



**Institute for Building Energetics,  
Thermotechnology and Energy Storage**  
Research and Testing Center for Thermal Solar  
Systems (TZS)  
**University of Stuttgart**



**Test Report**  
**Solar Water Heater**  
**Determination of energy efficiency**  
**according to SASO 2884:2017**

(This test report substitutes test report no. 21SU128 of October 30<sup>th</sup>, 2023)

Test Report No.: 21SU129/2

Stuttgart, March 7<sup>th</sup>, 2024

**Claimant:** DIMAS SA  
2nd km Argos-Nafplio  
21200 Argos  
Greece

**Manufacturer:** DIMAS SA

**System:** THERMO 300.40

**Store:** BLTGL ECO 300 II

**Collector:** Energy+EVO2.0

**Construction Year:** 2021

## Revisions history:

Test Report No.:	Date:	Remarks:
21SU129/2	March 7 <sup>th</sup> , 2024	Change of company name at the request of the applicant, front page, page 4 and page 5
21SU129/1	October 30 <sup>th</sup> , 2023	Inclusion of authentication link, page 8
21SU129	June 16 <sup>th</sup> , 2021	Issue of test report

## Contents

	Page
1 Technical data of store .....	4
2 Technical data of collector .....	5
3. Calculation of the water heating energy efficiency $\eta_{WH}$ .....	6
3.1 Parameters of the storage tank.....	6
3.2 Parameters of the solar collector .....	6
3.3 Further parameters.....	6
3.4 Results .....	7
4 Test occurrences .....	8
5 General .....	8

<b>1 Technical data of store<sup>1</sup></b>			
Manufacturer:		Product type:	
DIMAS SA		BLTGL ECO 300 II	
Model year:	Serial No.:	Rated capacity:	Design:
2021	005848/21	300 liters	Horizontal thermosiphon solar domestic hot water store
Country of manufacture:	Length <sup>2</sup> :	Diameter <sup>2</sup> :	Weight (empty):
Europe	1.84 m	0.58 m	102.0 kg
<b>Water volume:</b>			
Corrosion protection:		Enamel Powder Coated, Magnesium Anode	
Max operation pressure:		10 bar	
Max operation temperature:		95 °C	
<b>Thermal insulation:</b>		Polyurethane: 50 mm	
<b>Mantle Heat exchanger</b>			
Max operation pressure [bar]:		3.0	
Max operation temperature [°C]:		95	
Volume of heat exchanger [liters]:		9.2	
Area [m <sup>2</sup> ]:		1.53	

<sup>1</sup> as stated by the manufacturer

<sup>2</sup> with insulation

<b>2 Technical data of collector<sup>3</sup></b>			
Manufacturer:		Type:	
DIMAS SA		Energy+EVO2.0	
Year:	Serial No.:	Weight (empty):	Design:
2021	10311617001453	27.0 kg	Flat plate collector
Gross area		2.02 m <sup>2</sup>	
Absorber area		1.83 m <sup>2</sup>	
Length		2.006 m	
Width		1.007 m	
Height		0.085 m	
Max. operating pressure		10 bar	
Absorber volume		1.6 liters	
Stagnation temperature <sup>4</sup>		230 °C	

---

<sup>3</sup> as stated by the manufacturer

<sup>4</sup> determined by test laboratory

### 3. Calculation of the water heating energy efficiency $\eta_{WH}$

The water heating energy efficiency  $\eta_{WH}$  of the solar water heater is determined according to SASO 2884:2017, chapter C3.2.

#### 3.1 Parameters of the storage tank

Type:	BLTGL ECO 300 II
Rated capacity:	300 l
Total store volume $V_{sto,tot}$ :	305.5 l
Auxiliary store volume $V_{sto,bu}$ :	152.8 l
Heat loss rate of the whole store $H_{sto,los,tot}$ :	2.45 W/K
Rated thermal losses $Q_{PR}$ :	2.65 kWh/24h
For further details see:	Test report: 21STO397, dated 19.05.2021 Test Institute: IGTE Universität Stuttgart

#### 3.2 Parameters of the solar collector

Type:	Energy+EVO2.0
Gross area $A_G$ :	2.02 m <sup>2</sup>
Zero-loss efficiency $\eta_0$ :	0.737
First-order coefficient $a_1$ :	3.39
Second-order coefficient $a_2$ :	0.01
Incidence angle modifier $K_{hem}(50^\circ)$ :	0.94
Number of collectors	2
For further details see:	Test report: 21COL1590, dated 09.06.2021 Test Institute: IGTE Universität Stuttgart

