

Boiling Point

Autumn/Winter
2017

Match it right

How to choose the best boiler for your project. [Pages 4/5](#)

Plus

What's new from the EU? – ErP: Efficiency limits and more for water heaters. [Page 3](#)

Hands-on – What to expect from our product training and CPD seminars. [Page 8](#)



Heating *at work.*





Editor's point of view

It's a material choice

Which metal do you prefer? I'm seeing more manufacturers talk about the construction of the heat exchanger inside their boilers. Most will have a bias towards a certain material (that's probably because they only offer one!) However, we see the benefits of all and can give you impartial advice due to a product range that has it all – aluminium, stainless steel, cast iron, steel.

We understand that each has its own merits and will be suited to different applications. We go into more detail on pages 4-5 on the pros and cons of each heat exchanger material to help you select the suitability of a boiler for your next project.

EU legislation still applies

Yes, despite Brexit, EU legislation will remain. And one regulation that has been prevalent in the commercial heating and hot water industry is the ErP (Energy-related Products) Directive.

In August 2015, rules on compliance for product integrated pumps (i.e. the ones inside our boilers) meant only variable speed pumps could be used. Then in September, strict efficiency levels for boilers under 400kW meant that atmospheric boilers were effectively wiped out, condensing boilers became the norm. This caused a massive shake up, particularly for refurbishment projects. You can no longer replace like for like, flue changes are needed to enable it to cope with condensate.

This year further tightening of efficiency levels for boilers are being put in place and the emphasis becomes greater on water heaters.

Stricter efficiency levels and standing loss requirements came into place in September this year and then in September 2018 even stricter efficiency rules will be enforced.

This will do for the hot water market what it did for boilers in 2015 – render atmospheric water heaters obsolete as they are unable to meet the criteria. We explore this in more detail on the page opposite.

Our roundup from across the industry on page 6 seems to have a common theme of collaboration. BESA are working with the government to advise on the Building Regulation reviews in response to the Grenfell Tower tragedy. Plus, ICOM have been working with manufacturers from the heating industry to address the important topic of water treatment. Great to see organisations working together and taking advice from the people who deal with these subjects, day in day out.

The challenge of a listed building

A recent heating and hot water upgrade at St Paul's Cathedral had to consider both the EU legislation and the guidelines set out by its listed status. The Grade 1 listed building is governed by stringent rules and the refurbishment had to consider access and space, along with meeting high heating and hot water demand.

To do this, they chose our Wessex ModuMax modular boiler solution. Being able to fit through a standard doorway to avoid any changes to the building, the boilers provide a reliable and energy efficient solution. Coupled to the boiler are two smaller calorifiers (instead of one larger unit that could not fit through the door). Thanks to a recovery time of just 18 mins they can deal with the peak demands for hot water during the busy summer period. You can read the full project case study on page 7.

Best wishes

Sam Boshier
Editor

The story behind the numbers:

1MW FROM 1m²

Read about our new modular boiler on page 5.

4XL LOAD PROFILE

Efficiency levels are tightening for water heaters under ErP. Page 3.

18 MINUTES

Recovery time of our Powerstock calorifiers installed at St Paul's Cathedral. Page 7.

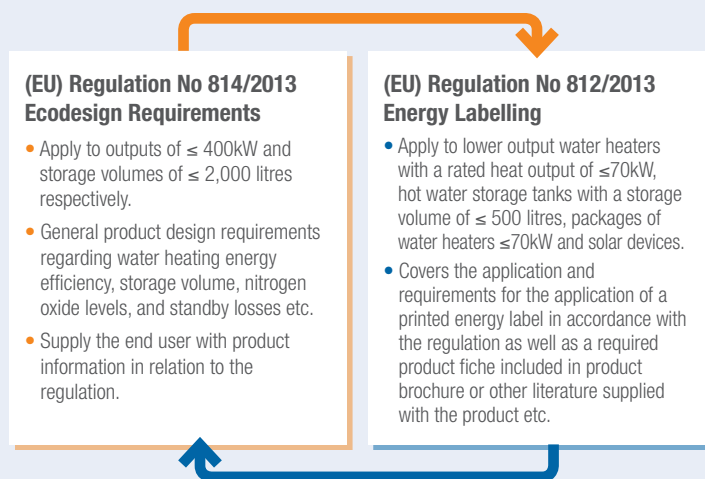
Energy efficiency for water heaters – what’s new from the EU (*despite Brexit*) ?

