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# Hot water solutions for every situation

Enjoy highly efficient hot water performance without compromising comfort



## Why choose A.O. Smith?

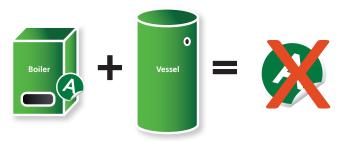
#### 1. Condensing product range

We offer the most efficient range of condensing water heaters and boilers on the market. All of our products meet the European Energy Related Products (ErP) Directives for 2018. For you that efficiency

- a) Your savings will cover your initial investment costs in less time.
- b) You can be comforted by the knowledge that you've made a choice that's environmentally safe.

#### 2. Direct fired water heaters.

Our direct water heaters offer far more efficiency than standard boiler and separate hot water storage systems.



#### 3. Solar enhanced systems.

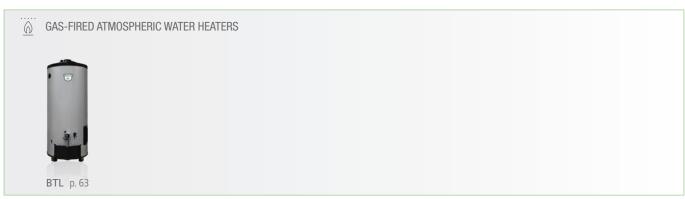
By complementing standard systems with additional solar thermal options, A.O. Smith can dramatically enhance efficiency.

#### 4. Complete service and aftercare.

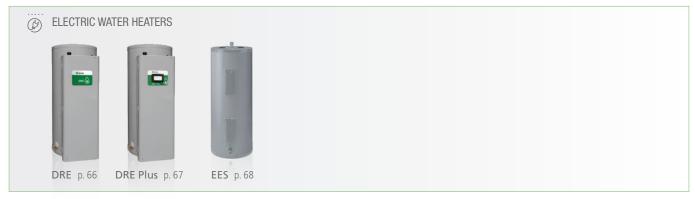
A.O. Smith customers benefit from comprehensive customer care from the initial design right through to aftersales service. We are here to help for your first system, and for any subsequent replacement systems.













#### History

Arthur's father, Charles Jeremiah Smith (pictured left) set up a blacksmith shop in Milwaukee in 1847 that soon grew out to be a successful family business.

### Introduction

# Who are A.O. Smith?

A.O. Smith Water Products Company B.V. manufactures water heaters and water equipment for both residential and industrial use. Although a subsidiary of the American A.O. Smith corporation, the company is based in the Netherlands. Our European Head Office has been situated in Veldhoven since 1972. The company takes its name from Arthur Oliver Smith, son of the original founder of the A.O. Smith Corporation.



#### mith) s



#### Sustainability and innovation

Since the company's origins 140 years ago, A.O. Smith has been continually shaped by a focus on two key drivers. Sustainability and Innovation. Inventors of a patented glass-coating process to increase efficiency, A.O. Smith are industry leaders in maximizing the service life and quality of glass-lined water heating systems. Our patented PermaGlass Ultra Coat involves applying an enamel layer to a fully assembled heater. This pioneering process has been trademarked and is exclusive to A.O. Smith.

A.O Smith provides products for a wide range of industries and uses. To maintain its market leader position, the company cultivates a spirit of continual innovation, constantly imagining new ways to enhance both production and application of its products. That relentless spirit of innovation permeates every aspect of design from the choice of components and materials, through to evaluating the efficiency of systems, and improving ease of use.

A.O. Smith specialises in solar thermal energy systems, condensing technologies and heating applications. We invest in energy-saving and efficient ways of supplying hot water.

We believe in the following key words:

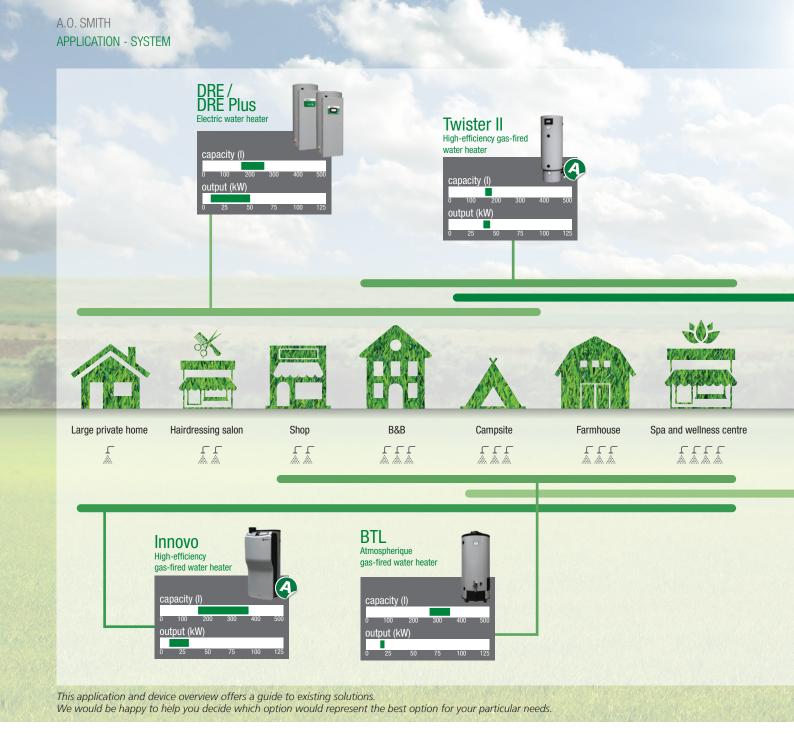
- Innovation
- Efficiency
- Partner & Advisor
- Complete customer service
- The best solution for each different use

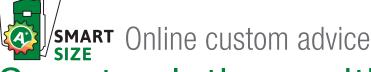
#### Condensing technologies

For more than 20 years, A.O. Smith's main production focus has been on condensing water heaters. That expertise is the reason our systems are able to delivery such high levels of efficiency. Simple yet intelligent controls ensure that every system does its job effectively and efficiently

#### Research and development

An internal research and development department allows A.O. Smith to pioneer and produce new products entirely in-house. That capability allows us to produce highly customized systems in response to a customer's particular needs. Our team can work with you through the entire production cycle from orientation, to installation, to maintenance and service.

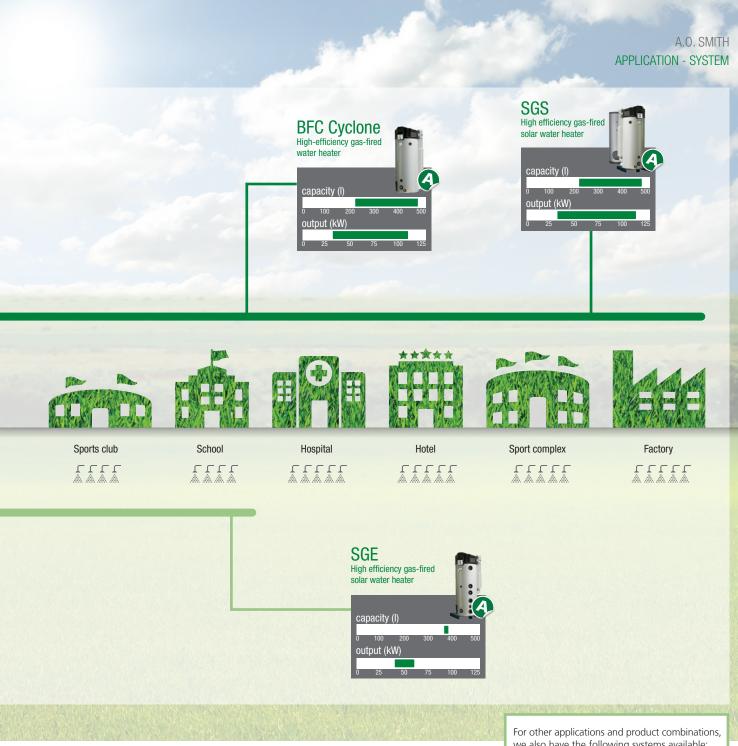




# Smart solutions with Smartsize

Smartsize is a selection programme that helps you understand which configuration will best suit your specific requirements. Upon entering your specifications and needs, Smartsize generates a proposal with your best possible solution.

This custom-built tool can help with every aspect of your project from an inventory to help with project planning, to the generation of visual designs so you can explore possibilities and recommendations. Our Technical Support Group and Customer Service teams are always on hand to help with any support you might need when using Smartsize, or for any other matter. We're here to provide all the support and advice you will ever need, all free of charge.



we also have the following systems available: EES/IT/ITE/ITS

## Personal advice

# Your perfect partner for every project

A.O. Smith are a firm believer in providing the highest possible standards of customer service. We are on hand to provide advice from the preliminary planning stages of your project, when many of the most important decisions are made. Which hot water system will best fit your particular needs? You can rely on the guidance of our highly experienced sales engineers to find your perfect answer.

A.O. Smith's support extends throughout your project to provide ongoing guidance about your system, and its proper maintenance. The high quality of our service is maintained by our in-house Technical Support Group. Whenever you need support, we'll be there.

#### **ENERGY-EFFICIENT PERFORMANCE**

#### Direct versus indirect water heaters

In a **direct-fired domestic hot water system**, heat created by the burning process is transmitted directly to the water via a heat exchanger. Atmospheric systems and room-sealed high-efficiency condensing water heaters are both types of direct gas-fired water heater, but only a sealed heater uses smart design to condense combustion gases. In these systems residual heat is drawn from the flue gases to deliver the highest possible levels of efficiency.

#### CONDENSING HIGH-EFFICIENCY HOT WATER SOLUTIONS



#### INNUVU

 Output
 11.7 – 31.3 kW

 Capacity
 160 – 380 litres

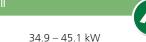
 ErP efficiency
 up to 94% (XL-XXL)

Max. temperature setpoint 85°C Water efficiency up to 98%



#### TWISTER





Max. temperature setpoint 85°C
Water efficiency up to 93%



#### BFC CYCLONE

 Output
 31.0 – 121.8 kW

 Capacity
 217 – 480 litres

 ErP efficiency
 up to 93% (XXL-3XL)

Max. temperature setpoint 80°C Water efficiency up to 98%



#### SCE

Output 42.8 – 60.4 kW
Capacity 370 litres
ErP efficiency up to 91% (XL-XXL)
Max. temperature setpoint 80°C
Water efficiency up to 96%



#### 565

 Output
 31.0 – 121.8 kW

 Capacity
 217 – 480 litres

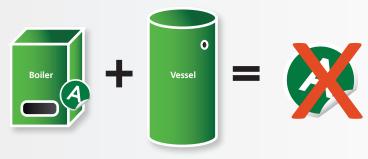
 ErP efficiency
 up to 93% (XXL-3XL)

Max. temperature setpoint 80°C Water efficiency up to 98%



The hot water solutions score well below the maximum NO<sub>X</sub> emission in accordance with the ErP regulations.

An **indirect** hot water system is created by combining several products, none designed individually as a water heater, but which together create a hot water system. Although it is natural to assume that a central heating boiler with a Class A classification should create a Class A water heating system, that assumption is inaccurate. The boiler's classification relates only to its heat producing ability, not to its performance as a water heater. If you want a truly energy-saving and highly efficient solution, a direct water heating solution is always a better idea.



## Systems

# Energy-efficient performance

Today's products need to be both durable and efficient. Guidelines for energy consumption within buildings are becoming increasingly demanding. Fortunately, A.O. Smith offers a range of product options that match current requirements, and many that exceed them.

#### Energy performance directive

The EU directive on the energy performance of buildings was implemented in 2002. It is intended to improve the energy efficiency of buildings, to reduce carbon emissions, and ultimately to reduce the impact of climate change. The directive was amended in 2010 to further improve the energy-saving performance of buildings.

One of the key aims of the directive is to make the performance of individual buildings transparent with the use of certificates to indicate energy ratings. For each building certification includes clear guidance on what improvements a building could make to further increase performance.

#### Efficiency

The efficiency of a water heating system is measured as a percentage. This percentage indicates how much energy is transferred to the water in the tank in comparison to the amount of energy used by the heating system.

#### Ecodesign

Created as part of the EU's Ecodesign Directive, Ecodesign regulations oblige manufacturers to restrict the energy consumption of their products by setting minimum standards for energy efficiency. As a result of the EU's 2015 Energy Labelling Directive, the efficiency rating of individual products must be made clear to consumers using energy labels.

#### Solar & condensing systems

A.O. Smith water heaters deliver consistently high-efficiency ratings. The Innovo, TWI and BFC Cyclone heaters, depending on the model, deliver ratings up to 109% (nett). Its SGE and SGS solar water heaters are amongst the most efficient in the market, delivering maximum solar contribution. They already operate safely within the new NO<sub>X</sub> requirements







## Expanding the gas-fired water heater range

# High-efficiency condensing water heaters

A consistent advocate for the benefits of condensing gas-fired water heaters, A.O. Smith was an early pioneer in the category. The BFC Cyclone, our first gas-fired high-efficiency water heater, launched in 1998. Since then, with recent introductions of the Innovo model, we have built a comprehensive range of condensing heaters to offer the ideal solution for every different situation.

#### **Applications**

The BFC Cyclone, Twister, SGE and SGS water heaters have been developed to match the demands of **medium** to **large usage buildings**. The medium classification includes buildings such as dairy farms, camping grounds and sports centres, whilst the large classification covers buildings with high volume demands like schools and nursing homes. Our new Innovo system has been designed to meet the needs of smaller establishments with more modest requirements like hairdressing salons, car washes, B&B's and large private homes. Combined, this range offers ideal solutions for businesses and buildings of every size. Whatever your choice, efficient performance is guaranteed. All products in the range have been assigned at least a Class A label with many, like our solar systems, achieving up to an A++++, depending on the configuration.

#### Innovo

The Innovo range includes 9 room-sealed condensing gas-fired water heaters with capacities ranging from 11,7 to 31,3 kW, and volumes ranging from 160 to 380 litres. A load profile between XL and XXL can be attained depending on the appliance, while the ErP efficiency varies between 90 and 94. The entire range has a maximum temperature setting of 85°C, and with a NO<sub>X</sub> output of under 37 mg/kWh, already meets the standards set by the European Directive.





#### **BFC Cyclone**

Fully room-sealed condensing high-efficiency water heater (109% nett)

Nominal output 31,0 - 121,8 kW Flue options B23, C13, C33, C43, C53, C63

- O Automatic gas/air premix burning system, including burner modulation
- O Standard low-maintenance powered anodes
- O Whisper-quiet operating sound
- $\, \circ \,$  Varying water temperature setting from 40°C to 80°C with use of weekly timer
- O Flexible flue options (maximum length 100m) allows systems to be placed almost anywhere
- O Easy fault diagnosis and computer-controlled digital weekly timer
- O Programmable for anti-legionella purge cycle
- $\, \bigcirc \,$  Voltage-free contact for general fault indication to BMS







 Comes with a steel pallet base as standard to simplify transport and installation



Technical specific	ations		BFC 28	BFC 30	BFC 50	BFC 60	BFC 80	BFC 100	BFC 120
Nominal input (g	ross value) *	kW	32.2	33.3	52.2	63.3	86.6	105.5	128.8
Nominal input (n	ett value)	kW	29.0	30.0	47.0	57.0	78.0	95.0	116.0
Nominal output		kW	31.0	32.7	50.3	60.4	84.2	100.7	121.8
Gas consumption	**	m³/h	3.1	3.2	5.0	6.0	8.3	10.1	12.3
Empty weight		kg	177	214	214	214	405	405	405
Efficiency (gross	value)	%	96	98	96	95	97	95	95
Efficiency (nett va	alue)	%	107	109	107	106	108	106	105
NO <sub>x</sub> emissions*		mg/kWh GVC	24	32	36	37	34	36	37
Draw-off capacity									
Capacity		I	217	368	368	368	480	480	480
Max. temperatur	e setting	°C	80	80	80	80	80	80	80
30 minutes	∆T=44 °C	1	430	550	730	840	1100	1300	1500
60 minutes	ΔT=44 °C	1	730	870	1300	1500	1900	2300	2600
90 minutes	ΔT=44 °C	1	1100	1200	1800	2100	2800	3200	3800
120 minutes	ΔT=44°C	1	1400	1500	2300	2700	3600	4200	5000
Continuous	ΔT=44°C	l/h	610	640	990	1200	1700	2000	2400
Heating-up time	∆T=44°C	minutes	21	35	22	19	17	15	12
30 minutes	<b>∆</b> T=50°C	1	360	450	620	720	910	1100	1300
60 minutes	ΔT=50 °C	1	630	730	1100	1300	1700	2000	2300
90 minutes	ΔT=50 °C	1	900	1100	1500	1800	2400	2800	3400
120 minutes	ΔT=50 °C	1	1200	1300	2000	2300	3100	3700	4400
Continuous	ΔT=50 °C	l/h	540	570	870	1100	1500	1800	2100
Heating-up time	ΔT=50 °C	minutes	24	39	26	21	20	17	14
30 minutes	ΔT=55 °C	1	320	390	540	630	800	920	1100
60 minutes	ΔT=55 °C	1	560	650	940	1100	1500	1700	2100
90 minutes	ΔT=55 °C	1	800	900	1400	1600	2200	2500	3000
120 minutes	ΔT=55 °C	1	1100	1200	1800	2100	2800	3300	4000
Continuous	ΔT=55 °C	l/h	490	520	790	950	1400	1600	2000
Heating-up time	∆T=55 °C	minutes	27	43	28	23	22	18	15
Dimensions									
Height		mm	1390	1925	1925	1925	2060	2060	2060
Depth		mm	705	705	705	705	1000	1000	1000
Width		mm	705	705	705	705	900	900	900
Height of cold w	ater connection	mm	170	160	160	160	225	225	225
Height of hot wa	ter connection	mm	1390	1925	1925	1925	2060	2060	2060
Height of gas cor	nnection	mm	1285	1815	1815	1815	1855	1855	1855
Diameter of flue	connection	mm	100/150	100/150	100/150	100/150	130/200	130/200	130/200
Cleaning opening	g	mm	95 x 70						
Energy labelling									
Load profile			XXL	XXL	XXL	XXL	3XL	3XL	3XL
Energy labelling			А	А	А	А	-	-	-
Efficiency		%	91	91	91	90	93	93	92