#### 3.3 Further parameters

Daily hot water load (tapping profile) $Q_{ref}$ : "M"	5.85 kWh
Conversion coefficient CC according to SASO 2884:2017:	1
Auxiliary electric consumption $Q_{aux}$ (no controller):	0 kWh
Heat generator water heating energy efficiency $\eta_{WH,nonsol}$ (electric heating element):	1
Monthly average cold water temperature $\vartheta_{w;low}$ according to EN 15316-4-3:2014:	10 °C
Hot water temperature $\vartheta_{w;high}$ according to EN 15316-4-3:2014:	40 °C
Power collector loop pump $P_{sol;pmp}$ (no pump, thermosiphon system):	0 W
Correction coefficient for the orientation of the collector $f_{col}$ : according to table A.9, EN 15316-4-3:2014	0.8
Type of system according to EN 15316-4-3:2014 (SOL_TYPE):	parallel
Efficiency factor of the collector loop $\eta_{loop}$ according to EN 15316-4-3:2014, table A.11	0.9

Correction coefficient $f_{app}$ according to EN 15316-4-3:2014, table A.18	1.08
Correlation factor a according to EN 15316-4-3:2017, table A.18	1.029
Correlation factor b according to EN 15316-4-3:2017, table A.18	-0.065
Correlation factor c according to EN 15316-4-3:2017, table A.18	-0.245
Correlation factor d according to EN 15316-4-3:2017, table A.18	0.0018
Correlation factor e according to EN 15316-4-3:2017, table A.18	0.0215
Correlation factor f according to EN 15316-4-3:2017, table A.18	0
Factor describing the effect of insulation of the auxiliary heating loop $f_{bu;ins}$ according to EN 15316-4-3:2017, table B.14	0.02
recoverable heat losses of the solar system $Q_{x;sol;ls;rbl,m}$ (without solar space heating system):	0 kWh
Annual operation time for solar loop pump $t_{aux}$ according to EN 15316-4-3:2017, table B.13	2000 h
Annual global irradiation $I_{glob,ref}$ according to SASO 2884:2017, table B2	1848 kWh/m <sup>2</sup>
Auxiliary energy consumption of the auxiliary heat generator $W_{x;bu;aux;nom,m}$ :	0 kWh
Heat losses of the auxiliary heat generator $Q_{x;bu;ls;nom,m}$ :	0 kWh

### 3.4 Results

Table 1: Monthly Contribution of the auxiliary heater to the heat demand  $Q_{w;bu;out,m}$  [kWh]

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
104.5	75.1	59.8	42.2	32.8	24.6	22.1	20.9	35.0	57.3	89.9	116.8

The annual non-solar heat contribution  $Q_{non,sol}$  is calculated according to equation 1:

$$Q_{non,sol} = \sum_{m=1}^{12} Q_{w,bu,out,m} = 681.0 \text{ kWh} \quad (1)$$

The annual energy consumption  $Q_{tota}$  is calculated according to equation 2:

$$Q_{tota} = \frac{Q_{non,sol}}{1.1 \times \eta_{WH,non-sol} - 0.1} + Q_{aux} \times CC = 681.0 \text{ kWh} \quad (2)$$

The water heating energy efficiency  $\eta_{WH}$  is calculated according to equation 3:

$$\eta_{WH} = \frac{220 \times Q_{ref}}{Q_{tota}} = 189.0 \% \quad (3)$$

Table 2: Energy efficiency classification for load profile “M” according to SASO 2884:2017:

Energy class	A	B	C	D	E	F	G
$\eta_{WH}$ [%]	210	140	93	87	80	73	65

## 4 Test occurrences

No special incidents

## 5 General

The determined results are only valid for the tested versions of the test samples.  
The reproduction of **single pages** of this test report is not allowed without permission of IGTE.  
The nomenclature of SASO 2884:2017 and EN 15316-4-3:2014/2017 was used.

Arrival of test samples: 27.01.2021 (collector), 04.05.2021 (storage tank)  
Testing period: 10.02. bis 15.05.2021  
Test location: Stuttgart, Pfaffenwaldring 10  
Identification of test samples: Adhesive label: 21STO397, 21COL1590  
Test engineer: Dipl.-Ing. S. Bachmann, F. Sansonnens

Stuttgart, March 7<sup>th</sup>, 2024



Dr.-Ing. Harald Drück

- Head of test section solar –

**Authentication:** Test report available by the following [link](#)