The Energy-related Products Directive came into force in September 2015 to help achieve the EU’s energy savings goal of 20% reduction compared to 1990 levels by 2020. Stricter water heater energy efficiency limits were recently enforced (26 September 2017) and others will apply from 26 September 2018.

We’re taking a look behind the regulations, their meaning and investigate their impact.

The regulations

The 2013 published Ecodesign and Energy Labelling regulations were one step towards achieving more energy savings. The regulations are roughly split into two parts (*extract of water heater regulations only*):



Energy efficiency

Since 2015, increasingly stricter sets of minimum efficiency requirements for water heaters (excluding hot water storage tanks and solar water heaters) have been enforced.

The minimum energy efficiency level that applies is dependent on the so-called “load profile” of a water heater, ranging from 3XS to 4XL. Every water heater meets at least one, but the declared profile is either the maximum or one below the maximum load profile.

They are based on a given sequence of water draw-offs in a 24-hour cycle that the water heater is able to provide.

All of Hamworthy’s condensing water heaters already meet the Tier 3 efficiency levels set for 2018.

Load profile of water heater ¹ /Year of implementation	Minimum Energy Efficiency ²			
	2015 Tier 1	2017 Tier 2	2018 Tier 3	
3XS	22%	32%	Water heaters with low max load profiles become obsolete	
XXS	23%	32%		
XS	26%	32%		
S	26%	32%		
M	30%	36%		
L	30%	37%		
XL	30%	37%		
XXL	32%	37%		60%
3XL	32%	37%		64%
4XL	32%	38%		64%

¹ Load profile as indicated by the manufacturer.

² Different efficiency levels apply for water heaters with smart controls.

Nitrogen oxide (NO_x) emissions

NO_x emissions are a contributor to smog and therefore poor air quality. For this reason, NO_x emission levels will also be enforced for water heaters from 26 September 2018. For conventional water heaters the limits are 56 mg/kWh (gaseous fuels) and 120 mg/kWh (liquid fuels).**

Storage volume and sound power level

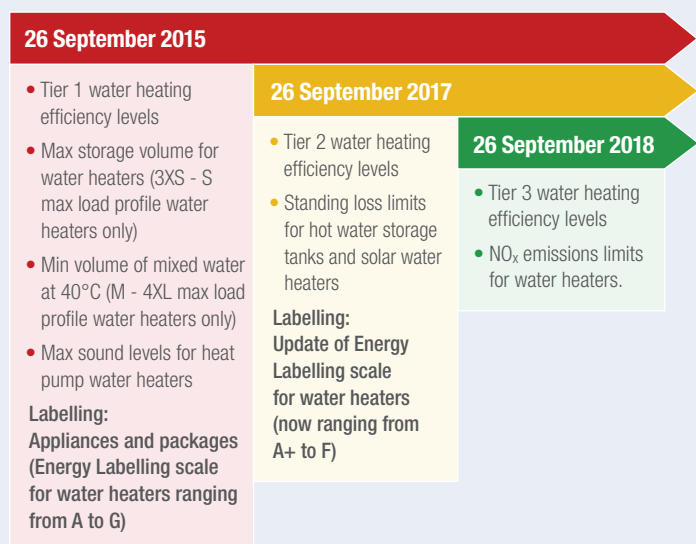
In 2015, storage volume limits and minimum amount of stored water at 40°C were enforced. For heat pump water heaters, maximum sound power level limits were introduced in the same year.

Standing losses

Limits for standing losses (heat lost to the environment = wasted energy) for hot water storage tanks and solar water heaters were introduced on 26 September 2017

The bigger the tanks, the bigger the heat loss. That’s why our calorifiers are supplied with an insulation jacket to keep the heat in the system and minimise standing losses.