<sup>\*</sup> Gas data based on G20-20 mbar

Draw-off capacities are based on the maximum control temperature and cold water set at 10  $^{\circ}\text{C}$ 

<sup>\*\*</sup> Gas consumption at 15 °C and 1013.25 mbar

(o)

### HIGH-EFFICIENCY CONDENSING WATER HEATERS





#### Innovo

Fully room-sealed condensing high-efficiency water heater (109% nett)

Nominal output 11,7 - 31,3 kW Flue options B23, C13, C33, C43, C53, C63

- O Automatic gas/air premix burning system, including burner modulation
- O Standard low-maintenance powered anodes
- O Flue lengths up to 75 metres depending on unit and flue gas system configuration
- O Heat exchanger constructed to minimise limescale deposits
- O External on-/off-switch
- O Voltage-free contact for general fault indication to BMS
- O Maximum set point of 85°C
- O All components can be easily reached through front cover for simplified servicing and maintenance
- Completely insulated, low standby losses
- O Suitable for PP and aluminium flue gas exhaust materials
- Suitable for natural gas and butane/propane



- \* Gas data based on G20-20 mbar
- \*\* Gas consumption at 15 °C and 1013.25 mbar



#### Twister II

Fully sealed condensing high-efficiency water heater (93%)

34.9 - 45.1 kW B23, C13, C33, C43, C53, C63



- O Premix Low NO<sub>x</sub> burner is extremely environmentally friendly
- $\, { \bigcirc }\,$  Whisper-quiet operating noise delivered by specially designed blower and burner
- O Light weight (79 kg) makes for easy installation
- O Suitable for natural gas and propane
- O Ideal for agricultural with a max setting of 85°C
- O Suitable for PP and aluminum flue materials
- O Easy-to-use graphic LCD touchscreen display



Technical specific	ations		TWI 35-200	heater system 45-200
Nominal input (g	ross value) *	kW	37.8	48.9
Nominal output		kW	34.9	45.1
Gas consumption	1**	m³/h	3.6	4.7
Empty weight		kg	79	79
Efficiency (gross	/alue)	%	93	93
NO <sub>x</sub> emissions*		mg/kWh GVC	53	53
Draw-off capacity				
Capacity		1	182	182
Max. temperatur	e setting	°C	85	85
30 minutes	ΔT=44 °C	1	670	730
60 minutes	ΔT=44 °C	I	1100	1200
90 minutes	ΔT=44 °C	1	1400	1700
120 minutes	ΔT=44°C	1	1800	2100
Continuous	ΔT=44 °C	l/h	710	910
Heating-up time	ΔT=44 °C	minutes	17	13
30 minutes	ΔT=50°C	I	560	620
60 minutes	ΔT=50 °C	I	870	1100
90 minutes	ΔT=50 °C	I	1200	1500
120 minutes	ΔT=50 °C	I	1500	1900
Continuous	ΔT=50 °C	Vh	620	800
Heating-up time	ΔT=50 °C	minutes	18	14
30 minutes	ΔT=55 °C	I	490	540
60 minutes	ΔT=55 °C	I	770	900
90 minutes	ΔT=55 °C	I	1100	1300
120 minutes	ΔT=55 °C	I	1400	1700
Continuous	ΔT=55 °C	l/h	570	730
Heating-up time	ΔT=55 °C	minutes	19	15
Dimensions				
Height		mm	1655	1655
Depth		mm	660	660
Width		mm	560	560
Height of cold water connection		mm	400	400
Height of hot water connection		mm	1655	1655
Height of gas connection		mm	170	170
Diameter of flue connection		mm	80/125	80/125
Energy labelling				
Load profile			XXL	XXL
Energy labelling			A	A
Efficiency		%	93	91

<sup>\*</sup> Gas data based on G20-20 mbar

Draw-off capacities are based on the maximum control temperature and cold water set at 10 °C

<sup>\*\*</sup> Gas consumption at 15 °C and 1013.25 mbar



## Our advice

# Replace your atmospheric heater with condensing water heaters to deliver more value

Given the enormous added value delivered by condensing systems, A.O. Smith always recommend replacing atmospheric water heaters with condensing alternatives.

Achieving maximum possible energy savings is key to the design of any water heating system. When designing a building, and planning the installation of your water heater, A.O. Smith's hugely efficient gas-fired and solar water heaters can provide significant improvements to your Energy Performance Certificate (EPC) computation. Our condensing systems have been built to comply with the ErP Ecodesign regulations and have been awarded the highest possible energy labels.

Using few sample calculations, we can visually demonstrate the speed with which you can make up your initial investment.

Opting for a condensing water heater has several immediate benefits:

- The time it takes to see a return on your investment is dramatically reduced by the efficiency of the system.
- That same efficiency delivers a very environmentally friendly solution to heating water.
- Your system is guaranteed to meet the increased efficiency requirements of the **ErP 2018** regulations.

A condensing water heater delivers savings of energy and cost. The following chart indicates anticipated payback times, providing a figure for the amount of time needed to regain the investment of changing from an atmospheric heater compared to a condensing alternative. Once this "break-even" point has been passed, you will enjoy huge savings compared to your original running costs.

If you'd like specific advice to understand the ideal solution for your particular case, please contact our sales engineers.



ATMOSPHERIC WATER HEATER	CONDENSING ALTERNATIVE	AVERAGE PAYBACK TIME (YEAR)
ADM	BFC Cyclone/Innovo	2,0
ADMR	BFC Cyclone/Innovo	1,2
BFM	BFC Cyclone/Innovo	1,4
BT/BTI	Innovo	4,3
EQ 280-380	Innovo	5,2

A condensing water heater not only provides energy savings, it also generates substantial cost savings. The chart on the next page gives you an indication of the possible payback periods. This is the time needed to earn back the investment in a condensing system with respect to an atmospheric system. As from this 'break-even point', you save continuously with respect to the old situation.

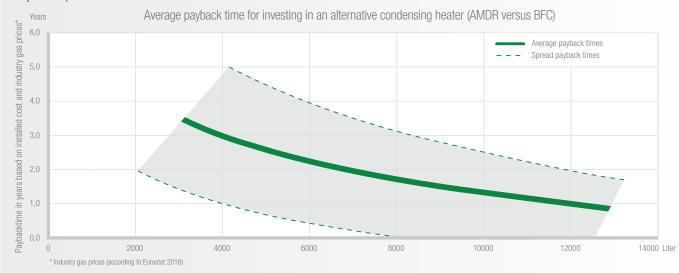
Please contact our sales engineers for targeted advice about the best condensing alternative for your atmospheric water heater.

#### **BASIC CALCULATION PRINCIPLES**

- 2 peaks of 60 minutes of 38°C a day, for 365 days
- Peak times fluctuate between 30-180 minutes
- Maximum set point of 70°C
- Maximum set point of condensing alternative > maximum set point of atmospheric system
- An under-capacity of 10% when compared to the atmospheric system is permitted

#### Example – condensing alternative for ADMR

- Draw-off capacity of the ADMR 80 is 2400 litres, with a peak of 60 minutes.
- Lower limit for the draw-off capacity of the condensing system is 2160 litres (2400 – 10%)
- The most efficient condensing system for this 60 minute draw-off capacity is the BFC 60 with 2260 litres.



#### **CALCULATION EXAMPLE**

#### Payback time

- The price of a BFC 60 is roughly equivalent to that of an ADMR 80.
- Flue gas exhaust material and extra installation costs increase investment price of the BFC 60 which makes the total investment 15% higher than the ADM 80.
- With two peaks per day, consumption totals 5000 litres at 38°C. This translates to 584 MJ per day, or 213 GJ per year.
- Based on an efficiency rating of 84%, and factoring standby loss of 487 W at 80°C, the ADMR 80 uses 7907 m³/year .
- Based on an efficiency rating of 106%, and factoring standby loss of 218 W at 80°C, the BFC 60 uses 6114 m³/year
- The difference delivers a gas saving of 1793 m³/year. That equates to a € 538 per year, based on an average European industry gas price of € 0,30/m³ as recorded by Eurostat.
- The BFC 60 delivers an average payback period of 2,4 years.
- \* This calculation is based on industrial, typically lower gas prices. At a higher rate, the financial benefits of changing systems are even more pronounced.

These calculations only offer a general guide. To identify the best solution for you, we would be happy to calculate the payback time based on your specific figures. Nothing makes us happier than helping you save energy.



#### **BENEFIT OPPORTUNITIES**

When purchasing a condensing system, companies and private buyers are eligible for benefits. Make sure to check your country's incentives.



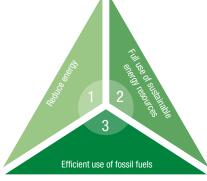


# System solutions

# Designing with Trias Energetica

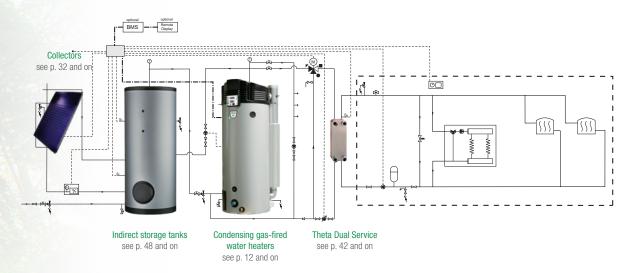
The Trias Energetica principle (Strategy developed by Delft University) is used to improve efficiency when designing sustainable structures. A.O. Smith use the three steps detailed in the model to optimize performance of their systems.

- 1 Minimise wastage by reducing energy consumption as much as possible
- 2 Make full use of sustainable energy resources (e.g. A.O. Smith's solar optimized systems)
- 3 Use fossil fuels in the most efficient ways possible (e.g. the enhanced efficiency provided by an A.O. Smith condensing heater)



Trias Energetica

By creating optimal combinations of individual products, A.O. Smith can build hot water systems that offer more efficient and sustainable solutions.



- Water is preheated using stored solar energy
- If this energy is not sufficient, a high-efficiency gas-fired water heater initiates to provide additional heat
- A Theta Dual Service component allows the system to provide both central heating and water heating,
   with thermal solar energy used to heat both
- To monitor the whole system, a BMS module can provide a link to a building management system





## Meet our renewables

# Solar thermal energy

Relying on energy generated by the sun, our renewables product line offers hugely efficient, extremely green solutions. By combining technologies within a single system, we can greatly reduce your gas consumption.

#### Maximum efficiency

In every system, the **intelligent operating system** can be programmed to adapt to individual preferences and draw-off needs. This operating system can be used to make optimal use of solar energy at all times. Even when sunshine is limited, efficiency is maximised. The SGS solar water heater can store an avarage 40% more solar energy in comparison with a traditional solar system.

#### Intelligent controller

Temperature of the sensors, pump status and output can all be viewed on a single display. Every function of the system can be controlled from this screen.

#### Long service life

Using a patented drainback system mounted below the solar collector, stagnation temperatures of the heat exchange medium are prevented. This design feature helps extend the service life of the entire system.

#### Solar water heaters

The showpiece models within our renewable product range are the **SGE** and **SGS** high-efficiency solar water heaters.

Ideal for medium-sized commercial requirements, where space is limited, the SGE solar heater exchanger integrates directly into a condensing water heater system.

The SGS combines with an IT, a storage tank with an internal heat exchanger. With a maximum storage capacity of 2800 litres, this powerful solution is perfect for large-scale, industrial requirements.

#### Installation possibilities

These solar systems may be installed on or inside a roof, or mounted with a frame on a wall or flat roof. The systems are delivered as a complete package to make installation easier.

#### Total solution

For maximum efficiency, A.O. Smith always advocate a total system solution. The renewable units are incorporated and delivered as part of a single, integrated system. By trusting us with design and delivery of the complete system, we can ensure all components work together perfectly, delivering maximum possible efficiency. We are the only partner you'll need for every hot water project.

#### Indirect solar systems

In addition to our combination solar and high-efficiency water heaters, A.O. Smith also supply indirect solar systems. These can be combined with an existing afterheater. These systems can combine with our gas-fired products, but are also compatible with our electric DRE series. For more information about this option, see page 64.



Exploded view of the SGE

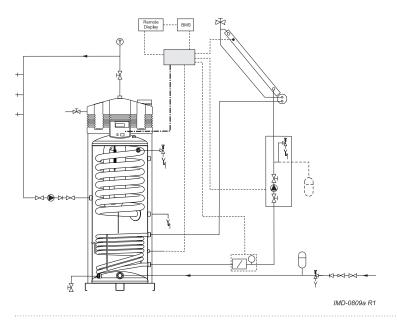


#### **OPTIMAL SOLAR CONTRIBUTION**

The SGE is a compact system with an integrated heat exchanger. Its small size does nothing to detract from a highly efficient performance. Collectors are connected to the lowest heat exchanger, allowing them to deliver all available heat to the water. When needed, the upper heat exchanger provides additional heat to increase water temperature.

The SGS must always be installed together with an IT storage tank, with an inbuilt heat exchanger. The collectors are connected to the IT's integrated heat exchanger to allow the transfer of all available heat to the tank. Should the water temperature in the SGS differ by more than 5°C from the water temperature in the IT, heat is automatically transferred to the SGS. When needed, the SGS will heat water to the set point.

Both systems are designed to maximise solar contributions. Supplementary gas heating is only used when a temperature above the limits of the solar system is required. In this way the system minimises your use and dependency on gas.

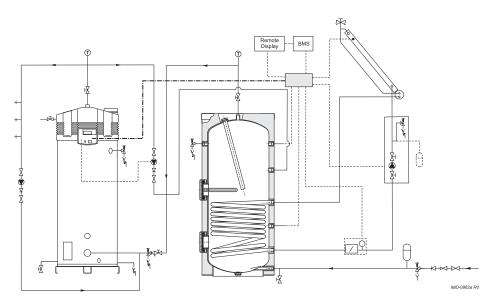


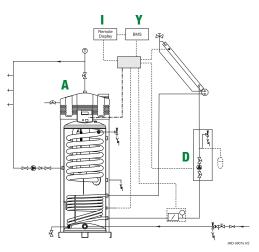
#### SGE

A highly efficient solar system delivered as a compact package. Applied condensation technology in the 44 kW and 63 kW models guarantees maximum solar contributions. Only one control is needed for the complete system.

#### SGS+IT(E)

The ideal solar system solution for large-scale usage. Maximum solar contributions are enhanced by condensing support from 31 kW to 122 kW and storage tank capacities of 385 to 2800 litres. For systems with more than 15 collectors, A.O. Smith can help you design a custom-built arrangement. To explore this option, please contact our Technical Support Group (see page 74).

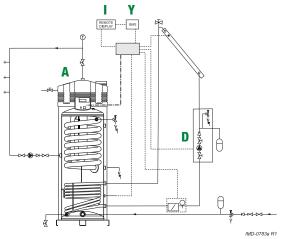




Also applicable as a vented system

#### SGE SOLAR SYSTEMS WITH DRAINBACK FUNCTION\*

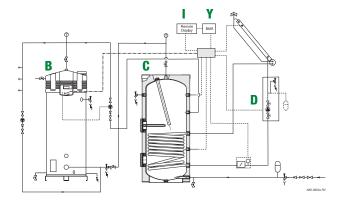
- SGE high-efficiency condensing solar water heater with integrated heat exchanger
- o SGE is available in 44 and 63 kW versions with a capacity of 370 litres
- Compact, small-sized system
- When combined with the correct pump station, multiple collectors are possible
- Drainback feature prevents the system reaching stagnation temperatures
- When using a large pump station, always install an expansion vessel.
   A.O. Smith can advise on the size of vessel needed.



