

Issue No. 2	الشركة السعودية للفحص والاختبار	
Issue Date : 01/10/2020	SAUDI INSPECTION & TESTING CO. (SAITCO)	
Revision No. 3	ملحق 7 - أ: ملاحق متطلبات العملية - نتائج الاختبارات مختبر الكهرباء	
Issue Date : 05/08/2023	Appendix 7-A: LAB process REQ. TEST RESULTS -ELECTRICAL LAB	

Code of product in Lab :	C-138	   
LAB DATA		بيانات المختبر
Laboratory name	اسم المختبر	Saudi Inspection & Testing Co.(SAITCO)
Address	العنوان	1st Industrial Area, St. No.4,5,6,7-Riyadh
Country	الدولة	Saudi Arabia
Client Data		بيانات العميل
Sample Date in	تاريخ استلام العينة	15/10/2023
Date or period of tests	تاريخ / فترة الاختبار	16 / 3 / 2024
Date of report issue	تاريخ اصدار التقرير	20 / 3 / 2024
Laboratory test report number	رقم التقرير بالمختبر	E-231200
Client Name	اسم العميل	Orbital Horizon Industrial Factory company
Client Address	عنوان العميل	Al Damja Street Industrial Zone Phase II Rabigh 25756 – 2902 Saudi Arabia
Client Reference No. / Date	مرجع العميل	11210003E/23
No of received Samples	عدد العينات المستلمة	2
Sample Data		بيانات العينة
Product description	وصف المنتج	Electric Storage Water Heater
Brand name or trademark	العلامة التجارية	PINO
Type or reference	النوع / المرجع	EWH-30V1
Country of Origin	بلد الصنع	Saudi Arabia
Manufacture Name	اسم المصنع	Orbital Horizon Industrial Factory
Manufacture Address	عنوان المصنع	Al Damja Street Industrial Zone Phase II Rabigh 25756 – 2902 Saudi Arabia
Products Category	تصنيف المنتج	Water Heaters - Energy Performance Requirements and Labeling
Standard / TR No.	رقم المواصفة / اللائحة	SASO 2884:2017/AMD4:2021
Test case verdicts		حالات الحكم على نتيجة الاختبار
Conformity to articles tested		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Test case does not apply to the test object		Not Applicable N/A
Test item does meet the requirement		Pass P
Test item does not meet the requirement		Fail F

Technical Lab supervisor / Manager



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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/A
	- rated capacity from 15 liters as multiples of 5 liters	30L	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	665kWh	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							Tested as load profile S		P																																						
	Declared load profiles of 3XS, XXS, XS and S							-		N/A																																						
	3XS shall not exceed 7 litres in capacity							-		N/A																																						
	XXS and XS shall not exceed 15 litres in capacity							-		N/A																																						
	S shall not exceed 36 litres in capacity							30L		P																																						
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		N/A																																						
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.						-					P																																				
	<table><tr><th colspan="12">Table 1 – MINIMUM ENERGY EFFICIENCY (η_{wh}) in %</th></tr><tr><th colspan="2">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 colspan="2">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	Measure d η_{wh} 69.06%
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/A																																				
	The limit values for QPR are expressed in table 2, rounded to 2 decimal places.							-				N/A																																				
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																																				

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4.3	Acceptance Criteria for Labelling and Market Surveillance					-
	The energy label shall be accepted as valid when a sample unit(s) tested meets the following criteria:					-
	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	1120W	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/A
	d) Tested Standing loss power (S)	$\leq 1.05 \text{ rated S}$	-	-	-	N/A
AMD 3	e.) Capacity (L)	$\geq 0.95 \times \text{rated Capacity}$	30L	$\geq 28.5L$	30L	P
	f.) Mixed quantity of water (V_{40})	$\geq 0.97 \times \text{rated } V_{40}$	-	-	-	N/A
	g.) Tested Energy (any type)	$\leq 1.05 \times \text{rated annual energy}$	665kWh	$\leq 698.25kWh$	689kWh	P
	h) Tested Collector Aperture (m^2)	$\geq 0.98 \times \text{rated value}$	-	-	-	N/A
	i) Tested Standby Power $P_{sol;stby}$	$\leq 1.03 \text{ rated } P_{sol;stby}$	-	-	-	N/A
	j) Tested Pump power consumption $P_{sol;pump}$	$\leq 1.03 \text{ rated } P_{sol;pump}$	-	-	-	N/A
	Qelec	-	3.2	-	3.322kWh	-

