





Summary of	<b>EN12977-3</b>	<b>HEAT STORE test results</b>	Licence Number	<b>011-7S2545 T</b>				
Annex to Solar KEYMARK Certificate			Issued	2016-02-29				
Company	Protherm Production s.r.o.		Country	Slovenska Republika				
Brand (optional)	Protherm - Helio Set		Website	<a href="http://www.vaillant.com">www.vaillant.com</a>				
Street	Jurkovicova 45		E-mail	<a href="mailto:info@vaillant.com">info@vaillant.com</a>				
Postal Code	909 01	Skalica	Tel. / Fax	+49	(0)2191-180			
<b>Solar heat store - general description</b>								
Application(s)			Hot water					
Direct solar loop / heat exchanger			Internal heat exchanger					
Direct hot water loop / heat exchanger			Direct					
Internal auxiliary heating (I)			Internal heat exchanger	Internal auxiliary heating (II)		None		
Store location options			Indoor only	Store geometri		Vertical cylinder		
<b>Heat store parameters and test results</b>								
Parameter		Source <sup>1</sup>	Unit	FES1 150 BM	FES1 250 BM	FES2 250 BM	FES1 350 BM	FES2 350 BM
Weight	Weight of the unit (empty) incl. insulation	M	kg	67.7	90.7	104.5	129.2	135.0
Size	Gross height of unit incl. insulation	M*	mm	1064	1539	1539	1700	1700
	Gross width incl. insulation	M*	mm	600	600	600	700	700
	Gross depth incl. insulation	M*	mm	600	600	600	700	700
Volumes	Nominal - total	M*	litres	162	254	246	335	330
	Effective - total (out of simulation)	L	litres	161	264	264	367	367
	Auxiliary heated volume (I)	L	litres	-	-	106	-	147
	Auxiliary heat exchanger	M*	litres	-	-	5.6	-	4.6
	Solar loop heat exchanger	M*	litres	8.9	8.9	8.9	10.4	10.4
Insulation	Thickness on top	M	mm	30...115	30...115	30...115	70...150	70...150
	Thickness on sides	M	mm	50	50	50	75	75
	Thickness on bottom	M	mm	30...164	30...164	30...164	20...100	20...100
Others	Max. operation pressure (solar loop)	M	kPa	6	6	6	6	6
	Max. operation pressure (hot water)	M	kPa	10	10	10	10	10
	Max. operation pressure (space heating)	M	kPa	-	-	10	-	10
	Max. operation temperature (solar loop)	M	°C	120	120	120	120	120
	Material of store (water enclosure part)	M	-	enamelled steel				
Corrosion protection	M	-	Magnesium anode					
Notes	<sup>1</sup> Source of information		L: Laboratory test result	M: Manufacturers information				
Testing Laboratory	TÜV Rheinland Energie und Umwelt GmbH							
Website	<a href="http://www.tuv.com/st">http://www.tuv.com/st</a>							
Test report id. number	21227422.014							
Date of test report	2016-02-29							
Comments of test lab laboratoire				 Genau. Richtig. TÜV Rheinland Energie und Umwelt GmbH Am Grauen Stein 51105 Köln				
The electrical auxilliary heater is included into the pump unit and connected to the solar heat exchanger! The Types FES1 150 BM and FES2 350 BM were fully tested according to EN 12977-3.								