Also applicable as a vented system

#### SGE SOLAR SYSTEMS WITHOUT DRAINBACK FUNCTION\*

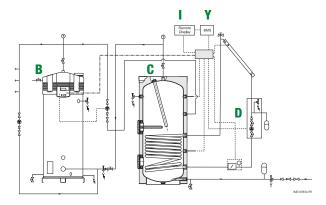
- SGE high-efficiency condensing solar water heater with integrated heat exchanger
- SGE is available in 44 and 63 kW versions with a capacity of 370 litres
- Compact, small-sized system
- When combined with the correct pump station, multiple collectors are possible
- Always use an expansion vessel when using a system without a drainback



Also applicable as a vented system

#### SGS + IT(E) SOLAR SYSTEMS WITH DRAINBACK FUNCTION\*

- SGS condensing high-efficiency solar water heater combined with an IT(E) with integrated heat exchanger
- SGS is available from 31 and 122 kW with a capacity of 217-480 litres
- Always used in combination with an IT(E) indirect tank available in capacities from 385 to 1007 litre (or large IT tanks up to 2800 litres)
- Drainback feature prevents the system reaching stagnation temperatures
- Delivers a solar contribution of up to 40% more than standard systems
- When using a large pump station, always install an expansion vessel.
   A.O. Smith can advise on the size of vessel needed.



Also applicable as a vented system

#### SGS + IT(E) SOLAR SYSTEMS WITHOUT DRAINBACK FUNCTION\*

- SGS condensing high-efficiency solar water heater combined with an IT(E) with integrated heat exchanger
- SGS is available from 31 and 131 kW with a capacity of 217-480 litres
- Always used in combination with an IT(E) indirect tank available in capacities from 385 to 1007 litre (or large IT tanks up to 2800 litres)
- When combined with the correct pump station, multiple collectors are possible
- Always use an expansion vessel when using a system without drainback
- Stores an avarage 40% more solar energy in comparison with standard systems

<sup>\*</sup> Green letters on the installation drawings above indicate required components. The corresponding item number can be found on pages 30-32.



#### SGE

#### Fully room-sealed condensing high-efficiency solar water heater (107% nett)

Nominal output 42,8 - 60,4 kW Flue options B23, C13, C33, C43, C53, C63

- Maximum solar contribution and comfortable heat levels are delivered by a fully integrated and intelligent solar controller
- O Automatic gas/air premix burning system including burner modulation
- O Low-maintenance inert anodes as standard
- O Whisper-quiet operation
- One control and display unit for all system functions
- Easy fault diagnosis and computer-controlled digital weekly timer
- O Programmable for anti-legionella purge cycle
- $\, \bigcirc \,$  Very small footprint because of integrated solar heat exchanger
- $\, \circ \,$  Varying water temperature setting from 40°C to 80°C with use of weekly timer



Technical specifications		SGE 40	SGE 60
Nominal input (gross value) *	kW	44.4	63.3
Nominal input (nett value)	kW	40.0	57.0
Nominal output	kW	42.8	60.4
Gas consumption**	m³/h	4.2	6.0
Empty weight	kg	245	245
Efficiency (gross value)	%	96	95
Efficiency (nett value)	%	107	106
NO <sub>x</sub> emissions*	mg/kWh GVC	29	31
Draw-off capacity			
Capacity	I	370	370
Max. temperature setting	°C	80	80
Tset = 65 °C/Tcold = 10 °C			
30 minutes ∆T=44 °C	Ī	470	630
60 minutes ΔT=44 °C	I	890	1300
90 minutes ΔT=44 °C	1	1400	1900
120 minutes ΔT=44°C	I	1800	2400
Continuous ΔT=44 °C	l/h	840	1200
Heating-up time ∆T=44 °C	minutes	15	10
30 minutes ΔT=50 °C	ī	400	530
60 minutes ∆T=50 °C	I	760	1100
90 minutes ∆T=50 °C	I	1200	1600
120 minutes ∆T=50 °C	I	1500	2100
Continuous ∆T=50 °C	l/h	740	1100
Heating-up time ∆T=50 °C	minutes	17	12
Tset = 80 °C/Tcold = 10 °C			
30 minutes ΔT=55 °C	I	340	470
60 minutes ΔT=55 °C	I	680	940
90 minutes ∆T=55 °C	I	1100	1500
120 minutes ∆T=55 °C	I	1400	1900
Continuous ∆T=55 °C	l/h	670	950
Heating-up time $\Delta T$ =55 °C	minutes	18	13
Dimensions			
Height	mm	2055	2055
Depth	mm	925	925
Width	mm	850	850
Height of cold water connection	mm	185	185
Height of hot water connection	mm	2055	2055
Height of gas connection	mm	1945	1945
Diameter of flue connection	mm	100/150	100/150
Cleaning opening	mm	95 x 70	95 x 70
Energy labelling			
Load profile		XXL	XXL
Energy labelling		A	A
Efficiency	%	89	91
,			

- \* Gas data based on G20-20 mbar
- \*\* Gas consumption at 15 °C and 1013.25 mbar



#### SGS

#### High-efficiency condensing solar water heater (109% nett)

Nominal output 31,0 - 121,8 kW Flue options B23, C13, C33, C43, C53, C63

- Maximum solar contribution and comfortable heat levels delivered by a fully integrated intelligent solar controller
- $\, { \bigcirc }\,$  Automatic gas/air premix burning system including burner modulation
- O Delivered with low-maintenance inert anodes
- O Whisper-quiet operation
- One control and display unit for all system functions
- $\, \bigcirc \,$  Easy fault diagnosis and computer-controlled digital weekly timer
- O Programmable for anti-legionella purge cycle
- One control and display unit for all system functions
- O Compatible with IT storage tank of 385 to 2800 litres
- O Varying water temperature setting from 40°C to 80°C with use of weekly timer



Technical specifications		SGS 28	SGS 30	SGS 50	SGS 60	SGS 80	SGS 100	SGS 120
Nominal input (gross value) *	kW	32.2	33.3	52.2	63.3	86.6	102.7	128.8
Nominal input (nett value)	kW	29.0	30.0	47.0	57.0	78.0	92.5	116.0
Nominal output	kW	31.0	32.7	50.3	60.4	84.2	98.1	121.8
Gas consumption**	m³/h	3.1	3.2	5.0	6.0	8.3	10.1	12.3
Empty weight	kg	196	239	239	239	405	405	405
Efficiency (gross value)	%	96	98	96	95	97	95	95
Efficiency (nett value)	%	107	109	107	106	108	106	105
NO <sub>x</sub> emissions*	mg/kWh GVC	25	32	36	37	34	34	37
Draw-off capacity								
Capacity	I	217	368	368	368	480	480	480
Max. temperature setting	°C	80	80	80	80	80	80	80
Tset = 65 °C/Tcold = 10 °C								
30 minutes ΔT=44 °C	I	370	440	630	730	940	1100	1300
60 minutes ΔT=44 °C	I	670	760	1200	1400	1800	2100	2500
90 minutes ΔT=44 °C	I	980	1100	1700	2000	2600	3100	3700
120 minutes ΔT=44°C	I	1300	1400	2100	2500	3500	4100	4900
Continuous ∆T=44 °C	l/h	610	640	990	1200	1700	2000	2400
Heating-up time ∆T=44 °C	minutes	21	35	22	19	17	15	12
30 minutes ΔT=50 °C	T	310	350	520	610	780	910	1100
60 minutes ΔT=50 °C	1	570	640	950	1200	1600	1800	2200
90 minutes ΔT=50 °C	1	840	920	1400	1700	2300	2700	3200
120 minutes ∆T=50 °C	1	1200	1200	1900	2200	3000	3600	4300
Continuous ∆T=50 °C	l/h	540	570	870	1100	1500	1800	2100
Heating-up time ∆T=50 °C	minutes	24	39	26	21	20	17	14
Tset = 80 °C/Tcold = 10 °C								
30 minutes ∆T=55 °C	I	260	290	440	530	670	790	950
60 minutes ∆T=55 °C	I	500	550	840	1000	1400	1600	1900
90 minutes ΔT=55 °C	1	750	800	1300	1500	2000	2400	2900
120 minutes ΔT=55 °C	1	990	1100	1700	2000	2700	3200	3800
Continuous ∆T=55 °C	l/h	490	520	790	950	1400	1600	2000
Heating-up time ∆T=55 °C	minutes	27	43	28	23	22	18	15
Dimensions								
Height	mm	1485	2015	2015	2015	2060	2060	2060
Depth	mm	925	925	925	925	1000	1000	1000
Width	mm	850	850	850	850	900	900	900
Height of cold water connection	mm	265	255	255	255	225	225	225
Height of hot water connection	mm	1485	2015	2015	2015	2060	2060	2060
Height of gas connection	mm	1380	1910	1910	1910	1855	1855	1855
Diameter of flue connection	mm	100/150	100/150	100/150	100/150	130/200	130/200	130/200
Cleaning opening	mm	95 x 70	95 x 70	95 x 70	95 x 70	95 x 70	95 x 70	95 x 70
Energy labelling								
Load profile		XXL	XXL	XXL	XXL	3XL	3XL	3X
p. 5c		, , , , ,	,,,,	, , , , ,	,,,,	5,12	5/12	5/1

\* Gas data based on G20-20 mbar

Energy labelling Efficiency

\*\* Gas consumption at 15 °C and 1013.25 mbar

90



#### ITE Indirect water heater

Nominal output

52 - 87 kW



- O Capacity 389 to 1024 litres
- O Single-wall spiral heat exchanger
- O Fitted with PermaGlas Ultra Coat enamel as standard
- O Insulated access cover for comprehensive waterside maintenance
- O Replaceable magnesium anode



Technical specifications		ITE 400	ITE 500	ITE 600	ITE 750	ITE 1000
Output coil	kW	78	68	72	80	87
Surface area coil	m²	1.64	2.13	2.39	2.66	2.89
Water capacity coil	I	9.9	12.8	20.3	22.3	24.6
Flow rate coil (80-60 °C)	l/h	2236	2924	3096	3440	3741
Pressure drop solar coil	mbar	78	166	37	50	61
Max. working pressure tank	kPa (bar)	1000(10)	1000(10)	1000(10)	1000(10)	1000(10)
Max. working pressure coil	kPa (bar)	1600(16)	1600(16)	1600(16)	1600(16)	1600(16)
Max. operating temperature tank	°C	95	95	95	95	95
Max. operating temperature coil	°C	110	110	110	110	110
Anodes	-	1	1	1	1	1
Empty weight	kg	131	179	229	237	314
Draw-off capacity						
Capacity	I	389	478	652	734	1024
30 minutes ∆T=44 °C	1	952	1206	1463	1638	2068
60 minutes ∆T=44 °C	l	1461	1871	2167	2420	2919
90 minutes ∆T=44 °C	l	1969	2536	2870	3201	3769
120 minutes ΔT=44 °C	I	2477	3200	3574	3983	4619
Continuous ∆T=44 °C	l/h	1016	1329	1407	1564	1700
Heating-up time ∆T=44 °C	minutes	23	22	28	28	36
30 minutes ΔT=50°C	I	838	1062	1288	1441	1820
60 minutes ΔT=50 °C	I	1285	1646	1907	2129	2568
90 minutes ΔT=50 °C	I	1733	2231	2526	2817	3317
120 minutes ∆T=50 °C	I	2180	2816	3145	3505	4065
Continuous ΔT=50 °C	l/h	894	1170	1238	1376	1496
Heating-up time $\Delta$ T=50 °C	minutes	26	25	32	32	41
30 minutes ΔT=55 °C	I	762	965	1170	1310	1655
60 minutes ΔT=55 °C	l	1169	1497	1733	1936	2335
90 minutes ΔT=55 °C	<u> </u>	1575	2028	2296	2561	3015
120 minutes ∆T=55 °C	l	1982	2560	2859	3187	3695
Continuous ∆T=55 °C	l/h	813	1063	1126	1251	1360
Heating-up time ∆T=55 °C	minutes	29	27	35	35	45
Dimensions						
Height (including lid)	mm	1705	2040	1835	2000	2000
Diameter (including insulation)	mm	740	760	910	930	1100
Height of cold water connection	mm	70	70	85	85	95
Height of hot water connection	mm	1655	1995	1805	2000	1965
Energy labelling						
Load profile	-	С	С	-	-	-
Standby loss	W	100	104	165	171	192

Draw-off capacities are based on Tset = 80  $^{\circ}$ C and Tcold = 10  $^{\circ}$ C

A.O. Smith developed the IT for large-scale usage. If there is no need to integrate an electric resistance backup heating in the tank, the IT can serve as an alternative solution, independent of the needed volume. For more information, please refer to page 53.

#### DOMESTIC







NDUSTRY







EDUCATION







RECREATION AND HOSPITALITY







SPORTS CENTRES AND VENUES







MEDICAL AND HEALTH









#### LARGE PUMP STATION SYSTEM WITH DRAINBACK

D

 $\bigcirc$  Always install in combination with an expansion vessel to ensure the system is not compromised

Article number for SGE/SGS	0309977	0309981	0309985	0309989	0309993
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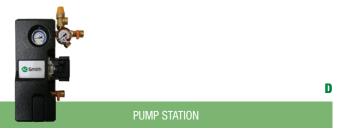


#### LARGE PUMP STATION SYSTEM WITHOUT DRAINBACK

D

 $\bigcirc$  Always install in combination with an expansion vessel to ensure the system is not compromised

Article number for SGE/SGS	0309978	0309982	0309986	0309990	0309994
----------------------------	---------	---------	---------	---------	---------



- O Pump station module with integrated pump
- Number of collectors used depends on the piping
   Integrated flow meter and overpressure protection

Article number	0311590	0311591	0311691	0311589
Collectors*	1-7	8-15	1-7	8-15
Drainback system	Yes	Yes	No	No

<sup>\*</sup> Dependent on the boost height



- O Expansion vessel for high temperatures, specifically for solar systems
- O 25 to 80 litres capacity, depending on the number of solar collectors used For more information, please contact the Technical Support Group (see page 74)

Article number	0308875	0308876	0308877	0308878
Litres	25	35	50	80
Collectors*	1_//	5-6	7_11	12-15

<sup>\*</sup> The number of collectors is an indication as to which expansion vessel should be used



- O Corrosion inhibiting and anti-frost agent Tyfocor L
- Suitable for systems with and without drainback
  10 litre package, 40% mixed solution

Article number	0308803
Litres	10









ADAPTER NIPPLES

O Set of 2 units

Description	IT 300	IT(E) 400	IT(E) 500	IT(E) 600	IT(E) 750	IT(E) 1000	IT 1500	IT 2000	IT 2500	IT 3000
Reducing Nipple Set 2" BSp F x R 1" M	-	0309	754(S)	-	-	-		0309	754(S)	
Reducing Nipple Set 2" BSp F x R 1 1/2" M	-	0309	755(S)	-	-	-		0309	755(S)	
Reducing Nipple Set 2 1/2" BSp F x R 1" BSp F	-	-	-		0309756(S)		-	-	-	-
Reducing Nipple Set 2 1/2" BSp F x R 1" BSp F	-	-	-		0309756(S)		-	-	-	-
Reducing Nipple Set 2 1/2" BSp F x R 1 1/2" BSp F	-	-	-		0309758(S)		-	-	-	-



#### CIRCULATION PUMP

○ Without valves and check valve ○ In the installation drawings, this pump is indicated with an 8

Article number	0305515(S)



#### INSULATION MATERIAL

O Bird-proof, suitable for outside use

Article number	0309933(S)	0309934(S)
Dimensions	Ø 22 mm x 2 m	Ø 28 mm x 2 m



O Measures the solar contribution and displays this information on the screen of the control

Article number	0309285(5)



 $\, \bigcirc \,$  Filling pump designed to simplify filling a solar system

Article number	0308814
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#### GLYCOL SGE SYSTEM

O Quantities are based on capacity of the system, excluding the piping
O Quantities are calculated as an average. To make a calculation based on exact quantities, please contact our Technical Support Group (see page 74)

	SGE 40	SGE 60
1-2 collectors	50	50
3-5 collectors 6-11 collectors	60	60
	70	70
12-15 collectors	80	80

#### GLYCOL SGS SYSTEM

Quantities are based on capacity of the system, excluding the piping
 Quantities are calculated as an average. To make a calculation based on exact quantities, please contact our Technical Support Group (see page 74)