Timeline of ErP Directive changes



**Given as fuel input in terms of gross calorific value (GCV). Different levels apply to heat pump water heaters which are not covered in this article.

Read our hot water expert Kevin Potter’s comment on the changes on page 6.

Find our water heater product range on hamworthy-heating.com/commercial-hot-water-heaters.

How do I choose the best suited boiler for my project?

Making the right material choice

Commercial heating systems are as diverse as the buildings they are installed in. Their design depends on many factors which need to be considered when laying out a new heating system or refurbishing an existing one.

In the case of refurbishment projects, the existing heating system design needs to be taken into account, as the replacement of pipework and other components may not be practical due to time constraints, costs and building regulations. A good example of such is our St Paul's Cathedral case study on page 7 that had to accommodate the rules of a listed building.

Boiler compatibility can be an issue, especially when the old heating system is 'dirty' from years of use. However, via methods such as hydraulic separation between primary (new boiler) and secondary (old pipework) circuit, this problem can be bypassed.

New builds on the other hand allow more freedom when it comes to heating design, but are limited by stricter building regulations, such as Part L, e.g. in relation to carbon emissions.

What impact does this have on boiler choice?

Different metals have different properties, such as weight, corrosion resistance and heat conductivity which also have an impact on the heat exchanger design. We're exploring the benefits, but also disadvantages of each material to give you the options to consider for your next commercial heating project.

Cast iron

Cast iron is composed of iron, carbon (high ratio), silicon, and may contain traces of other elements. Traditionally dominating the market, a large number of cast iron sectional boilers are still installed in buildings across the UK.

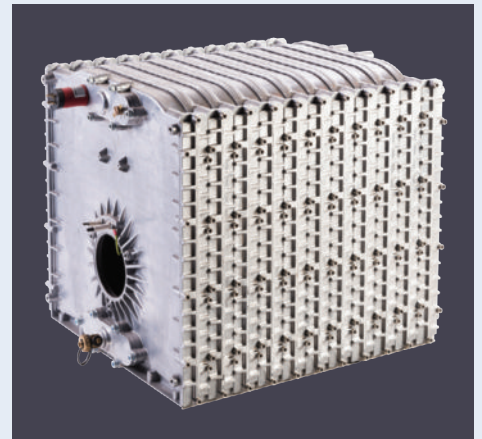


It is a robust, heavy material and not easy to break.

Originally, cast iron was used due to its tolerance to sulphurous flue gases – a by-product of burning coal.

Cast iron heat exchangers feature a sectional heat exchanger design and benefit from large waterways. That's why they deal well with debris in circuits of older heating systems, making them a great choice for refurbishment projects.

Cast iron boilers are usually not suitable for condensing due to risk of corrosion from acidic flue gases. This means energy efficiency levels as outlined by the Energy-related Products Directive are hard to meet with them. However, the addition of a second heat exchanger enables it to condense – an example is our ErP-compliant Purewell VariHeat cast iron condensing boiler.



Aluminium alloy

Aluminium alloys come in many different varieties. It can be combined with iron and other elements to enhance its properties, especially strength.

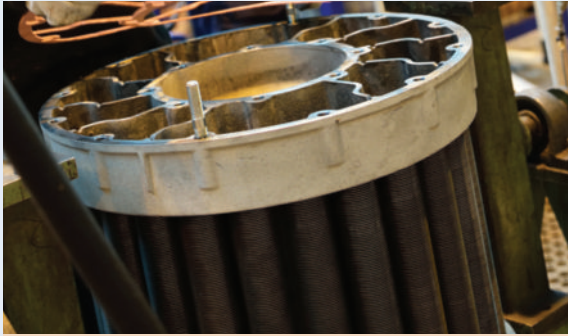
Aluminium offers excellent heat transfer properties and is lightweight, which is why it is often used in wall hung boilers.

To prevent galvanic attack and corrosion setting in, good heating system water quality (pH band 7–8.5) must be ensured.