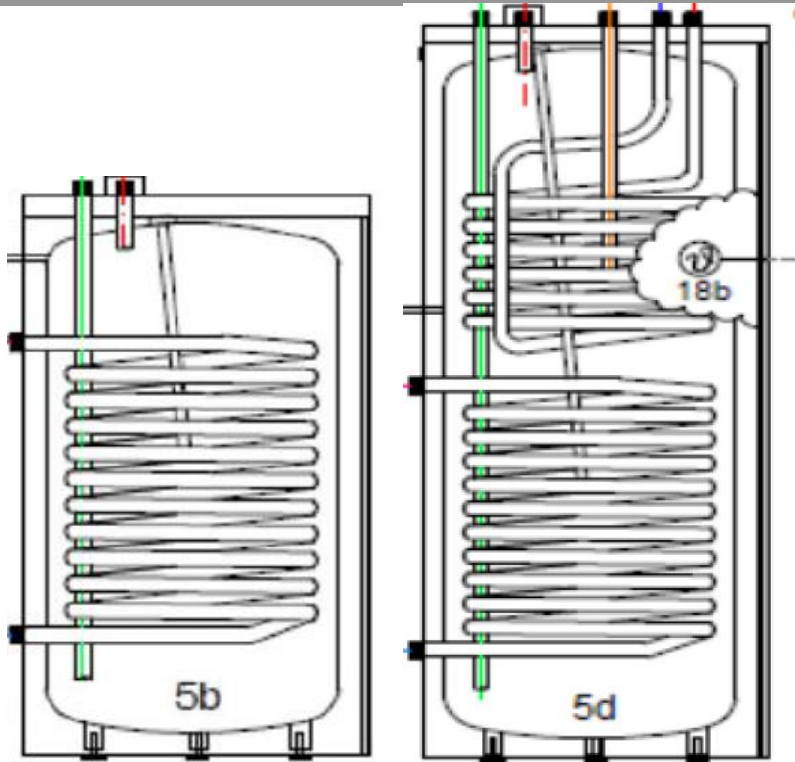


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<b>Annex to Solar KEYMARK Certificate</b>			<b>Issued</b>	2016-02-29				
<b>Company</b>	BULEX		<b>Country</b>	Belgium				
<b>Brand (optional)</b>	BULEX - Helio Set		<b>Website</b>	www.vaillant.com				
<b>Street</b>	Bergensesteenweg 1425		<b>E-mail</b>	info@vaillant.com				
<b>Postal Code</b>	1070	Brussels	<b>Tel. / Fax</b>	+49	(0)2191-180			
<b>Measured thermal parameters</b>								
Parameter	Source <sup>1</sup>	Unit	FES1 150 BM	FES1 250 BM	FES2 250 BM	FES1 350 BM	FES2 350 BM	
Thermal parameters	Total effective thermal capacity	L	kJ/K	668.039	1095.42	1095.42	1522.8	1522.8
	Thermal capacity of aux. heated part I	L	kJ/K	-	-	439.827	-	609.948
	Thermal capacity of aux. heated part II	L	kJ/K	-	-	-	-	-
	Stand-by heat loss rate	L	W/K	1.67	1.82	1.82	2.15	2.15
	Effective vertical heat conductivity	L	W/(m*K)	1.7	2.33	2.33	2.33	2.33
	Stratification number (during discharge)	L	-	ES1 150 B	ES1 250 B	ES2 250 B	ES1 350 B	ES2 350 B
	UA-value, solar heat exchanger at mean temperature difference	L	W/K	148	148	148	148	148
		L	K	10	10	10	10	10
	at mass flow	L	[kg/h]	100	200	200	300	300
		L	W/K	-	-	-	-	-
	UA-value, hot water heat exchanger at mean temperature difference	L	W/K	-	-	-	-	-
		L	K	-	-	-	-	-
	at mass flow	L	[kg/h]	-	-	-	-	-
		L	W/K	-	-	-	-	-
UA-value, space heat exchanger at mean temperature difference	L	W/K	-	-	-	-	-	
	L	K	-	-	-	-	-	
at mass flow	L	[kg/h]	-	-	-	-	-	
	L	W/K	-	-	182	-	224	
UA-value, auxiliary heat exchanger at mean temperature difference	L	W/K	-	-	20	-	20	
	L	K	-	-	900	-	900	
at mass flow	L	[kg/h]	-	-	900	-	900	
	Notes	<sup>1</sup> Source of information		L: Laboratory test result	M: Manufacturers information			
<b>Testing Laboratory</b>	TÜV Rheinland Energie und Umwelt GmbH							
<b>Website</b>	http://www.tuv.com/st							
<b>Test report id. number</b>	21227422.014							
<b>Date of test report</b>	2016-02-29							
<b>Comments of test lab laboratoire</b>			 <b>TÜVRheinland®</b> Genau. Richtig. TÜV Rheinland Energie und Umwelt GmbH Am Grauen Stein 51105 Köln					
No comments								



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Street	Bergensesteenweg 1425		E-mail	info@vaillant.com
Postal Code	1070	Brussels	Tel. / Fax	+49 (0)2191-180

Schematic drawing(s) of heat store (showing positions of inlets, outlets, heat exchangers, sensors etc.)



Parameter		Source <sup>1</sup>	Unit	FES1 150 BM	FES1 250 BM	FES2 250 BM	FES1 350 BM	FES2 350 BM	
<b>Relative</b>	Cold water inlet	L	%	20	5	5	22	22	
positions of inlets, outlets, sensors and other inserts in the store - all related to the indicated reference point	Hot water outlet	L	%	100	100	100	100	100	
	Collector loop inlet	L	%	80	56	56	44	44	
	Collector loop outlet	L	%	14	15	15	12	12	
	Space heating inlet	L	%	-	-	-	-	-	
	Space heating outlet	L	%	-	-	-	-	-	
	Auxiliary heating inlet	L	%	-	-	100	-	98	
	Auxiliary heating outlet	L	%	-	-	59	-	66	
	Lower point of electrical heater	L	%	-	-	-	-	-	
	Temp. sensor 1	Auxiliary heater	L	%	-	-	59	-	61
	Temp. sensor 2	Optional info on usage	L	%	-	-	-	-	-
	Temp. sensor 3	Optional info on usage	L	%	-	-	-	-	-
	Temp. sensor 4	Optional info on usage	L	%	-	-	-	-	-
	Temp. sensor 5	Optional info on usage	L	%	-	-	-	-	-
	Temp. sensor 6	Optional info on usage	L	%	-	-	-	-	-
Reference point for all positions above		L	inner bottom of tank						
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