	IT 300	IT(E) 400	IT(E) 500	IT(E) 600	IT(E) 750	IT(E) 1000	IT 1500	IT 2000	IT 2500	IT 3000
1-2 collectors	40	50	50	60	70	80	80	80	80	80
3-5 collectors	50	60	60	70	70	80	80	80	80	80
6-11 collectors	60	70	70	80	80	90	100	100	100	100
12-15 collectors	70	80	80	90	90	100	100	110	110	110

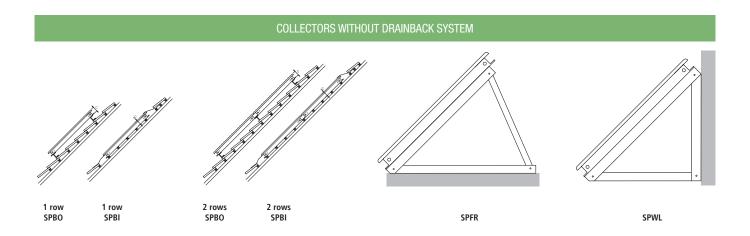


SOLAR COLLECTOR + DRAINBACK SYSTEM

N

- $\, { \bigcirc }\,$  Approved by EN12975-2-2006 and Solar Keymark certified
- $\circ$  Temperature resistant up to 200°C
- O Installation options: roof unit (SPBO), built into the roof (SPBI), flat-roof mounting console (SPFR), wall-mounted console (SPWL)
- $\, \bigcirc \,$  Simple installation system even with multiple panels
- O The system is supplied with all parts needed for complete installation. The entire package is available as a single order number
- O Patented drainback system to prevent stagnation temperature is available as an accessory
- O Sets are available in two versions: with copper absorber and meander, or with copper absorber and aluminum meander
- O Can be set up with up to 15 collectors. For larger requirements, please contact our Technical Support Group (see page 74)

# COLLECTORS WITH DRAINBACK SYSTEM 1 row 1 row 2 rows 5PBO SPBI SPFR SPWL



SPECIFICATIONS									
Collector type		Width	Height	Thickness	Weight	Liquid Capacity			
copper/	Vertical collector	116.7 cm	206.7 cm	11 cm	44 kg	2.2 L			
copper	Horizontal collector	206.7 cm	116.7 cm	11 cm	44 kg	2.2 ∟			
copper/	Vertical collector	116.7 cm	206.7 cm	11 cm	43 kg	2.2 ∟			
	Horizontal collector	206.7 cm	116.7 cm	11 cm	43 kg	2.2 ∟			

# Solar thermal energy

# Solar collectors

Efficiency and environmentally friendly innovation are at the heart of our renewable product range. Our flagship products within this range are our solar collectors. A.O. Smith solar collectors are constructed of a full-plate absorber with an eco-friendly vacuum coating. The durable quality of this coating creates a collector that is built to last. Set in a protective frame, dirt and moisture are prevented from having any impact on performance. Cased in aluminum, the solar collectors have been designed to work in any environment.

#### Drainback system

To limit high temperature, and to extend the lifespan of your collector, an optional drainback module makes for a smart investment. The drainback module is mounted directly below the collectors to reduce the required pump capacity. This reduction helps reduce the **power consumption** of the fully modulating solar pump to an **absolute minimum**.

#### Mounting options

Our collectors are available in 4 installation options: on-roof and roof integrated for a pitched roof or using a frame to mount on a wall (only horizontal position) or flat roof (available in horizontal and vertical position). Wall and flat-roof mounting frame sets depend on the angle of positioning. Depending on construction requirements, flat-roof mounting frames may be ordered and used without concrete blocks. All sets are compatible with a drainback option. The solar collectors are delivered with all the tools and parts you need for installation. Whatever, and however you want your solar collectors set up, we can help you build the perfect solution.

#### Tailor-made solutions

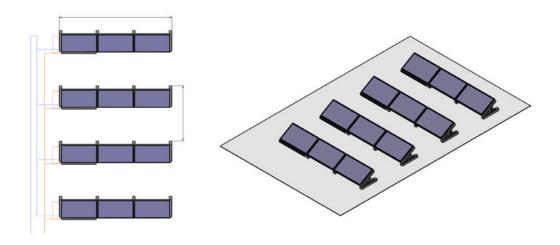
With a broad range of collector sets, A.O. Smith can tailor-make solutions to match any anticipated DHW capacity.

#### Certification

All A.O. Smith collectors are built to meet the highest standards and are Solar Keymark certified.

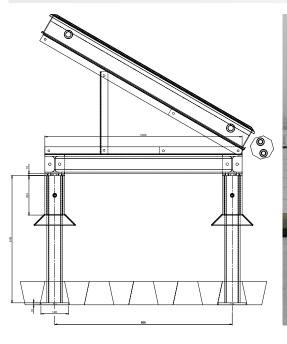
#### **PLACING**

To help you understand how best to position the collectors on your roof, we will provide you with accurate drawings. We take into account the available space, the best angles for performance of the collectors, and the movement of the sun. Once positioning has been decided, we will explain what piping is needed.



#### INSTALLATION

When installing the collectors on a roof, you can request detailed drawings of the proposed framework prior to installation. In cases where our standard frame set is not sufficient for the project, we can advise for custom built frame constructions (see example below).





## Collector sets

# Tailor-made solutions

With a wide range of solar collector sets, A.O. Smith can deliver the perfect solar solution for every possible project.

#### Tailored solar systems

When designing and installing your solar system, our singleminded goal is to maximise efficiency. To do that, we take into account the individual features of the building, and your anticipated hot water requirements.

#### Recommendation

Based on the details of your particular project, our experienced sales engineers can provide specific recommendations to help you get maximum value from your system. We can provide you with construction drawings, and we'll adapt plans to meet the needs of highly individual installations.

#### Technical drawings

Detailed technical drawings will help you decide the exact positioning of the collectors on your roof. We can offer a detailed proposal to suggest optimal installation, and advice to help with construction.

#### Wind loads

Wind load needs to be taken into consideration when purchasing and installing solar collectors. Standard A.O. Smith collector sets and flat-roof frames are built to endure up to wind force 7. The frame can be built to withstand more powerful winds by reinforcing construction with concrete blocks. More information about this option can be found in the collectors spec sheet in the library section of our website.

#### Transportation

Depending on the specifics of your particular installation, special transportation, or a crane, may be required to move and position the system. In these cases, A.O. Smith can handle the entire operation. We'll be there to help with every aspect of your ideal solar solution.



#### INSTALLATION

Installing solar collectors on a flat roof.



#### DRAINBACK SYSTEMS

One of the most innovative components in our solar product range is the optional drainback system. They extend the service life of the whole system by preventing stagnation temperatures. Mounted directly under the collectors, they also reduce the required pump capacity.



#### CONTROLLER

The indirect solar water heating system is controlled by a pump station module. The operating system features a modulating pump control and a display showing solar contributions.



#### **SMART DISPLAY**

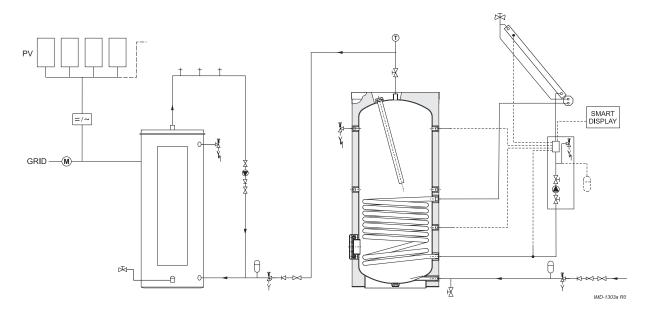
Our systems are available with a smart display to monitor temperature in the collector, temperature of stored water, and the solar contribution. This option requires the installation of output sensors.

## APPLICATIONS

When gas is not available, and to simplify installation, electric water heaters can offer an alternative solution. These systems can also be combined with solar energy or storage tanks to provide extra hot water storage to match demand.

The diagram below shows how a DRE can be combined with an IT to create a solar system. DREs are available with a power consumption of 9,0 to 54,0 kW, and in a range of sizes from 200 to 450 litres. In combination with an IT storage tank of between 300 to 2800 litres, you have the flexibility to create a system of any size. With so many variables to choose from, the possibilities are endless.

In the system detailed below, water is heated in the IT using solar heat. The hottest water is transferred into the bottom of the DRE. The DRE acts as an afterheater.



# **SOLAR COLLECTORS VS PV PANELS**

In an "all electric" solution, energy used by the DRE for afterheating can be compensated totally, or in part, by electricity provided to the grid by PV panels.

Solar collectors are 4 times more effective at converting solar energy into heat than PV panels. That means PV panels, which convert solar energy into electricity, require up to 4 times more roof space to deliver the same amount of energy.





# Solar thermal energy

# Indirect solar system

Indirect solar systems use solar energy to compliment an alternatively powered water heater. These systems consist of a storage tank connected to a central heating boiler, a water heater (electric, gas-fired or oil-fired), or a combination boiler. By adding solar accessories, a system's energy savings can be hugely improved. Both the IT and ITS can be integrated in such system which is available with an optional drainback function.

## Heat transfer

In both the IT(E) and the ITS, solar heat is transferred to the hot water supply through a heat exchanger. The ITS is equipped with two heat exchangers to allow the central heating boiler, water heater or combi boiler to transfer heat back to the ITS. This delivers a higher level of heating comfort.

## Controller

An indirect solar water heating system is controlled with a pump station module. The pump activates in response to temperature readings in the collector and storage tank. Sensor temperatures and pump speed are displayed on the control. This control set-up comes as standard.

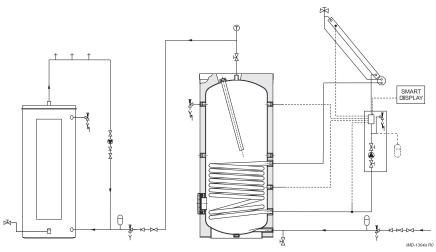
## Composing systems

The choice of pump station is dictated by the number of collectors, and the length of the piping. A.O. Smith offers a range of regular and large pump stations to meet your needs. Depending on the set-up of your system, pumps are available with our innovative drainback function. By preventing stagnation temperatures, this innovation extends the lifespan of a system.

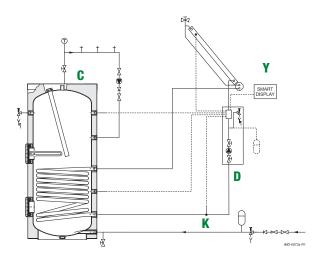
To help you find the perfect indirect solar system, the next few pages explain a number of potential system configurations, both with and without drainback.

## No gas connection? PV system electricity available?

When a gas supply is not available, electric can be the only solution. A.O. Smith's extensive range of **electric range water heaters** are all compatible with our **solar thermal energy** products. If electricity can be generated by **PV panels**, this set-up offers a practical and sustainable solution.



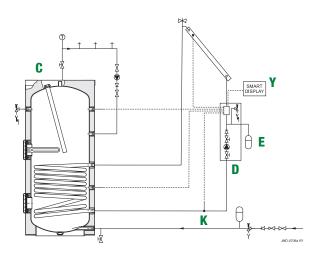
An indirect solar system consisting of water heater, IT tank and solar collectors.



Also applicable as a vented system

# IT(E) INDIRECT SOLAR SYSTEM WITH DRAINBACK FUNCTION\*

- Solar components connected to an existing water heater, central heating boiler, or combination boiler
- IT or ITE indirect tank with 1 heat exchanger available in capacities from 300 to 1024 litre (IT tank up to 2800 litres)
- When combined with the correct pump station, multiple collectors are possible
- Drainback system prevents stagnation temperatures
- When using a large pump station, always install an expansion vessel.
   A.O. Smith can advise on the size of vessel needed.

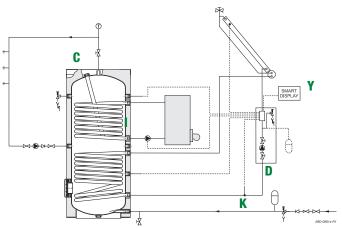


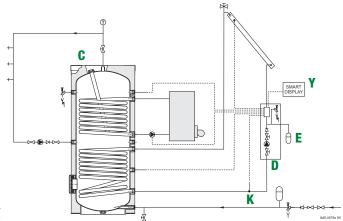
Also applicable as a vented system

# IT(E) INDIRECT SOLAR SYSTEM WITHOUT DRAINBACK SYSTEM\*

- Solar components connected to an existing water heater, central heating boiler, or combination boiler
- IT or ITE indirect tank with 1 heat exchanger available in capacities from 300 to 1024 litre (IT tank up to 2800 litres)
- When combined with the necessary pump station, multiple collectors are available
- When using a large pump station, always install an expansion vessel.
   A.O. Smith can advise on the size of vessel needed.

<sup>\*</sup> Green letters on the installation drawings above indicate required components. The corresponding item number can be found on pages 58/59 and 32.





Also applicable as a vented system

# ITS INDIRECT SOLAR SYSTEM WITH DRAINBACK SYSTEM\*

- Solar components connected to an existing water heater, central heating boiler, or combination boiler
- ITS storage tank with two heat exchangers and a capacity of 300 to 1007 litres
- When combined with the correct pump station, multiple collectors are possible
- Drainback system prevents stagnation temperatures
- Heat is transferred from both the existing system and from the collectors for maximum heat comfort
- When using a large pump station, always install an expansion vessel.
   A.O. Smith can advise on the size of vessel needed

## Also applicable as a vented system

# ITS INDIRECT SOLAR SYSTEM WITHOUT DRAINBACK SYSTEM\*

- Solar components connected to an existing water heater, central heating boiler, or combination boiler
- ITS storage tank with single heat exchanger and a capacity of 300 to 1007 litres
- When combined with the necessary pump station, multiple collectors are available.
- Always use an expansion vessel in a system without drainback
- Heat is transferred from both the existing system and from the collectors for maximum heat comfort

<sup>\*</sup> Green letters on the installation drawings above indicate required components. The corresponding item number can be found on pages 58/59 and 32.

# Theta Dual Service

# Hot water and heating in a single solution

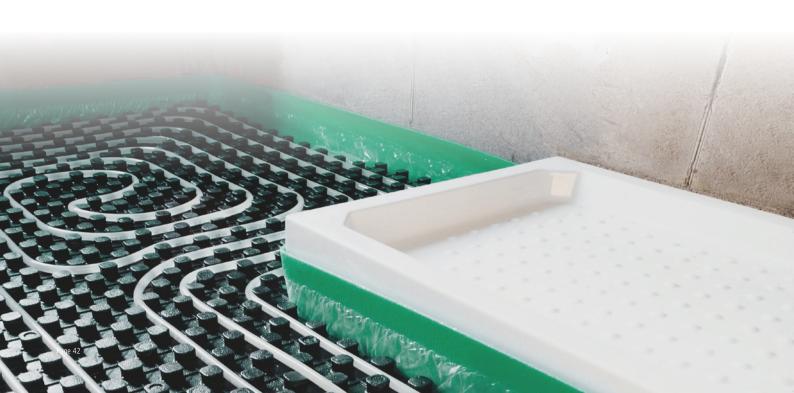
Using a Theta Dual Service module, our high-efficiency water heaters can be used for both hot water and central heating. The Theta Dual Service module is compatible with the BFC Cyclone, and the SGE and SGS solar systems. Using the Theta can provide a practical solution when you need hot water, and a modest amount of central heating.

The Theta Dual Service module combines a heat exchanger with a primary hot water pump, a three-way mixing valve, a control and all the required materials for connection. The intelligent control system manages hot water between the two functions to deliver high levels of efficiency, and comfortable heating levels.

## Modulating

For a **normal radiator circuit** with a range of 50°C to 70°C, a set point of 70°C can be programmed. For **underfloor heating** with a standard range of 30°C to 40°C, the set point can be programmed at 40°C. The control system will manage the DHW pump and the three-way mixing valve to reach the set point. By reducing the pump speed, and using the three-way mixing valve, return water is mixed with water from the water heater to create a stable temperature source for the central heating.

By modulating the pump and controlling the three-way mixing valve, the central heating capacity can be reduced to a minimum when required. Colder, draw-off water is returned to the water heater contributing to the efficiency of the system. The intelligent control allows for different set points for hot water and central heating functions.