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			PINO	P
	• Country of origin			Saudi Arabia	P
	• Manufacturer's model or type reference and serial number of the unit			EWB-30V1	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			30L	P
	• Annual standby losses (kWh/year) or daily standby losses (kWh/24h), when applicable			-	N/A
6.3	Instruction sheet			-	-
	An instruction sheet or manual in both Arabic and English shall be delivered with each water heater			Instruction manual provided	P
	Tables, drawings and circuit diagrams may be depicted in English only			-	P
	The instruction sheet or manual shall include the following information as a minimum:			-	-

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	a) Supplier's name or trade mark	PINO	P
	b) Supplier's model number	EWB-30V1	P
	c) Declared load profile	S	P
	d) Energy Efficiency Class of the model	E	P
	e) Water heating energy efficiency in %	71.3%	P
	f) Annual electricity consumption in kWh under average climatic condition for Saudi Arabia	665kWh	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/A
	h) Thermostat temperature setting	60°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/A
	k) annual electricity consumption in kWh (or mass of butane equivalent when applicable)	-	N/A
	l) Collector aperture area in m ²	-	N/A
	m) zero-loss efficiency	-	N/A
	n) First-order coefficient (W/(m ² . K ²))	-	N/A
	o) Second-order coefficient (W/(m ² . K ²))	-	N/A
	p) Incidence angle modifier (I _{am})	-	N/A
	q) Storage Capacity in Liters	30L	P
	r) pump power consumption in W	-	N/A
	s) standby power consumption in W,	-	N/A
	t) Annual non-solar heat contribution Q _{nonsol} in KWh	-	N/A
	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/A
	• Dimensions of the unit	-	N/A
	• Instruction for mounting and connection to the pipes	-	N/A
	• Instruction for connection to the electrical installation	-	N/A
	• Instructions necessary for the correct operation of the unit and any special precautions to be observed to ensure its safe use and maintenance	-	N/A
	• Instruction for packing and unpacking the unit	-	N/A
	• Instructions on unit handling and rigging	-	N/A
	• Net weight of the unit (empty)	-	N/A

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}
		2.10	0	1.00	3.322	0	-0.28
		$\eta_{wh} = 69.06\%$					

C.5	Determination of the Ambient Correction Term Qcor					
(a) for conventional water heaters using electricity:	Qelec	Qfuel	Qref	SCFsmart	CC	k
$Q_{cor} = -k \cdot (CC \cdot (Q_{elec} \cdot (1 - SCF_{smart}) - Q_{ref}))$	3.322	0	2.10	0	1.00	0.23
Qcor = -0.28						
Where the k values are given in Table C1 for each load profile				S		-

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C.6	Determination of the mixed quantity of water V40		
$V_{40} = V_{40;exp} \times \frac{(\theta_p - 15)}{(40 - 15)}$		The normalized value of the average temperature θ_p	-
		Corresponds to the quantity of water delivered at least 40°C test. $V_{40;exp}$	-
$V_{40} = -$			N/A

ANNEX D	Calculation of the Annual Energy Consumption		
D.1	Principle for Calculation of the Annual Energy Consumption (AECWH)		
	The annual energy is based on the energy efficiency ratio AEC_{WH} used for Classification and the reference energy Q_{ref} refused to characterize the water heaters.	689kWh/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		
$AEC_{WH} = 220 \times Q_{ref} / \eta_{wh;KSA}$		Q_{ref}	$\eta_{wh;KSA}$
		2.10	67.03%
		$AEC_{WH} = 689kWh/y$	
$\eta_{WH;KSA} = \frac{1}{1 + \left(\frac{1 - \eta_{WH}}{\eta_{WH}} \right) \times \left(\frac{65 - \vartheta_{amb;test}}{65 - \vartheta_{amb;KSA}} \right)}$		η_{wh}	$\vartheta_{amb;test}$
		69.06%	20°C
		$\vartheta_{amb;KSA}$	24°C
		$\eta_{wh;KSA} = 67.03\%$	
		Ambient temperature for test: $\vartheta_{amb;test} = 20^\circ C$	
		Ambient temperature for label: $\vartheta_{amb;KSA} = 24^\circ C$	