Small waterways in aluminium heat exchangers allow a fast response to changing system requirements. However, water must be kept clean using dirt separation to allow flow through the narrower waterways.

It is often a preferred choice due to its lower cost and high efficiency, especially for new build projects where good water quality can be maintained.

Our new Upton floor standing condensing boiler (see right page) features a precision-engineered heat exchanger with fin and pin design to optimise heat distribution and efficiency. Compared to traditional aluminium boilers, it features a single flow path resulting in high flow velocity, helping to reduce scale build up.



Stainless steel

Stainless steel is an alloy based on iron combined with chromium (min. of 10.5%) to make it corrosion resistant, and lower carbon content compared to cast iron. It is heavier than aluminium, but lighter than cast iron. Many different types of stainless steel with other added elements to improve weldability and formability exist.

Grade 316 is the most common type, with good welding and heat transfer properties similar to those of cast iron.

Compared to aluminium, stainless steel is tolerant towards a wider pH band (7-10), making it suitable for more challenging water conditions.

Wetter environments such as swimming pools can especially benefit from these properties.

Given its durability and longevity, warranty terms are often favourable (5-10 years). An example is our Wessex ModuMax mk3 boiler with a 10-year warranty on the heat exchanger.

Steel shell or shell and tube

Steel shell or shell and tube steel heat exchangers are used in higher output, often pressure jet boilers. Benefits are lower cost and a wide differential temperature (back in the day only achievable from such boilers). As they corrode readily, they are not suitable for condensing, unless a secondary heat exchanger is used. A minimum return temperature control in these kind of boilers is also necessary to prevent condensing. Pressure jet burners are based on a single piece boiler design and take up a lot of space, which is why access and installation need to be considered. Boilers of this kind are unsuitable for tight plant rooms, or refurbishments with limited access to the plant room.

Huge heat loads can call for steel shell boilers, but other boilers might be arrangeable as cascade/modular installation to cover heat demand.

An advantage of the latter is the ability to load match and modulate the boiler down to supply only heat that is required, rather than always running at full load. This way, more boilers are running, but all of them at a more efficient part load, saving fuel/gas.

In a nutshell

While each material has its benefits and disadvantages, a certain type of boiler's suitability for a project depends on other factors, too. Is it a new building or the refurbishment of an existing heating system? What type of building is it; town hall, hotel, school, church? What's the heat load?

What are the environmental objectives? It's crucial to look at nitrogen oxide emissions (particularly in city centre locations) and efficiency levels for compliance and green assessments.

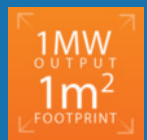
How will the equipment be looked after? What is the planned maintenance regime, what are the warranty terms? Is there a way to control water quality?

Lastly, the cost factor is driving many decisions. Stainless steel for long-term peace of mind takes the lead, with cast iron and aluminium followed as more economical choice.

We offer boilers using each type of material - visit hamworthy-heating.com/commercial-boilers to get to know our product range.

Penthouse power, box room footprint

Years of research have gone into the development of our new Upton floor standing condensing boiler.



It features an aluminium heat exchanger for most efficient heat distribution with quick heat up time, backed up by a 5-year warranty. The Upton benefits from a gross seasonal efficiency of up to 97% and can deliver an output of up to 1,050kW from less than a square metre of footprint.

Thanks to low NO_x emissions (European Class 6) and low noise, it is suitable for city centres, and adjoining quiet areas such as hotels and schools.

If output requirements change mid-project, models can easily be swapped out, as gas and water connections stay in the same place across all models in the range. That means only minimum revision of plant room design is required.

As optional extras, matched pipework kits including boiler pumps and low loss header kits with integrated air and dirt separator are available.

Find out more about the Upton boiler here: hamworthy-heating.com/commercial-boilers/upton-boiler



upton

OUR SMALLEST FOOTPRINT
HIGH OUTPUT CONDENSING
GAS BOILER

Industry roundup

We get the view from our industry on latest legislation, policy changes and heating best practice.



BESA welcomes review of Building Regulations

The Building Engineering Services Association (BESA) has welcomed the commissioning of Dame Judith Hackitt, Chair of the Engineering Employers Federation EEF, to lead an independent review of Building Regulations.