# Theta Dual Service

# Your benefits at a glance

# Advantages for installers

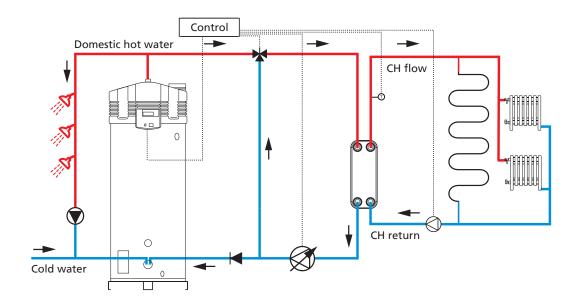
With an A.O. Smith Theta Dual Service, all hot water heating needs can be delivered by a single solution. A single flue gas exhaust and one connection for gas and water are all that is required.

With a single system for both functions, servicing and maintenance are hugely simplified.

Control of the entire system is delivered by a single controller. During installation, the controller makes it easy to set up the system to deliver optimum performance.

# Advantages for the end user

When combined with a BFC Cyclone, SGE or SGS, all heating and hot water needs can be delivered by a single energy-saving, high-efficiency system. The systems are compact in size, and provide comfortable heating temperatures. Set-up costs are reduced without the need for a separate boiler, and running costs are minimised with the use of a high-efficiency condensing water heater.



## MINI CAMPSITE

In the following example an SGE with 5 collectors has been set up with a Theta Dual Service module. Hot water provided by the SGE solar water heater is delivered to 8 showers, and all the basins in the camp's washrooms. Heat from the sun is converted to provide underfloor heating for a communal living space.

In this scenario both hot water and heating for guests are powered by solar energy. Given the exterior location of the campsite, and the popularity of camping during the summer, harnessing energy from the sun represents a logical and efficient solution.



# DAIRY FARM

In this scenario, a typical dairy farm, hot water is needed to clean 2 milking robots and a 12,000 litre milk tank. To match that requirement, a BFC Cyclone and Theta Dual Service module have been installed. A heat plate exchanger provides underfloor heating for an area next to the stalls. As extremely hot water is needed to safely clean the robots and milk tank, the BFC Cyclone's ability to heat water up to 80°C makes it an obvious choice.



## **SPORTING VENUES AND LOCATIONS**

In addition to hot water requirements for showers and bathrooms, many sports facilities choose to heat changing rooms and toilets.



## **FEATURES AND OPTIONS**

- o Module to combine central heating with a high-efficiency water heater
- o Compatible with a condensing gas-fired water heater BFC Cyclone or solar water heaters SGE or SGS
- o Modules for BFC Cyclone, SGE and SGS are tailored to the needs of the customer
- o Ideal for applications with a relatively small heating demand compared to hot water demand
- Delivered as complete package including: plate heat exchanger, DHW pump, three-way mixing valve, control, temperature sensor
  incl. clip and connection materials.
- o Maximum distance between the system and the plate heat exchanger is 5m (in a system with a pipe diameter of Ø 22mm)
- o Initial investment, servicing and maintenance costs are considerably lower than a stand-alone boiler
- Options:
  - Remote Display for SGE and SGS which shows temperatures and solar contribution
  - BMS Interface for monitoring up to 50 parameters through a building management system
  - Insulation materials for the plate heat exchanger



	BFC MODULES							
Art. No.	Controller	kW CV capacity	△T CV delivery system					
TM 20 06	М	20	06					
TM 20 10	М	20	10					
TM 20 20	M	20	20					
TM 30 06	M	30	06					
TM 30 10	M	30	10					
TM 30 20	M	30	20					
TM 40 06	M	40	06					
TM 40 10	M	40	10					
TM 40 20	M	40	20					



# THETA MODULE FOR SGE & SGS

- Plate heat exchanger single separation (a double separated heat exchanger can be delivered upon request)
- o Primary hot water pump
- o Temperature sensor with cable incl. clip
- o Three-way mixing valve, including cables
- o Instruction manual

	SGE/SGS MODULES							
Art. No.	kW CV capacity	△T CV delivery system						
T 20 06	20	06						
T 20 10	20	10						
T 20 20	20	20						
T 30 06	30	06						
T 30 10	30	10						
T 30 20	30	20						
T 40 06	40	06						
T 40 10	40	10						
T 40 20	40	20						

For installations that require more than 40 kW heating capacity, please contact A.O. Smith.



# Systems

# System capabilities

A.O. Smith offers a huge range of varied products. On their own, or working in combination, this product diversity allows us to create perfect hot water solutions for every conceivable scenario. Through ceaseless innovation, we are constantly evolving our product range. At any one time, our engineers are imagining new products, building new systems and adapting and improving existing designs.

## Integration with a building management system

A number of appliances in our gas-fired product range are equipped with voltage-free contacts so they can be connected to a **building management system**. To improve this integration, we created the **BMS interface**. This interface can be combined with the latest generation BFC Cyclone, SGE and SGS systems.

The BMS interface converts information from the system and delivers it to a ModBus protocol building management system. The interface can monitor over 50 parameters including: temperatures within the system, **pump readings, burning hours** and **operating hours**.

# A complete supplier & trusted partner

The hot water requirements of every building are different. A.O. Smith's broad product range includes a solution that is just right for you. Our expert advice can help you navigate the countless options available. We will take into account all contributing considerations, and match them with our product range to help you identify the best possible solution. We'll also identify all the components needed to implement that solution. When you work with us, you'll find everything you need to create your perfect system from a single, reliable partner.

# **BMS INTERFACE - MODULE FOR BUILDING MANAGEMENT SYSTEM**

This interface feeds operating data from a SGE, SGS or BFC Cyclone into the software of your building management system. The module allows you to monitor every aspect of your hot water system.

The BMS interface converts operating data into a ModBus protocol, one of the most widespread protocols for building management software. The interface can monitor over 50 parameters including: temperatures within the system, pump readings, burning hours and operating hours.

If you would like to integrate the BMS interface into an existing SGE, SGS or BFC Cyclone system, please contact A.O. Smith for help. (see page 75)

## **REMOTE DISPLAY – SOLAR OUTPUT SCREEN**

- O Displays multiple key temperatures, solar contribution in Joules, and pump status
- Requires installation of a QT sensor
- Only applicable for SGE and SGS systems





# Storage tanks and plate heat exchangers

# Indirect water heaters

In addition to a range of water heaters in different sizes, A.O. Smith offers a range of storage tanks. Our storage tanks, available with and without integrated heat exchangers, are produced in a variety of sizes from 300 to 2800 litres. Storage tanks without heat exchangers are labeled "ST". "IT or ITE" is used for tanks with a single heat exchanger, and "ITS" for tanks with two exchangers. When creating a system, these storage tanks can be used in conjunction with a solar water heater, or with an A.O. Smith gas-fired system.

## Storage tank without heat exchanger (ST)

The ST stores extra hot water to enlarge the capacity of the system. This is relevant in a system in which large amounts of hot water are tapped within a short period (dump load).

## Storage tank with one or two heat exchangers (IT(E) & ITS)

Available in capacities of 300 to 2800 litres, A.O. Smith produces storage tanks with both single and double integrated heat exchangers. With their single heat exchanger, IT storage tanks can be used, for example, to transfer heat produced by a solar system. ITE also has a single heat exchanger but with the option for mounting an additional electric heating element as afterheater. With two heat exchangers, ITS tanks can be connected to create a second hot water generator, providing the system with an afterheater.

For easy maintenance, all storage tanks and indirect water heaters are made with clean-out doors. These doors make comprehensive waterside maintenance simple and efficient.

# Plate heat exchangers (PHE)

A.O. Smith offers a range of double separated, plate heat exchangers. Capable of a high heat output, these exchangers are ideal in situations that require domestic hot water. The plate heat exchangers (PHE) are available in capacities of 50 kW to 275 kW. Insulation covers to minimise heat loss are available as an optimal accessory.



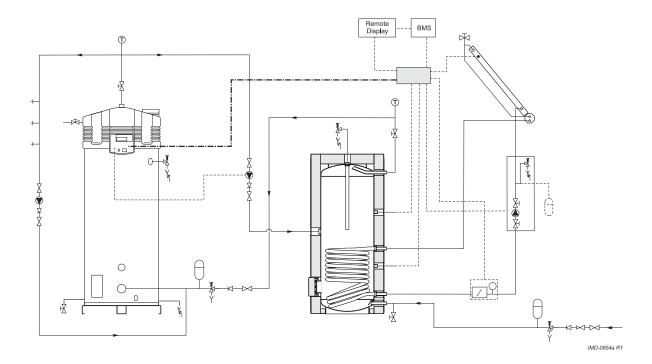
# **APPLICATIONS**

Our indirect systems offer a variety of output ranges and capacities. That flexibility allows the systems to be used in several possible configurations.

- 1. Storage tank with solar water heater
- 2. Storage tank with central heating and plate heat exchanger
- 3. Storage tank with gas-fired water heater

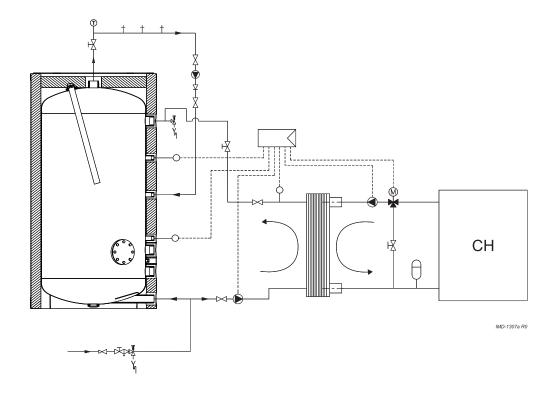
# STORAGE TANK WITH A SOLAR WATER HEATER

IT(E) and ITS storage tanks can be used in combination with a solar water heater (see pages 40/41). The IT(E) and ITS can also be used to add solar energy to an existing water heater system.



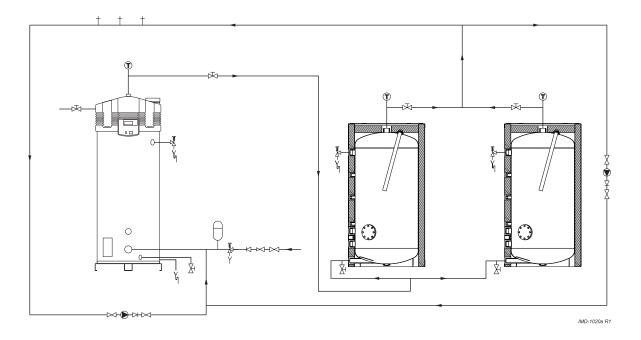
# STORAGE TANK WITH A PLATE HEAT EXCHANGER FOR SPACE HEATING

By connecting the storage tank to a central heating system, the central heating boiler's capacity is increased, allowing it to contribute to the production of hot water. By making full use of the central heating system, hot water is produced at a fraction of the normal energy demands.



# STORAGE TANK WITH A GAS-FIRED WATER HEATER

Storage tanks can also be added to a gas-fired system. In this set-up, the tanks are used to store the extra hot water needed during peak periods. The system can be adapted to meet higher volumes by using more than one tank.



# INDIRECT WATER HEATERS TECHNICAL SPECIFICATIONS IT



# II Indirect water heater for a wide range of applications

Nominal output

46 - 156 kW

- O Capacity 300 to 2800 litres
- O Single separation spiral heat exchanger
- $\, \bigcirc \,$  Standard IT model is lined with PermaGlas Ultra Coat enamel
- O Insulated ring base for easy installation
- O Insulated clean-out door for comprehensive waterside maintenance
- O Replaceable anode
- $\, { \bigcirc \, }$  Standard system comes with a removable insulation jacket
- Options:
  - Flexible anode to installation in confined areas
  - Temperature and pressure valve with stainless-steel spring set to 99°C and a maximum water pressure of 10 bar
  - Analogue temperature gauge (0-120°C)





Technical specifications		IT 300	IT 400	IT 500	IT 600	IT 750	IT 1000	IT 1500	IT 2000	IT 2500	IT 3000
Capacity coil	kW	46	78	100	104	112	145	147	147	156	156
Surface coil	m <sup>2</sup>	1.40	2.45	3.11	3.45	3.72	4.82	5.20	5.20	6.00	6.00
Capacity coil	1	8.8	14.8	18.8	29.3	31.6	40.9	40.0	40.0	45.0	45.0
Flow rate coil (80-60 °C)	l/h	1900	3354	4300	4472	4816	6235	6485	6485	6871	6871
Pressure drop coil	mbar	80	244	489	104	128	259	830	830	695	695
Max. working pressure tank	kPa (bar)	1000(10)	1000(10)	1000(10)	1000(10)	1000(10)	1000(10)	700(7)	700(7)	700(7)	700(7)
Max. working pressure coil	kPa (bar)	2500(25)	1600(16)	1600(16)	1600(16)	1600(16)	1600(16)	600(6)	600(6)	600(6)	600(6)
Max. operating temperature tank	°C	95	95	95	95	95	95	85	85	85	85
Max. operating temperature coil	°C	160	110	110	110	110	110	90	90	90	90
Anodes	-	1	1	1	1	1	1	3	3	3	3
Empty weight	kg	125	139	180	241	254	336	398	426	576	600
Draw-off capacity											
Capacity		300	385	473	643	725	1007	1550	1800	2550	2800
30 minutes ΔT=44 °C	1	786	1176	1482	1733	1908	2557	3266	3584	4618	4936
60 minutes ΔT=44 °C	1	1236	1938	2459	2749	3002	3974	4702	5020	6142	6460
90 minutes ΔT=44 °C	ı	1686	2701	3436	3766	4097	5391	6139	6457	7667	7985
120 minutes ΔT=44 °C	I	2135	3463	4413	4782	5192	6808	7575	7894	9191	9509
Continuous ΔT=44 °C	l/h	899	1525	1955	2033	2189	2834	2873	2873	3049	3049
Heating-up time ∆T=44°C	minutes	20	15	15	19	20	21	32	38	50	55
30 minutes ΔT=50°C	I	692	1035	1304	1525	1679	2250	2874	3154	4063	4343
60 minutes ΔT=50 °C	I	1088	1706	2164	2420	2642	3497	4138	4418	5405	5685
90 minutes ΔT=50 °C	I	1483	2377	3024	3314	3605	4744	5402	5682	6747	7027
120 minutes ΔT=50 °C	I	1897	3047	3884	4208	4569	5991	6666	6946	8088	8368
Continuous ∆T=50 °C	l/h	791	1342	1720	1789	1926	2494	2528	2528	2683	2683
Heating-up time ∆T=50 °C	minutes	23	17	16	22	23	24	37	43	57	63
30 minutes ΔT=55 °C	I	629	941	1185	1386	1526	2046	2613	2867	3694	3949
60 minutes ΔT=55 °C	1	989	1551	1967	2200	2402	3179	3762	4016	4914	5168
90 minutes ∆T=55 °C	I	1348	2160	2749	3013	3278	4313	4911	5166	6133	6388
120 minutes ∆T=55 °C	1	1708	2770	3531	3826	4153	5447	6060	6315	7353	7608
Continuous ∆T=55 °C	l/h	719	1220	1564	1626	1751	2267	2299	2299	2439	2439
Heating-up time $\Delta$ T=55 °C	minutes	25	19	18	24	25	27	40	47	63	69
Dimensions											
Height (including lid)	mm	1650	1710	2045	1840	2035	2005	1930	2118	1989	2118
Diameter (including insulation)	mm	750	740	760	910	930	1100	1300	1300	1600	1600
Height of cold water connection	mm	110	70	70	85	85	95	135	135	185	185
Height of hot water connection	mm	1460	1655	1995	1805	2000	1965	1985	2175	2045	2070
Height cleaning opening	mm	280	330	330	420	420	450	450	450	530	530
Energy labelling											
Energy labelling	-	C	C	C	-	-	-	-	-	-	-
Standby loss	W	92	100	104	126	126	140	154	171	232	243

Draw-off capacities are based on Tset = 80  $^{\circ}$ C and Tcold = 10  $^{\circ}$ C

# INDIRECT WATER HEATERS TECHNICAL SPECIFICATIONS ITE

# ITE Indirect water heater

Nominal output

52 - 87 kW



- O Capacity 389 1024 litres
- O Single-wall spiral heat exchanger
- O ITE standard fitted with PermaGlas Ultra Coat enamel
- O Insulated access cover for comprehensive waterside maintenance
- O Replaceable magnesium anode





Technical specifications		ITE 400	ITE 500	ITE 600	ITE 750	ITE 1000
Output coil	kW	78	68	72	80	87
Surface area coil	m²	1.64	2.13	2.39	2.66	2.89
Water capacity coil	1	9.9	12.8	20.3	22.3	24.6
Flow rate coil (80-60 °C)	l/h	2236	2924	3096	3440	3741
Pressure drop solar coil	mbar	78	166	37	50	61
Max. working pressure tank	kPa (bar)	1000(10)	1000(10)	1000(10)	1000(10)	1000(10)
Max. working pressure coil	kPa (bar)	1600(16)	1600(16)	1600(16)	1600(16)	1600(16)
Max. operating temperature tank	°C	95	95	95	95	95
Max. operating temperature coil	°C	110	110	110	110	110
Anodes	-	1	1	1	1	1
Empty weight	kg	131	179	229	237	314
Draw-off capacity						
Capacity	ı	389	478	652	734	1024
30 minutes ΔT=44 °C	I	952	1206	1463	1638	2068
60 minutes ΔT=44 °C	I	1461	1871	2167	2420	2919
90 minutes ∆T=44 °C	I	1969	2536	2870	3201	3769
120 minutes ∆T=44 °C	I	2477	3200	3574	3983	4619
Continuous ∆T=44 °C	l/h	1016	1329	1407	1564	1700
Heating-up time ∆T=44 °C	minutes	23	22	28	28	36
30 minutes ΔT=50°C	I	838	1062	1288	1441	1820
60 minutes ΔT=50 °C	1	1285	1646	1907	2129	2568
90 minutes ΔT=50 °C	I	1733	2231	2526	2817	3317
120 minutes ΔT=50 °C	1	2180	2816	3145	3505	4065
Continuous ΔT=50 °C	l/h	894	1170	1238	1376	1496
Heating-up time $\Delta$ T=50 °C	minutes	26	25	32	32	41
30 minutes ∆T=55 °C	I	762	965	1170	1310	1655
60 minutes $\Delta$ T=55 °C	I	1169	1497	1733	1936	2335
90 minutes $\Delta$ T=55 °C	I	1575	2028	2296	2561	3015
120 minutes ΔT=55 °C	I	1982	2560	2859	3187	3695
Continuous ΔT=55 °C	Vh	813	1063	1126	1251	1360
Heating-up time $\Delta$ T=55 °C	minutes	29	27	35	35	45
Dimensions						
Height (including lid)	mm	1705	2040	1835	2030	2000
Diameter (including insulation)	mm	740	760	910	930	1100
Height of cold water connection	mm	70	70	85	85	95
Height of hot water connection	mm	1655	1995	1805	2000	1965
Energy labelling						
Load profile	-	С	С		-	-
Standby loss	W	100	104	165	171	192

Draw-off capacities are based on Tset = 80 °C and Tcold = 10 °C

A.O. Smith developed the IT for large-scale usage. If there is no need to integrate an electric resistance backup heating in the tank, the IT can serve as an alternative solution, independent of the needed volume. For more information, please refer to page 53.