Remarks:

Photo no. 1 (Marking)



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Photo no.2 (General view / External package)



Photo no.3 (Energy efficiency test report)



Report Reference E231200RETESTEEFS5R00

Storage Water Heater Test Data:

Applicable Standard(s)		SASO-2884:2017, BS EN 50440-2015				
Manufacturer	Country of Origin	Model	Type	Sub Type		
PINO	SAUDI ARABIA	EWB-30V1	Electric	Storage		
Test Start Date	Testing Stop Date	Load Profile	Rated Power	Actual Power		
3/17/2024	3/18/2024	S	W	W		
			1200	1120		
Actual Capacity	Rated Capacity	T3	T5	Ambient	Smart	SCF
Litres	Litres	°C	°C	°C	0	1
30.00	30.00	72.28	59.58	19.65		
$Q_{testelec}$	Q_{ref}	Q_{H2O}	Q_{elec}	Q_{cor}		
kWh	kWh	kWh	kWh	kWh		
3.20	2.10	2.31	3.322	-0.28		
$V_{full-drawing\ water}$	CC	η_{elecwh}	η_{wh}	MEPS MIN. η_{wh}		
Litres	Coefficient	%	%	%		
43.75	1.00	63.21	69.06	63.00		
$\eta_{wh,KSA}$	Rated AEC	Actual AEC	Actual AEC _{WH}	Efficiency Class		
%	kWh/y	kWh/y	kWh/y	F		
67.03		668	689			

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			Verdict

Photo no.4 (Classification as per declared load profile)

Table 3 – ENERGY EFFICIENCY CLASSIFICATION as per DECLARED LOAD PROFILE												
Energy Efficiency in %							69.06					
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

Conformity Decision is usually included in the report, unless the agreement states otherwise by the client.

Results Notes: The acceptance criterion is based on :		A-The relevant TR Requirements <input type="checkbox"/>		B-The relevant standard specifications <input type="checkbox"/>	
		C- Manufacturer's manual (product technical data sheet) <input type="checkbox"/>		D- Customer requirements <input type="checkbox"/>	
Acceptance Rule is based on:		Special Case		Rejection Rule (Failing)is based on:	
A- The measured value (+) measurement uncertainty value is less than the maximum required to criteria of acceptance. B- The measured value (-) measurement uncertainty value is greater than the minimum required to criteria of acceptance.		Accept when a confidence level of less than 95% is acceptable <			

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Notes on results: The acceptance criterion is based on; A-Relevant standard specification ☐

B-Manufacturer's manual (product technical data sheet) ☐ C-Customer requirements . ☒

The rule of acceptance is based on: The measured value fulfills the requirement according to the .acceptance criterion, taking into account the uncertainty value in the measurement

The rule of rejection is based on: The measured value does not achieve the required according to the .acceptance criterion, taking into account the uncertainty value in the measurement

☒ The sample passed all the above-mentioned tests in accordance with the requirements of the product

☐ The sample passed all the tests mentioned above in accordance with the requirements for the product, except for the test where the measured value does not meet the requirements of the product mentioned in the attached standard specifications.

The result is for the sample referred to in the report, which has been tested only and is only representative of itself.

Accreditation statues :




All tests are accredit : ☐

All tests are accredit except:

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REMARK :

SOFT COPY OF THE CONTROL TEST RESULT SHEET IS AUDITED BY THE LAB SUPERVISOR

	Inspected by	Lab supervisor/ Reviewer	Technical Manager
Name	Rieman capio	Mark Benson	Ahmed Awad
Sign			
Date	20 / 3 / 2024	20 / 3 / 2024	20 / 3 / 2024

"End of Report"

