





<b>Summary of</b>	<b>EN12977-3</b>	<b>HEAT STORE test results</b>	<b>Licence Number</b>	<b>011-7S2544 T</b>				
<b>Annex to Solar KEYMARK Certificate</b>			<b>Issued</b>	<b>2016-02-29</b>				
<b>Company</b>	Vaillant Group Italia S.p.A unipersonale Società soggetta all' attività di direzione e coordinamento della Vaillant GmbH		<b>Country</b>	Italy				
<b>Brand (optional)</b>	Hermann Saunier Duval - Helio Set		<b>Website</b>	<a href="http://www.vaillant.com">www.vaillant.com</a>				
<b>Street</b>	Via Benigno Crespi, 70		<b>E-mail</b>	<a href="mailto:info@vaillant.com">info@vaillant.com</a>				
<b>Postal Code</b>	20159	Milano	<b>Tel. / Fax</b>	+49	(0)2191-180			
<b>Solar heat store - general description</b>								
<b>Application(s)</b>	Hot water							
<b>Direct solar loop / heat exchanger</b>	Internal heat exchanger							
<b>Direct hot water loop / heat exchanger</b>	Direct							
<b>Internal auxiliary heating (I)</b>	Internal heat exchanger		<b>Internal auxiliary heating (II)</b>	None				
<b>Store location options</b>	Indoor only		<b>Store geometri</b>	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 <sup>3</sup>	mm	1064	1539	1539	1700	1700
	Gross width incl. insulation	M <sup>3</sup>	mm	600	600	600	700	700
	Gross depth incl. insulation	M <sup>3</sup>	mm	600	600	600	700	700
Volumes	Nominal - total	M <sup>3</sup>	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 <sup>3</sup>	litres	-	-	5.6	-	4.6
	Solar loop heat exchanger	M <sup>3</sup>	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	
<b>Testing Laboratory</b>	TÜV Rheinland Energie und Umwelt GmbH							
<b>Website</b>	<a href="http://www.tuv.com/st">http://www.tuv.com/st</a>							
<b>Test report id. number</b>	21227422.011							
<b>Date of test report</b>	2016-02-29							
<b>Comments of test lab laboratoire</b>	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.							 Genau. Richtig. TÜV Rheinland Energie und Umwelt GmbH Am Grauen Stein 51105 Köln

All values are subject to some uncertainty.

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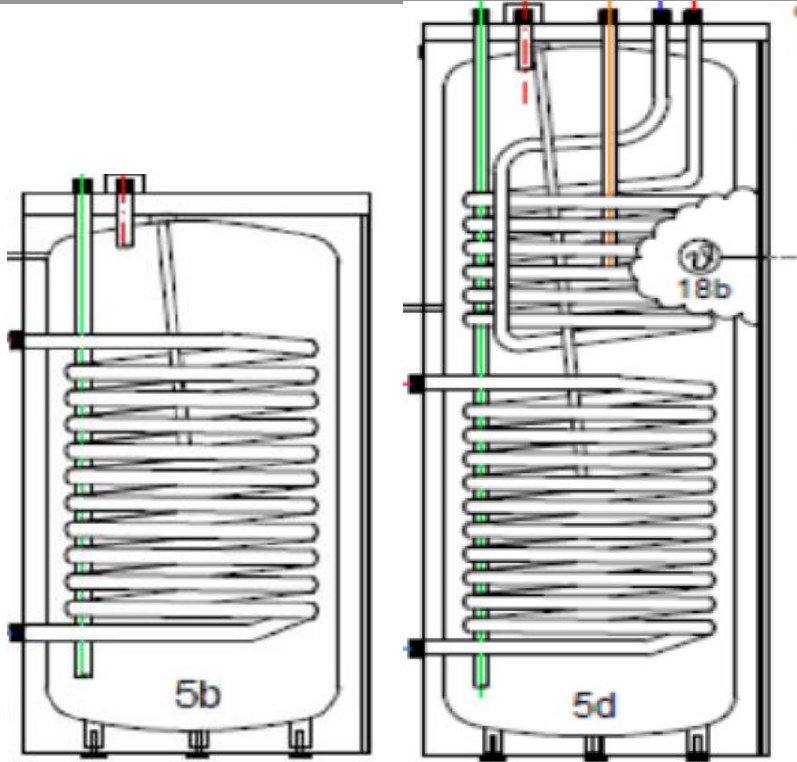
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Street	Via Benigno Crespi, 70		E-mail	info@vaillant.com				
Postal Code	20159	Milano	Tel. / Fax	+49 (0)2191-180				
Measured thermal parameters								
Parameter	Source <sup>1</sup>	Unit	FES1 150 BM	FES1 250 BM	FES2 250 BM	FES1 350 BM	FES2 350 BM	
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	BES1 250	BES2 250	BES1 350	BES2 350 B
	UA-value, solar heat exchanger at mean temperature difference at mass flow	L	W/K	148	148	148	148	148
		L	K	10	10	10	10	10
		L	[kg/h]	100	200	200	300	300
	UA-value, hot water heat exchanger at mean temperature difference at mass flow	L	W/K	-	-	-	-	-
		L	K	-	-	-	-	-
		L	[kg/h]	-	-	-	-	-
	UA-value, space heat exchanger at mean temperature difference at mass flow	L	W/K	-	-	-	-	-
		L	K	-	-	-	-	-
		L	[kg/h]	-	-	-	-	-
UA-value, auxiliary heat exchanger at mean temperature difference at mass flow	L	W/K	-	-	182	-	224	
	L	K	-	-	20	-	20	
	L	[kg/h]	-	-	900	-	900	
Notes	<sup>1</sup> Source of information		L: Laboratory test result	M: Manufacturers information				
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Website	http://www.tuv.com/st							
Test report id. number	21227422.011							
Date of test report	2016-02-29							
Comments of test lab	laboratoire							
No comments				 <p>TÜVRheinland® Genau. Richtig. TÜV Rheinland Energie und Umwelt GmbH Am Grauen Stein 51105 Köln</p>				



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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>								
positions of inlets,	Cold water inlet	L	20	5	5	22	22	
outlets,	Hot water outlet	L	100	100	100	100	100	
sensors and other	Collector loop inlet	L	80	56	56	44	44	
inserts in the store - all related to the indicated reference point	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 <a href="#">Auxilliary heater</a>	L	-	-	59	-	61	
	Temp. sensor 2 <a href="#">Optional info on usage</a>	L	-	-	-	-	-	
	Temp. sensor 3 <a href="#">Optional info on usage</a>	L	-	-	-	-	-	
	Temp. sensor 4 <a href="#">Optional info on usage</a>	L	-	-	-	-	-	
	Temp. sensor 5 <a href="#">Optional info on usage</a>	L	-	-	-	-	-	
	Temp. sensor 6 <a href="#">Optional info on usage</a>	L	-	-	-	-	-	
	Reference point for all positions above	L	<a href="#">inner bottom of tank</a>					

Notes <sup>1</sup> Source of information L: Laboratory test result M: Manufacturers information

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