# INDIRECT WATER HEATERS TECHNICAL SPECIFICATIONS ITS



Nominal output

46 - 87 kW (bottom coil)/27 - 58 kW (top coil)

- O Capacity 300 to 1007 litres
- O Single-wall spiral heat exchangers
- $\, \bigcirc \,$  Standard ITS model is lined with PermaGlas Ultra Coat enamel
- O Insulated ring base for easy installation
- O Insulated clean-out door for comprehensive maintenance
- O Replaceable anode
- $\, \bigcirc \,$  Standard system comes with a removable insulation jacket
- Options:
  - Flexible anode to installation in confined areas
  - Temperature and pressure valve with stainless-steel spring set to 99°C and a maximum water pressure of 10 bar
  - Analogue temperature gauge (0-120°C)





Capacity coil Surface coil Capacity coil Flow rate coil (80-60 ° Pressure drop coil		kW							
Capacity coil Flow rate coil (80-60 °	ı			46	52	68	72	80	87
Flow rate coil (80-60 °		m²	8	1.40	1.64	2.13	2.39	2.66	2.89
		l	collector	8.8	9.9	12.8	20.3	22.6	24.6
Pressure drop coil	°C)	l/h	ď	1900	2236	2924	3096	3440	3741
Tressure drop con		mbar		80	78	166	37	50	61
Output coil		kW		26	37	42	40	56	58
Surface coil	ı	m <sup>2</sup>		1.00	1.14	1.31	1.33	1.86	1.93
Capacity coil		l	£	6.3	6.9	7.9	11.3	15.8	16.4
Flow rate coil (80-60 °	°C)	l/h		1100	1591	1806	1720	2408	2494
Pressure drop coil	I	mbar		40	30	43	7	18	20
Max. working pressure	e tank	kPa (bar)		1000(10)	1000(10)	1000(10)	1000(10)	1000(10)	1000(10)
Max. working pressure	e coil	kPa (bar)		2500(25)	1600(16)	1600(16)	1600(16)	1600(16)	1600(16)
Max. operating tempe	erature tank '	°C		95	95	95	95	95	95
Max. operating tempe	erature coil	°C		160	110	110	110	110	110
Anodes		-		1	1	1	1	1	1
Empty weight		kg		142	145	196	246	262	340
Draw-off capacity									
Capacity	I	I		300	382	470	641	718	1007
30 minutes $\Delta T$ =	=44 °C	I		1023	1269	1566	1801	2110	2557
60 minutes ΔT=	=44 °C	l		1735	2139	2641	2895	3439	3974
90 minutes ΔT=	=44 °C	I		2448	3009	3716	3990	4768	5391
120 minutes ΔT=	=44 °C	l		3160	3878	4791	5085	6097	6808
Continuous $\Delta T$ =	=44 °C	l/h		1425	1740	2150	2189	2658	2834
Heating-up time $\Delta T$ =	=44°C	minutes		13	13	13	18	16	21
30 minutes ΔT=	=50°C	I		900	1117	1378	1585	1857	2250
60 minutes ΔT=	=50 °C	I		1527	1882	2324	2548	3026	3497
90 minutes ΔT=	=50 °C	l		2154	2648	3270	3511	4196	4744
120 minutes ΔT=	=50 °C	I		2781	3413	4216	4474	5366	5991
Continuous $\Delta T$ =	=50 °C	l/h		1256	1531	1892	1926	2339	2494
Heating-up time $\Delta T$ =	=50 °C	minutes		14	15	15	20	18	24
30 minutes ΔT=	=55 °C	I		818	1015	1253	1441	1688	2046
60 minutes ΔT=	=55 °C	I		1388	1711	2113	2316	2751	3179
90 minutes ΔT=	=55 °C	l		1958	2407	2973	3192	3815	4313
120 minutes ΔT=	=55 °C	l		2528	3103	3833	4068	4878	5447
Continuous $\Delta T$ =	=55 °C	l/h		1140	1392	1720	1751	2127	2267
Heating-up time $\Delta T$ =	=55 °C □	minutes		16	16	16	22	20	27
Dimensions									
Height (including lid)		mm		1650	1710	2045	1840	2035	2005
Diameter (including in:	nsulation)	mm		750	740	760	910	930	1100
Height of cold water of	connection	mm		110	70	70	85	85	95
Height of hot water co	onnection	mm		1460	1655	1995	1805	2000	1965
Height cleaning openi	ing	mm		280	330	330	420	420	450
Energy labelling									
Energy labelling		-		С	С	С	-	-	-
Standby loss		W		92	100	104	126	126	146

Draw-off capacities are based on Tset = 80 °C and Tcold = 10 °C and both heat exchangers (this is not always possible in practice)

# INDIRECT WATER HEATERS TECHNICAL SPECIFICATIONS ST

# ST Storage tank

- O Capacity 300 to 2820 litres
- $\, \bigcirc \,$  Standard ST model is lined with PermaGlas Ultra Coat enamel
- O Standard system comes with a removable insulation jacket
- O Insulated clean-out door for easy maintenance
- O Replaceable anode
- Options:
  - Flexible anode for installation in confined areas
  - Temperature and pressure valve with stainless-steel spring set to  $99^{\circ}\text{C}$  and a maximum water pressure of 10 bar
  - Analogue temperature gauge (0-120°C)





Technical specifications		ST 300	ST 400	ST 500	ST 600	ST 750	ST 1000	ST 1500	ST 2000	ST 2500	ST 3000
Max. working pressure tank	kPa (bar)	1000(10)	1000(10)	1000(10)	1000(10)	1000(10)	1000(10)	700(7)	700(7)	700(7)	700(7)
Max. operating temperature tank	°C	95	95	95	95	95	95	95	95	95	95
Number of anodes	-	1	1	1	1	1	1	3	3	3	3
Empty weight	kg	99	99	131	179	201	325	325	350	485	520
Draw-off capacity											
Capacity	I	300	405	499	678	763	1055	1550	1880	2500	2820
Dimensions											
Height (including lid)	mm	1650	1705	2040	1835	2030	2000	1930	2118	2000	2128
Diameter (including insulation)	mm	750	720	720	910	910	1100	1200	1200	1500	1500
Height of cold water connection	mm	110	70	70	85	85	95	135	135	185	185
Height of hot water connection	mm	1460	1655	1995	1805	2000	1965	1985	2175	2045	2170
Height cleaning opening	mm	280	410	410	500	500	535	450	450	530	530
Energy labelling											
Energy labelling	-	С	C	С	-	-	-	-	-	-	-
Standby loss	W	92	100	104	126	126	175	300	354	400	458

# INDIRECT WATER HEATERS TECHNICAL SPECIFICATIONS PHE



# PHE Copper soldered plate heat exchanger

Nominal output

50 - 275 kW

- Optimum security thanks to double separation-construction
- O Nominal output of 50 kW to 275 kW
- O Maximum working pressure of 25 bar
- $\, \bigcirc \,$  Maximum working temperature of heat exchangers: 120°C
- O Very easy installation
- O Maintenance-friendly because there are no gaskets
- O Available with additional insulation kit
- O Different capacities available upon request

Technical specifications		PHE 50	PHE 75	PHE 100	PHE 150	PHE 175	PHE 225	PHE 250	PHE 275
Power	kW	50	75	100	150	175	225	250	275
Number of plates	-	20	24	30	40	50	60	70	80
Primary temperature	°C	80/60	80/60	80/60	80/60	80/60	80/60	80/60	80/60
Secondary temperature	°C	10/60	10/60	10/60	10/60	10/60	10/60	10/60	10/60
Primary flow	m³/h	2.15	3.23	4.30	6.46	7.53	9.69	10.77	11.85
Secondary flow	m³/h	0.86	1.29	1.72	2.58	3.01	3.87	4.30	4.74
Primary pressure drop	kPa	22.7	33.7	37.3	46.4	41.3	48.6	46.2	45.2
Secondary pressure drop	kPa	3.3	5.2	5.9	7.6	6.9	8.2	7.8	7.6
Max. permitted pressure drop	kPa	50	50	50	50	50	50	50	50
Max. working pressure heat exchangers	bar	25	25	25	25	25	25	25	25
Min. working temp. heat exchangers	°C	0	0	0	0	0	0	0	0
Max. working temp. heat exchangers	°C	120	120	120	120	120	120	120	120
Material plate	-	AISI 316 L							
Soldering material	-	copper							
Empty weight	kg	5	6	7	8	10	12	14	15
Max. chlorine concentration (at 80 °C)	mg/kg	50	50	50	50	50	50	50	50
Primary capacity	l/duct	0.59	0.72	0.91	1.24	1.56	1.89	2.21	2.54
Secondary capacity	l/duct	0.65	0.78	0.98	1.30	1.63	1.95	2.27	2.60
Accessories									
nsulation package (art. no.)		0307623(S)	0307623(S)	0307625(S)	0307625(S)	0307627(S)	0307627(S)	0307629(S)	0307629(S)
Dimensions									
Height	mm	337	337	337	337	337	337	337	337
Width	mm	127	127	127	127	127	127	127	127
Depth	mm	61	71	85	109	133	157	181	205



O Always install in combination with an expansion vessel to ensure the system is not compromised O The control is also supplied

Item number for 0309975 0	309979	0309983	0309987	0309991
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# LARGE PUMP STATION SYSTEM WITHOUT DRAINBACK SYSTEM

O The control is also supplied

D

Item number for	0309976	0309980	0309984	0309988	0309992	
IT/ITF/ITS	0309976	0309980	0309984	0309988	0309992	



- O Pump station module with integrated pump
- Number of collectors used depends on the piping
   Integrated flow meter and overpressure protection

Article number	0311594	0311595	0311692	0311593
Collectors*	1-7	8-15	1-7	8-15
Drainback system	Yes	Yes	No	No

\* Dependent on the boost height



- $\, \circ \,$  Expansion vessel for high temperatures, specifically for solar systems
- 25 to 80 litres capacity, depending on the number of solar collectors used
   For more information, please contact the Technical Support Group (see page 74)

Article number	0308875	0308876	0308877	0308878
Litres	25	35	50	80
Collectors*	1-4	5-6	7-11	12-15

\* The number of collectors is an indication as to which expansion vessel should be used



- O Corrosion inhibiting and anti-frost agent Tyfocor L
- O Suitable for systems with and without drainback
- O 10 litre package, 40% mixed solution

Article number	0308803
Litres	10



# SMART DISPLAY - INFORMATION SCREEN

- O Displays temperatures in the collector and the storage tank
- O Displays solar contribution when combined with an output sensor

Article number	0309701(S)



O Measures the temperature in the system incl. piping and visualizes the solar contribution through the smart display

	Article number
22 mm solder	0309691(S)
28 mm solder	0309703(S)





ADAPTER NIPPLES

O Set of 2 units

Description	IT(E) 300	IT(E)/ITS 400	IT(E)/ITS 500	IT(E)/ITS 600	IT(E)/ITS 750	IT(E)/ITS 1000	IT 1500	IT 2000	IT 2500	IT 3000
Reducing Nipple Set 2" BSp F x R 1" M	-	0309	0309754(S)		-	-	0309754(S)			
Reducing Nipple Set 2" BSp F x R 1 1/2" M	-	0309	0309755(S)		-	-	0309755(S)			
Reducing Nipple Set 2 1/2" BSp F x R 1" BSp F	-	-	-		0309756(S)		-	-	-	-
Reducing Nipple Set 2 1/2" BSp F x R 1" BSp F	-	-	-		0309757(S)		-	-	-	
Reducing Nipple Set 2 1/2" BSp F x R 1 1/2" BSp F	-	-	-		0309758(S)		-	-	-	-





O Filling pump designed to simplify filling a solar system

Article number	0308814



# INSULATION MATERIAL

O Bird-proof, suitable for outside use

Article number	0309933(S)	0309934(S)
Dimensions	Ø 22 mm x 2 m	Ø 28 mm x 2 m

- Quantities are based on capacity of the system, excluding the piping
   Quantities are calculated as an average. To make a calculation based on exact quantities, please contact our our Technical Support Group (see page 74)

	IT 300	IT(E) 400	IT(E) 500	IT(E) 600	IT(E) 750	ITE 1000	IT 1500	IT 2000	IT 2500	IT 3000
1-2 collectors	40	50	50	60	70	80	80	80	80	80
3-5 collectors	50	60	60	70	70	80	80	80	80	80
6-11 collectors	60	70	70	80	80	90	100	100	100	100
12-15 collectors	70	80	80	90	90	100	100	110	110	110

# GLYCOL ITS SYSTEM

- Quantities are based on capacity of the system, excluding the piping
   Quantities are calculated as an average. To make a calculation based on exact quantities, please contact our Technical Support Group (see page 74)

	ITS 300	ITS 400	ITS 500	ITS 600	ITS 750	ITS 1000
1-2 collectors	40	50	50	60	70	80
3-5 collectors	50	60	60	70	70	80
6-11 collectors	60	70	70	80	80	90
12-15 collectors	70	80	80	90	90	100



# From atmospheric to high-efficiency

# Gas-fired atmospheric water heaters

Energy savings and comfort are both critical when selecting the ideal system for your hot water needs. From home use to large commercial applications, A.O. Smith offers a wide range of gas-fired systems to help you find the right solution. Our gas-fired heaters include both atmospheric and condensing systems.

# New construction and large-scale renovation projects

Energy efficiency regulations for new buildings and renovations are becoming increasingly demanding. As directives like ErP and Ecodesign raise the required energy performance standards, A.O. Smith have put more emphasis on developing high-efficiency condensing water heaters. From situations with modest hot water demands to large-scale construction with high volumes of hot water needed, A.O. Smith have a condensing solution to match.

# Replacement market

When you are replacing a hot water system, it is always worth exploring more efficient alternatives. Replacing an atmospheric system with a condensing hot water heater is a simple way to deliver increased efficiency.

For projects that demand a like-for-like replacement, or in the rare cases where building regulations restrict the installation of a condensing heater, we offer a wide range of gas-fired atmospheric water heaters.

To deliver our customers more long-term value, we naturally recommend a condensing water heater whenever possible. Our clients frequently replace old atmospheric systems with condensing alternatives like the BFC Cyclone and the Innovo. To calculate how much this change might save you, please refer to page 18 and 19.