Recent events (namely the Grenfell Tower tragedy) have highlighted that existing building regulations are not fit for purpose, and calls have grown for an urgent review. Part B of building regulations, which include fire and safety, and Part L which include energy efficiency, represent one of the key systemic failures in the construction industry, and will now hopefully become a priority for reform.

BESA are keen to ensure that the review includes opinions of experts from right across the construction sector, and particularly from building engineering. Tim Rook, BESA's Technical Director said:

"Dame Judith's appointment is significant, demonstrating that the government appreciates the importance of engineering expertise when undertaking a review of this nature."

It is expected that the review will present an interim report before the end of the year, with the final report and recommendation to the government completed no later than spring 2018.

Hear more from BESA at www.thebesa.com



New guide to water treatment for commercial heating systems

A new Commercial Water Treatment Guide, published earlier this year, provides a comprehensive guide to all aspects of water treatment for commercial heating systems.

Available as a free download, it has been compiled by boiler manufacturers and water treatment companies who are members of ICOM Energy Association.

ICOM Director Ross Anderson explained:

"Boiler manufacturers had repeatedly complained about the issue of water treatment and how it affected their products. In sharing their expertise our members have now produced this definitive guide for everyone involved in water treatment, from specifiers to maintenance contractors and building owners/operators."

"It has been very well received with a high number of downloads by both members and non-members. We are now pro-actively building on this interest to promote best practice through complementary activities," he continued.

A PDF or hard copy of the 'Water Treatment and Conditioning of Commercial Heating Systems Guide' can be requested by going to: www.icom.org.uk/users/register/



Kevin Potter is Hamworthy Heating's hot water expert.

What impact can we expect from the ErP Directive in the hot water sector?

The enforcement of these regulations will result in the most inefficient and highest polluting (NO_x emissions) water heaters to be forced out of the market.

This is good news for the consumer. It effectively means we're not only producing less carbon emissions and reducing air pollution by using a modern efficient water heater, but also lower the cost for the end user. More efficient water heating means less fuel/gas is used to heat the same volume of water compared to inefficient heaters. Consumers will also benefit from manufacturers developing more energy efficient technologies.

However, these regulations can also present a challenge to refurbishment projects, where flues often cannot be changed to cope with condensate and atmospheric water heaters would be the product of choice.

More information on ErP can be found on the website of the European Commission: www.ec.europa.eu/energy/en/topics/energy-efficiency/energy-efficient-products

CASE STUDY



Plant room refurbishment at iconic St Paul's Cathedral

The prestigious St Paul's Cathedral has been standing at the highest point of London on Ludgate Hill since its latest rebuild over 300 years ago. As a Grade 1 listed building, the delicate building structure is subject to strict regulations, prohibiting alterations without special permissions.

The well-known cathedral's existing heating system consisted of three steel shell boilers fitted in the 1960s which received a burner upgrade in the 1980s. Problems on the equipment occurred and were fixed until the boilers finally started leaking and could not be repaired anymore. Robin Bunton from Bunton M & E Services advised replacement boilers were necessary. The cathedral considered replacing them with the same kind, but this was not possible due to current legislation to eliminate inefficient boilers. Instead, Robin recommended Hamworthy's Wessex ModuMax mk3 space saving modular condensing boilers. He comments:

"We have used the Wessex boilers since they were introduced and we know they are a very reliable product. They are space saving, great in refurbishment projects and buildings where you can't change the building fabric, such as St Paul's. Hamworthy also has an excellent after-sales and spares service, with their own engineers, which is why I prefer working with them."

Old pipe system installation preparation

Six months prior to the installation of the boilers, two MagnaClean® filters were installed to clear the heating system from sludge and debris, followed by a system flush.

To create hydraulically separate systems from the new boilers to the existing radiator system, a plate heat exchanger has been installed. This not only divides the primary and secondary circuit, but also ensures a highly efficient heat transfer with minimal losses between the two, thanks to the heat exchanger's large surface areas. It also stops any dirt and debris from the secondary circuit entering the new boilers and pumps.

