for test: ϑ _{amb;test} = 20 °C		-	-	
	Ambient temperature for label: ϑ _{amb;KSA} = 24 °C		-	-	

Remarks:

Clause	Requirement – Test	Result - Remark	Verdict
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Photo No. 1 (Marking)



Photo no.2 (General view / External package)



Photo no.3 (Energy efficiency label / QR code)

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Clause	Requirement – Test	Result - Remark	Verdict
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Photo no.4 (Energy efficiency test report)



Report Reference SE220268EEFS1R03

Storage Water Heater Energy Performance Test Data:

Applicable Standard(s)		SASO-2884:2017, BS EN 50440						
Manufacturer		Country of Origin		Model	Type	Sub Type		
AQUAHOT		SAUDI ARABIA		EWH-V50	Electric	Conventional		
Test Start Date		Testing Stop Date		Load Profile	Rated Power	Actual Power		
2/1/2023		2/2/2023		M	W	W		
					1200	1133		
Actual Capacity		Rated Capacity		T3	T5	Ambient	Smart	SCF
Litres		Litres		°C	°C	°C	0	1
50.00		50.00		70.24	68.36	20.96		
Q _{testelec}		Q _{ref}		Q _{H2O}		Q _{elec}		Q _{cor}
kWh		kWh		kWh		kWh		kWh
9.22		5.85		7.27		7.53		-0.39
V _{full-drawing water}		CC		η _{elecwh}		η _{wh}		MEPS MIN. η _{wh}
Litres		Coefficient		%		%		%
160.84		1.00		77.71		81.91		73.00
η _{wh,KSA}		Rated AEC		Actual AEC		Actual AEC _{WH}		Efficiency Class
%		kWh/y		kWh/y		kWh/y		E
80.48		1530		1568		1599		
T _{set}		θ _c		θ _p		θ _p		
71.61		16.79		62.24		61.94		
FlowMeter Start		FlowMeter Stop		V40exp		V40		
71900.30		71944.05		43.75		82.14		

Clause	Requirement – Test	Result - Remark	Verdict
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Photo No.5 (Classification as per declared load profile)

Table 3 – ENERGY EFFICIENCY CLASSIFICATION as per DECLARED LOAD PROFILE												
Energy Efficiency in %							81.91					
Bar Color	Energy Class		LOAD PROFILE									
			3XS	2XS	XS	S	M	L	XL	2XL	3XL	4XL
Dark Green	أ	A	95	100	105	105	210	300	300	300	300	300
Green	ب	B	87	89	97	97	140	160	160	160	160	180
Light Green	ج	C	77	79	87	87	93	95	98	110	110	110
Yellow	د	D	69	71	79	79	87	87	92	93	93	93
Orange	هـ	E	61	63	71	71	80	80	86	86	86	86
Red	و	F	53	55	63	63	73	73	79	79	79	79
Dark Red	ز	G	45	47	55	55	65	65	71	71	71	71

Inspected by

Sign
Date**REMARK :*****SOFT COPY OF THE CONTROL TEST RESULTS SHEET AUDITING BY LAB SUPERVISOR.**

<<End of control of test result sheet>>