## Control and ease of use

At A.O. Smith we deliver pioneering, energy-saving technology in systems that are simple and easy to use. Control systems in our gas-fired heaters can be reduced to a simple on/off button, or built to offer automatic systems and advanced operating data including fault codes and history. Technological advances in all of our systems eradicates any threat from Legionnaires disease.

From installation, to maintenance, to daily use, everybody involved with your system will appreciate the brilliant simplicity of A.O. Smith designs.

## Long service life

The heart of any water heating system is the hot water tank, where the transfer of heat takes place. A.O. Smith storage tanks are made from stainless, or highly durable steel, coated with our patented PermaGlas Ultra Coat glass-lining. The quality and durability of our materials guarantees **maximum service life**.



## A PREFERENCE FOR CONDENSING-ONLY SYSTEMS

We care for our environment so have been investing in condensing technologies for over 20 years. Our condensing water heaters deliver the highest efficiencies and, with their low NO<sub>X</sub> emissions, already meet the requirements of the new ErP regulations which became effective since 26 September 2018. In fact, some of our condensing products achieve emissions levels over 50% below the new maximum, putting us well ahead of the new EU directive.

## ATMOSPHERIC PRODUCTS

Unfortunately, it is not always practical or cost-effective to convert to condensing because significant changes to the system might be needed like the installation of a new flue arrangement. Also, if the new hot water system needs to be up and running quickly, it may be simpler to replace an atmospheric product with a like-for-like alternative.

# **AVAILABLE FROM STOCK**

Since 26 September 2018 it is not allowed to produce gasfired appliances with  $NO_X$  emissions > 56 mg/ kWh. However, for some time those products do remain available from stock to meet any urgent replacement demand.



# LOW NO<sub>X</sub> ATMOSPHERIC PRODUCT RANGE NITROL

Next to our current atmospheric products, we have developed a new range of atmospheric products under the name Nitrol. This product range features a new burner system where the combustion takes place mainly with a primary air supply. This results in cleaner combustion and lower  $NO_X$  emissions in line with the new directive.



**ATMOSPHERIC** 



**CONDENSING – HIGH-EFFICIENCY** 

To find out more about the savings you could make, explore the savings scenarios on pages 18 and 19.







16,8 - 16,6 kW B11BS





- $\ \ \, \bigcirc \, \, \text{Atmospheric water heater, primarily intended for light commercial/industrial applications}$
- O Replaceable magnesium anode
- O Control, high limit and energy cut-off thermostats to ensure safe operation
- Safety sensor to prevent flue spillage
- O Waterway access cover for comprehensive waterside tank maintenance
- $\circ$  Low NO<sub>X</sub> < 56mg/Kwh, meets tightened emission and efficiency requirements 26/09/18
- O Stainless-steel burner for natural or LP gas

Technical specifications		BTL 85	BTL 100
Nominal input (gross value) *	kW	22,1	21,0
Nominal output	kW	16,8	16,6
Gas consumption**	m³/h	2,1	2,0
Empty weight	kg	124	151
NO <sub>x</sub> emissions*	mg/kWh GVC	17	12
Draw-off capacity			
Capacity	I	268	358
Max. temperature setting	°C	80	80
30 minutes ∆T=44 °C	1	450	550
60 minutes ∆T=44 °C	1	620	710
90 minutes ΔT=44 °C	1	780	870
120 minutes ΔT=44°C	1	940	1100
Continuous ΔT=44°C	l/h	330	330
Heating-up time ∆T=44 °C	min.	34	46
30 minutes ΔT=50°C	I	400	480
60 minutes ΔT=50 °C	I	540	630
90 minutes ΔT=50 °C	I	690	770
120 minutes ΔT=50 °C	1	830	910
Continuous $\Delta$ T=50 °C	l/h	290	290
Heating-up time ∆T=50 °C	min.	39	53
30 minutes ΔT=55 °C	I	360	440
60 minutes ΔT=55 °C	1	490	570
90 minutes ΔT=55 °C	1	630	700
120 minutes ΔT=55 °C	1	760	830
Continuous ∆T=55 °C	l/h	270	260
Heating-up time ∆T=55 °C	min.	43	58
Dimensions			
Height	mm	1450	1660
Depth	mm	735	795
Width	mm	645	705
Height of cold water connection	mm	1510	1700
Height of warm water connection	mm	1510	1700
Height of gas control	mm	385	375
Diameter of flue connection	mm	130	130
Cleaning opening	mm	370	360
Energy labelling			
Load profile		XL	XXL
Energy labelling		В	C
Efficiency	%	58	58

Dit toThis appliance must be installed on a non-flammable floor or surface.

Draw-off capacities are based on the maximum control temperature and cold water set at 10  $^{\circ}\text{C}$ 

<sup>\*</sup> Gas data based on G20-20 mbar

<sup>\*\*</sup> Gas consumption at 15 °C and 1013.25 mbar



# High power rating

# Electric water heaters

When access to natural gas is not an option, or where a simplified installation is essential, A.O. Smith offers a wide range of electric water heaters. Our electric heaters deliver high power and a capacity of 115 to 450 litres in systems that take up less space. They can be used for residential, commercial or industrial requirements.

# Voltages

The A.O. Smith electric water heater range caters to requirements of every size, from smaller industrial and domestic needs (single phase 230 volts) to large-scale industrial environments with heavy hot water demands (3 phase 400 volts).

## Control

All models in our electric water heating range come with durable and replaceable incoloy heating elements. The systems are controlled by a control thermostat, a safety thermostat and a reset button.

# Reliability

Our electric water heaters are simple to use and built for a long service life. Extremely easy to install, these heaters can be set up in almost any location. It's this flexibility that frequently makes them an ideal choice. All A.O. Smith electric water heaters, and every other product we make, meet with CE approval.

# DRE – ELECTRIC WATER HEATER

Connection and control unit



# DRE

# Three phase electric water heater. Primarily for commercial use

Output

8.4 - 50.4 kW

- O 3-9 Incoloy heating elements with a maximum rating of 54.0 kw
- $\odot$  Each element is controlled using a control thermostat (adjustable from 49°C 82°C) and a safety thermostat with a manual reset button
- $\, \circ \,$  Cascade control of the elements for steady and responsive heating
- O All elements and thermostats are fuse-protected
- O Corrosion is prevented with a PermaGlas Ultra Coat second-generation glass-coating
- O Equipped with dry fire protection
- O Replaceable magnesium anode



Technical speci	fications		DRE 52-9	DRE 52-18	DRE 52-36	DRE 80-9	DRE 80-18	DRE 80-36	DRE 80-54
Electrical power	er consumption	kW	8.4	16.8	33.6	8.4	16.8	33.6	50.4
Amperage		А	11-13	23-25	46-50	11-13	23-25	46-50	69-75
Number of ele	ctrical elements	-	3	3	6	3	3	6	9
Supply voltage					40	0(-15/+10%)/50 (± 1	Hz)		
Draw-off capac									
Capacity		I	173	173	173	264	264	264	264
Max. temperat	ure setting	°C	82	82	82	82	82	82	82
30 minutes	ΔT=44 °C	I	310	380	530	430	500	650	800
60 minutes	ΔT=44 °C	I	390	550	860	510	670	980	1300
90 minutes	ΔT=44 °C	I	470	710	1200	590	830	1400	1800
120 minutes	ΔT=44 °C	I	550	880	1600	680	1000	1700	2300
Continuous	∆T=44 °C	l/h	170	330	660	170	330	660	990
Heating-up tim	ne ∆T=44°C	min.	63	32	16	96	48	24	16
30 minutes	∆T=50°C	I	270	340	470	380	440	570	700
60 minutes	∆T=50 °C	I	340	480	760	450	590	860	1200
90 minutes	∆T=50 °C	I	420	630	1100	520	730	1200	1600
120 minutes	∆T=50 °C	I	490	770	1400	600	880	1500	2000
Continuous	∆T=50 °C	l/h	150	290	580	150	290	580	870
Heating-up tim	ne ∆T=50 °C	min.	72	36	18	110	55	27	18
30 minutes	∆T=55 °C	I	250	310	430	340	400	520	640
60 minutes	∆T=55 °C	I	310	440	690	410	530	780	1100
90 minutes	∆T=55 °C	I	380	570	950	480	670	1100	1500
120 minutes	∆T=55 °C	I	440	700	1300	540	800	1400	1900
Continuous	∆T=55 °C	l/h	140	270	530	140	270	530	790
Heating-up tim	ne ∆T=55 °C	min.	79	40	20	121	60	30	20
Dimensions									
Height		mm	1460	1460	1460	1580	1580	1580	1580
Depth		mm	690	690	690	790	790	790	790
Width		mm	560	560	560	640	640	640	640
Height of cold	water connection	mm	125	125	125	125	125	125	125
Height of hot	water connection	mm	1460	1460	1460	1580	1580	1580	1580
Energy labellin	g								
Load profile			XL	XL	XL	XL	XL	XL	XL
Energy labellin	g		С	С	С	С	С	С	С
Efficiency		%	38	39	39	39	39	39	39

Draw-off capacities are based on the maximum control temperature and cold water set at 10  $^{\circ}\text{C}$ 



Output

8.4 - 50.4 kW

- O Powerful electric water heater that produces large amounts of hot water in a short time
- O DWH capacity from 339 to 1132 litres/hour at 50°C depending on the chosen appliance
- Because the unit has an external on/off function, you can control when to use external power supply.
   For example when you have supply from your PV panels
- O 3 to 9 incoloy heating elements with a maximum output of 50.4 kW
- Cascade control of the heating elements allows a more even and responsive heating of the water
- $\, \bigcirc \,$  All elements and thermostats are fuse-protected
- $\, { \bigcirc }\,$  PermaGlas Ultra Coat second-generation glass coating technology helps to prevent corrosion
- The appliance can be adjusted according to DHW needs via the display, so that the appliance can function as energy-efficiently as possible
- O Thanks to the enameled elements, the exchangeable magnesium anode is less stressed
- O Targeted maintenance possible thanks to the display of the exact fault diagnosis on the elements

Electrical power consumption   NV	Technical specifications		DRE PLUS 52-9	DRE PLUS 52-18	DRE PLUS 52-36	DRE PLUS 80-9	DRE PLUS 80-18	DRE PLUS 80-36	DRE PLUS 80-54	
Number of electrical elements	Electrical power consumption	kW	8.4	16.8	33.6	8.4	16.8	33.6	50.4	
Supply voltage         400(-15/410%)/50 (± 1 Hz)           Deveral Expensive Supply voltage           Logacity         1         173         173         264         267         260         260         260 <th cols<="" td=""><td>Amperage</td><td>Α</td><td>12</td><td>24</td><td>49</td><td>12</td><td>24</td><td>49</td><td>73</td></th>	<td>Amperage</td> <td>Α</td> <td>12</td> <td>24</td> <td>49</td> <td>12</td> <td>24</td> <td>49</td> <td>73</td>	Amperage	Α	12	24	49	12	24	49	73
Deave of capacity         I         173         173         173         264         264         264         264           Max. temperature setting         °C         83 <td>Number of electrical elements</td> <td>-</td> <td>3</td> <td>3</td> <td>6</td> <td>3</td> <td>3</td> <td>6</td> <td>9</td>	Number of electrical elements	-	3	3	6	3	3	6	9	
Capacity         I         173         173         173         264         264         264         264           Max. temperature setting         °C         83         83         83         83         83         83         83         83         83         83         83         83         30         60         500         60         100         1500         60         130         60         990         1300         18	Supply voltage					400(-15/+10%)/50 (±	1 Hz)			
Max. temperature setting         °C         83 <th< td=""><td>Draw-off capacity</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>	Draw-off capacity									
30 minutes   ΔT=44 °C     310   380   530   430   500   650   800   1300	Capacity	T	173	173	173	264	264	264	264	
60 minutes	Max. temperature setting	°C	83	83	83	83	83	83	83	
90 minutes   AT=44 °C   1   470   710   1200   590   830   1400   1800   120 minutes   AT=44 °C   1   550   880   1600   680   1700   330   660   990   120 minutes   AT=44 °C   14   170   330   660   170   330   660   990   1400	30 minutes ∆T=44 °C	I	310	380	530	430	500	650	800	
120 minutes	60 minutes ∆T=44 °C	I	390	550	860	510	670	980	1300	
Continuous         ΛT=44 °C         Vh         170         330         660         170         330         660         990           Heating-up time         ΔT=44°C         min.         63         32         16         96         48         24         16           30 minutes         ΔT=50°C         I         270         340         470         380         440         570         700           60 minutes         ΔT=50°C         I         340         480         760         450         590         860         1200           90 minutes         ΔT=50°C         I         420         630         1100         520         730         1200         1600           120 minutes         ΔT=50°C         I         490         770         1400         600         880         1500         200           Continuous         ΔT=50°C         In         150         290         580         150         290         580         870           Heating-up time         ΔT=55°C         min.         72         36         18         110         55         27         18           30 minutes         ΔT=55°C         I         310         440	90 minutes ΔT=44 °C	I	470	710	1200	590	830	1400	1800	
Heating-up time         ΔT=44°C         min.         63         32         16         96         48         24         16           30 minutes         ΔT=50°C         1         270         340         470         380         440         570         700           60 minutes         ΔT=50 °C         1         340         480         760         450         590         860         1200           90 minutes         ΔT=50 °C         1         420         630         1100         520         730         1200         1600           120 minutes         ΔT=50 °C         1         490         770         1400         600         880         1500         200           Continuous         ΔT=50 °C         Irih         150         290         580         150         290         580         870           Heating-up time         ΔT=50 °C         Irih         150         290         380         150         290         580         870           30 minutes         ΔT=55 °C         I         250         310         430         340         400         520         660           60 minutes         ΔT=55 °C         I         430 <t< td=""><td>120 minutes ∆T=44 °C</td><td>I</td><td>550</td><td>880</td><td>1600</td><td>680</td><td>1000</td><td>1700</td><td>2300</td></t<>	120 minutes ∆T=44 °C	I	550	880	1600	680	1000	1700	2300	
30 minutes	Continuous ∆T=44 °C	l/h	170	330	660	170	330	660	990	
60 minutes         ΔT=50 °C         I         340         480         760         450         590         860         1200           90 minutes         ΔT=50 °C         I         420         630         1100         520         730         1200         1600           120 minutes         ΔT=50 °C         I         490         770         1400         600         880         1500         2000           Continuous         ΔT=50 °C         I/h         150         290         580         150         290         580         870           Heating-up time         ΔT=50 °C         min.         72         36         18         110         55         27         18           30 minutes         ΔT=55 °C         I         250         310         430         340         400         520         640           60 minutes         ΔT=55 °C         I         310         440         690         410         530         780         1100           90 minutes         ΔT=55 °C         I         380         570         950         480         670         1100         1500           120 minutes         ΔT=55 °C         I/h         140         <	Heating-up time ∆T=44°C	min.	63	32	16	96	48	24	16	
90 minutes   ΔT=50 °C   1   420   630   1100   520   730   1200   1600     120 minutes   ΔT=50 °C   1   490   770   1400   600   880   1500   2000     Continuous   ΔT=50 °C   1/h   150   290   580   150   290   580   870     Heating-up time   ΔT=50 °C   min.   72   36   18   110   55   27   18     30 minutes   ΔT=55 °C   1   250   310   440   690   410   530   780   1100     90 minutes   ΔT=55 °C   1   380   570   950   480   670   1100   1500     120 minutes   ΔT=55 °C   1   440   700   1300   540   800   1400   1900     Continuous   ΔT=55 °C   1   440   700   1300   540   800   1400   1900     Continuous   ΔT=55 °C   1/h   140   270   530   140   270   530   790     Heating-up time   ΔT=55 °C   min.   79   40   20   121   60   30   20     Dimensious   Dime	30 minutes ΔT=50°C	T	270	340	470	380	440	570	700	
120 minutes   AT = 50 °C   I   490   770   1400   600   880   1500   2000     Continuous   AT = 50 °C   I/h   150   290   580   150   290   580   870     Heating-up time   AT = 50 °C   min.   72   36   18   110   55   27   18     30 minutes   AT = 55 °C   I   250   310   430   340   400   520   640     60 minutes   AT = 55 °C   I   310   440   690   410   530   780   1100     90 minutes   AT = 55 °C   I   380   570   950   480   670   1100   1500     120 minutes   AT = 55 °C   I   440   700   1300   540   800   1400   1900     120 minutes   AT = 55 °C   I   440   270   530   140   270   530   790     Heating-up time   AT = 55 °C   Mh   140   270   530   140   270   350   790     Heating-up time   AT = 55 °C   min.   79   40   20   121   60   30   20     Dimensions   Dimensions   Depth   mm   690   690   690   790   790   790   790     Potth   mm   560   560   560   640   640   640   640   640     Height of cold water connection   mm   125   125   125   125   125   125   125   125   125     Height of hot water connection   mm   1460   1460   1460   1580   1580   1580   1580     Depth   mm   560   560   560   640   640   640   640     Height of hot water connection   mm   1460   1460   1460   1580   1580   1580   1580     Depth   mm   560   560   560   560   640   640   640   640     Height of hot water connection   mm   1460   1460   1460   1580   1580   1580   1580     Depth   mm   560   5	60 minutes ∆T=50 °C	I	340	480	760	450	590	860	1200	
Continuous         ΔT = 50 °C         Vh         150         290         580         150         290         580         870           Heating-up time         ΔT = 50 °C         min.         72         36         18         110         55         27         18           30 minutes         ΔT = 55 °C         I         250         310         430         340         400         520         640           60 minutes         ΔT = 55 °C         I         310         440         690         410         530         780         1100           90 minutes         ΔT = 55 °C         I         380         570         950         480         670         1100         1500           120 minutes         ΔT = 55 °C         I         440         700         1300         540         800         1400         1900           Continuous         ΔT = 55 °C         I/h         140         270         530         140         270         530         790           Heating-up time ΔT = 55 °C         min.         79         40         20         121         60         30         20           Digenesions         mm         1460         1460	90 minutes ∆T=50 °C	I	420	630	1100	520	730	1200	1600	
Heating-up time         ΔT=50 °C         min.         72         36         18         110         55         27         18           30 minutes         ΔT=55 °C         I         250         310         430         340         400         520         640           60 minutes         ΔT=55 °C         I         310         440         690         410         530         780         1100           90 minutes         ΔT=55 °C         I         380         570         950         480         670         1100         1500           120 minutes         ΔT=55 °C         I         440         700         1300         540         800         1400         1900           Continuous         ΔT=55 °C         I/h         140         270         530         140         270         530         790           Heating-up time ΔT=55 °C         min.         79         40         20         121         60         30         20           Dimensions           Wideling mm         1460         1460         1580         1580         1580         1580           Depth         mm         690         690         690	120 minutes ∆T=50 °C	I	490	770	1400	600	880	1500	2000	
30 minutes	Continuous ∆T=50 °C	l/h	150	290	580	150	290	580	870	
60 minutes ΔT=55 °C I 310 440 690 410 530 780 1100 90 minutes ΔT=55 °C I 380 570 950 480 670 1100 1500 120 minutes ΔT=55 °C I 440 700 1300 540 800 1400 1900 Continuous ΔT=55 °C I/h 140 270 530 140 270 530 790 Heating-up time ΔT=55 °C min. 79 40 20 121 60 30 20  Dimensions  Height mm 1460 1460 1460 1580 1580 1580 1580 1580 1580 Depth mm 690 690 690 790 790 790 790 790 Width mm 560 560 560 560 640 640 640 640 640 640 640 640 640 6	Heating-up time ∆T=50 °C	min.	72	36	18	110	55	27	18	
90 minutes	30 minutes ∆T=55 °C	T	250	310	430	340	400	520	640	
120 minutes ΔT=55 °C I 440 700 1300 540 800 1400 1900  Continuous ΔT=55 °C I/h 140 270 530 140 270 530 790  Heating-up time ΔT=55 °C min. 79 40 20 121 60 30 20  Dimensions  Height mm 1460 1460 1460 1580 1580 1580 1580 1580  Depth mm 690 690 690 790 790 790 790 790  Width mm 560 560 560 640 640 640 640 640  Height of cold water connection mm 125 125 125 125 125 125 125 125  Height of hot water connection mm 1460 1460 1460 1460 1580 1580 1580  Energy labelling  Load profile XL	60 minutes ∆T=55 °C	1	310	440	690	410	530	780	1100	
Continuous         ΔT=55 °C         I/h         140         270         530         140         270         530         790           Heating-up time ΔT=55 °C         min.         79         40         20         121         60         30         20           Dimensions           Height         mm         1460         1460         1580         1580         1580         1580           Depth         mm         690         690         690         790         790         790         790           Width         mm         560         560         560         640         640         640         640           Height of cold water connection         mm         125	90 minutes ∆T=55 °C	1	380	570	950	480	670	1100	1500	
Heating-up time ΔT=55 °C         min.         79         40         20         121         60         30         20           Dimensions           Height         mm         1460         1460         1460         1580         1580         1580           Depth         mm         690         690         690         790         790         790         790           Width         mm         560         560         560         640         640         640         640           Height of cold water connection         mm         125 <td>120 minutes ∆T=55 °C</td> <td>1</td> <td>440</td> <td>700</td> <td>1300</td> <td>540</td> <td>800</td> <td>1400</td> <td>1900</td>	120 minutes ∆T=55 °C	1	440	700	1300	540	800	1400	1900	
Dimensions           Height         mm         1460         1460         1580         1580         1580         1580           Depth         mm         690         690         690         790         790         790         790           Width         mm         560         560         560         640         640         640         640           Height of cold water connection         mm         125         1	Continuous ∆T=55 °C	l/h	140	270	530	140	270	530	790	
Height         mm         1460         1460         1460         1580         1580         1580         1580           Depth         mm         690         690         690         790         790         790         790           Width         mm         560         560         640         640         640         640           Height of cold water connection         mm         125         125         125         125         125         125         125         125         125         125         125         125         125         1580	Heating-up time $\Delta$ T=55 °C	min.	79	40	20	121	60	30	20	
Depth         mm         690         690         690         790         790         790         790           Width         mm         560         560         560         640         640         640         640           Height of cold water connection         mm         125	Dimensions									
Width         mm         560         560         560         640         640         640         640           Height of cold water connection         mm         125         125         125         125         125         125           Height of hot water connection         mm         1460         1460         1460         1580         1580         1580         1580           Energy labelling           Load profile         XL         XL         XL         XL         XL         XL         XL         XL         Energy labelling         C	Height	mm	1460	1460	1460	1580	1580	1580	1580	
Height of cold water connection         mm         125         1	Depth	mm	690	690	690	790	790	790	790	
Height of hot water connection         mm         1460         1460         1460         1580         1580         1580         1580           Energy labelling           Load profile         XL	Width	mm	560	560	560	640	640	640	640	
Energy labelling           Load profile         XL	Height of cold water connection	mm	125	125	125	125	125	125	125	
Load profile         XL	Height of hot water connection	mm	1460	1460	1460	1580	1580	1580	1580	
Energy labelling C C C C C C C	Energy labelling									
3,7 3	Load profile		XL	XL	XL	XL	XL	XL	XL	
3,7 3	<u>'</u>		С	C	C	C	C	C	C	
		%								

Draw-off capacities are based on the maximum control temperature and cold water set at 10 °C

# EES

# Vertical electric water heater for residential or small commercial applications

utput 3.0

- O Capacity: 115 to 450 litres
- O Two replaceable Incoloy-sheathed elements
- $\circ$  Each element is provided with a control thermostat (adjustable: 43°C 77°C)
- $\, \bigcirc \,$  Safety thermostat with manual reset button
- O Equipped with dry fire protection
- O Automatic switch regulates one of the elements to transfer a maximum of 3 kW
- O Corrosion is prevented with a PermaGlas Ultra Coat second-generation glass-coating
- O Replaceable magnesium anode

Technical specifications		EES 30	EES 40	EES 52	EES 66	EES 80	EES 120
Electrical power consumption	kW	3.0	3.0	3.0	3.0	3.0	3.0
Amperage	А	11-13	11-13	11-13	11-13	11-13	11-13
Number of electrical elements	-	2	2	2	2	2	2
Supply voltage				240(-15%/+10%	6)/50Hz (+/-1Hz)		
Draw-off capacity							
Capacity	I	115	155	190	250	300	450
Max. temperature setting	°C	77	77	77	77	77	77
30 minutes ∆T=44 °C	I	149	192	229	293	346	506
60 minutes ∆T=44 °C	I	178	221	258	322	375	535
90 minutes ΔT=44 °C	I	208	250	288	352	405	565
120 minutes ∆T=44 °C	I	237	280	317	381	434	594
Continuous ∆T=44 °C	l/h	59	59	59	59	59	59
Heating-up time ∆T=44 °C	min.	118	159	194	256	307	460
30 minutes ΔT=50°C	I	131	169	201	258	305	445
60 minutes ΔT=50 °C	I	157	194	227	284	330	471
90 minutes ∆T=50 °C	I	183	220	253	309	356	497
120 minutes ΔT=50 °C	I	208	246	279	335	382	523
Continuous ∆T=50 °C	l/h	52	52	52	52	52	52
Heating-up time ∆T=50 °C	min.	134	180	221	291	349	523
30 minutes ∆T=55 °C	I	119	153	183	234	277	405
60 minutes ΔT=55 °C	I	143	177	207	258	300	428
90 minutes ΔT=55 °C	I	166	200	230	281	324	452
120 minutes ∆T=55 °C	I	190	224	253	305	347	475
Continuous ∆T=55 °C	l/h	47	47	47	47	47	47
Heating-up time $\Delta$ T=55 °C	min.	147	198	243	320	384	576
Dimensions							
Height	mm	930	1110	1370	1530	1540	1620
Diameter	mm	Ø 520	Ø 520	Ø 520	Ø 560	Ø 610	Ø 710
Height of water connection	mm	110	110	110	110	110	110
Energy labelling							
Load profile		L	L	XL	XL	XL	XL
Energy labelling		С	C	С	C	D	D
Efficiency	%	39	38	38	38	37	37

Draw-off capacities are based on the maximum control temperature and cold water set at 10  $^{\circ}\text{C}$ 



# DRE

A key A.O. Smith design feature, connection panels are easy to access and sized to make installation easy. Each electrical element is built with its own control thermostat and a manual reset button.



# DRY FIRE PROTECTION

Dry fire protection is a standard feature of our DRE systems. This feature safeguards the elements even if water levels fall below the set minimum.

## APPLICATIONS

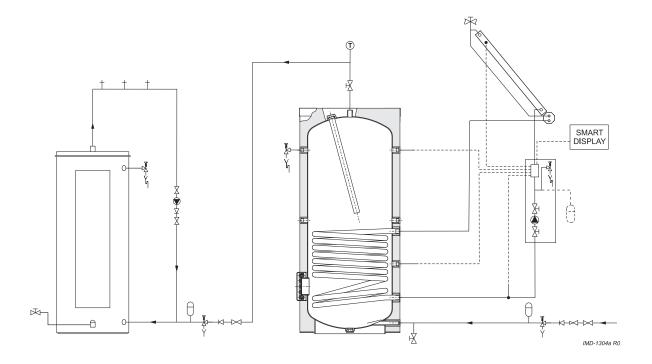
A lack of access to natural gas, or a need for simple installation are the most common reasons for choosing an electric water heater.

Our electric water heaters can combine with our **solar energy** systems and our **storage tanks** to increase efficiency and maximise the volume of hot water produced.

The diagram below shows a DRE electric water heater working in combination with an IT storage tank. DREs come in range of capacities from 200 to 450 litres with a power consumption range of between 9.0 kW and 54.0 kW. When combined with an IT storage tank of between 300 to 2800 litres, these variables can be configured to build a system of any required size. The variety of DRE and EES heaters available allows for infinite potential combinations.

In the system exampled below, cold water in the IT storage tank is heated by solar energy. The hottest water is transferred from the IT to the base of the DRE. This water will only require a boost by the DRE for it to reach required temperature. In this set-up, the DRE is used only as an afterheater, therefore saving a huge amount of electricity.

To find the configuration best suited to your needs, you can rely on advice from A.O. Smith experts.



# Water heaters

# Flue gas exhaust options

	B23	C11 - C13	C31 - C33	C43	C53	C83
	AIR SUPPLY FROM THE INSTALLATION AREA WITH ROOF DUCT	HORIZONTAL FLUE WITH WALL DUCT	VERTICAL FLUE WITH ROOF DUCT	CONNECTION TO THE SHARED FLUE	AIR SUPPLY THROUGH THE WALL AND FLUE THROUGH THE ROOF	CONNECTION TO THE SHARED FLUE SYSTEMS/ SEPARATE AIR SUPPLY
BFC Cyclone*	B23 single	C13 parallel/ concentric	C33 parallel/ concentric	C43 parallel/ concentric	C53 parallel	-
BFM 30/50/80		C13 concentric	C33 concentric			-
BFM 100/120		C13 parallel with concentric terminal	C33 parallel			
INNOVO*	B23 single	C13 parallel/ concentric	C33 parallel/ concentric	C43 parallel/ concentric	C53 parallel	-
TWISTER II	B23 single	C13 parallel/ concentric	C33 parallel/ concentric	C43 parallel/ concentric	C53 parallel	-
SGE*	B23 single	C13 parallel/ concentric	C33 parallel/ concentric	C43 parallel/ concentric	C53 parallel	-
SGS*	B23 single	C13 parallel/ concentric	C33 parallel/ concentric	C43 parallel/ concentric	C53 parallel	-

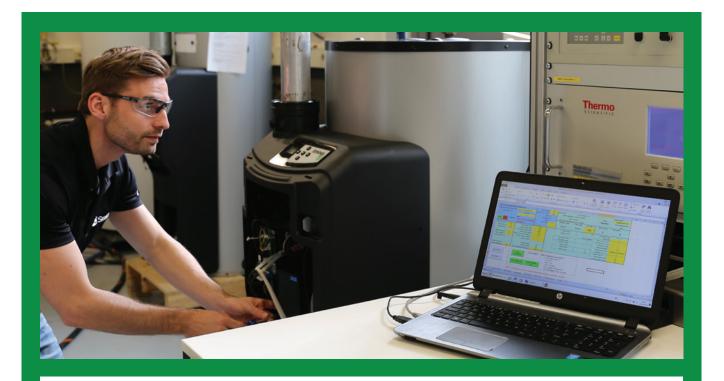
<sup>\*</sup> BFC Cyclone, Innovo, SGE, SGS and Twister II have also been certified for systems where the flue material is not supplied with the water heater (C63). Note: a horizontal pipe must be installed under a slope of 5 cm per metre of pipe towards he system.

# Benefits

# Rewards for sustainability

Homeowners and businesses can often benefit from attractive benefits promoting the use of high-efficiency (renewable) technology. Make sure to review what benefits you can apply for in your country as you may save an important sum on your capital investment.





# Quality

Superior product quality and complete customer satisfaction are the A.O. Smith promise.

# Certificates

All of our products are CE certified for the total European market, and meet the European RoHS, WEEE and PED Directives.

The manufacturing processes that deliver our products meet established quality standards such as ISO 9001:2008. As an international company with a presence across the globe, we are careful to meet local requirements and standards. This includes collecting certificates needed to meet the criteria for local incentive programs.

# Development and production processes

Innovation and product quality are at the heart of everything we do. One of the first manufacturers to introduce the condensing water heater, A.O. Smith has built a deserved reputation for pioneering technology and setting new standards in the water heater industry.





















# **3D DESIGN**

Using advanced 3D modelling software, our development department is able to create bespoke designs for highly individual projects.

# Customer satisfaction and support

# Customer service

A.O. Smith products are made to deliver maximum efficiency and lasting comfort for our customers. Delivering on that ambition means making sure those products continue to perform perfectly.

## System design

Before making a purchase decision, we advise you to contact our local distributor who can help you find the products, and design the configuration that will offer the most efficient solution for your particular needs.

## Technical and commercial advice

Using the existing building specifications, our local distributor can provide technical and commercial advice to help you find the very best hot water solution. We guarantee an ideal solution for every different project.

# Commissioning

Once installed, we advise you to book our commissioning service will help you get the very best out of your system. We will help you programme the system to deliver optimum levels of comfort and energy efficiency.

# Gas and waterside maintenance

To get the longest lifespan possible from your system, and to sustain perfect performance, A.O. Smith recommend gas and waterside maintenance on an annual basis.

## Effective descaling with Dscale

Descaling your water heater will extend the working life of the system, and ensure that the heating process and energy savings are optimized. To remove limescale effectively A.O. Smith developed their own powerful descaling product. Safe and easy to use, Dscale is made using natural, biodegradable acids.

For detailed instructions on descaling visit www.aosmithinternational.com

# Service

Can we help with a question? Would you like to place an order? Contact our local distributor. The experienced team can help you resolve faults, and send technical support to your location.

SERVICE TECHNICIANS WILL CHECK ON EVERY ASPECT OF THE SYSTEM TO LET YOU ENJOY A PROBLEM-FREE HOT WATER SOLUTION YEAR AFTER YEAR.





# CONTACT INFORMATION

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Website www.aosmithinternational.com

At A.O. Smith, we believe contact should be personal. That's why our dedicated Customer Service Team are available at all times to help.





**f** A.O. Smith Europe



(n) A.O. Smith Water Product Company Europe



# **DISCLAIMER**

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Data subject to change INT/0522/PC/11