The complete plant room was fabricated and built off-site at Bunton M & E Services workshop, dismantled and delivered to site reducing the total installation time on-site to just four weeks.

Identifying the right output and matching heat demand

Two Wessex ModuMax mk3 WM254/508V boilers were chosen. Backed up by a 10-year warranty and fitting through a standard doorway, they provided the installation flexibility needed for St Paul's Cathedral.



This combination consists of two stacks with two boiler modules in each, delivering a total output of up to 1,016kW and a turndown ratio of 20:1. The turndown ratio refers to the ratio of maximum capacity to minimum capacity. In St Paul's case, the boilers can deliver any output from 50.8kW up to 1,016kW. This ensures the load is matched to warm the building up, and in periods of low heat demand, the boilers are not constantly cycling and wasting energy. The modules can easily be stacked on top of each other and side by side to offer a variety of installation options.

To meet the hot water requirements, especially during the summer months' peak demand when tourist groups arrive, two Powerstock calorifiers with a capacity of 500 litres each and quick recovery time of 18 minutes were chosen. Robin comments:

"The speed of heat up has greatly improved. Previously it would take a week to heat the cathedral up from cold, but now it only takes one day."

Could we help your special refurbishment project? Get in touch with us to arrange a site visit hamworthy-heating.com/site-survey

Train today for tomorrow

There is always more to learn. That's our philosophy at Hamworthy, and one of the reasons that we like to share what we know with you.

The building services landscape is constantly changing and it can be difficult to keep up. That's why we're firm believers in Continuing Professional Development (CPD). CIBSE refer to CPD as the 'systematic maintenance, improvement and broadening of knowledge and skills'. It's about continually learning and putting into practice what you have learnt.

CPD comes in many forms and at Hamworthy, we offer both CIBSE-accredited CPD seminars and hands-on product training.

Stuart Turner, National Sales Manager, delivers our CPD seminars.

He has worked at Hamworthy Heating for nearly 30 years, and spent his career in the heating industry.

“ Having worked my way up on the tools I know the importance of continuous learning. It's great for me to now be on the other side giving our customers the knowledge we have about the plant room and relating legislation. As well as broadening their skills, they can use this to help advise their own customers – a win-win situation. ”

Steve Rose, Senior Service Engineer, carries out hands-on training.

He has been with Hamworthy for 18 years.

“ I service and commission Hamworthy products every week, so I know the real 'ins and outs' of the products. By training our customers on our boilers, they can be more confident in maintaining their equipment. ”



But who better to hear it from than our customers:

Nev Cluett from David G. Cluett and Son Heating Engineers in Guernsey attended one of our free product training days at our training centre in Northolt. The day combined a CPD seminar with hands-on product training.

“ Thank you for your great delivery of the Hamworthy products and general installation procedures. It was most useful and informative to attend this product training, being handed good advice and knowledge from both Stuart in the lecture room and Steve in the practical area. ”



Luka Shahin I had one day training with Hamworthy already it's was very help full, great staff highly recommended
Like Reply | 1 Like · 1 Reply



COMBINED HEATING SOL @combinedheating · May 17
Great @heatingatwork product training day at Northolt. Looking forward to the next one

Where can you train?

We currently have two training centres in the south – Northolt and Reading. Both are equipped with live firing boilers, a showroom of products and a classroom area.

To find out more and book a place at our next training day visit: hamworthy-heating.com/training/training-centre



Pictures of our new training centre in Reading



Join the conversation...

We're moving!

From the 1st of December 2017, our new address will be:

✉ Hamworthy Heating Ltd, Wessex House, New Fields Business Park, Stinsford Road, Poole, Dorset, BH17 0NF

✉ Email us: marketing@hamworthy-heating.com

☎ Call us: 01202 662500

🖥 Visit us: www.hamworthy-heating.com/boiling-point-magazine



Like us: /hamworthy



Follow us: @heatingatwork



Connect with us: hamworthy-heating-ltd



Watch us: HamworthyHeating



Heating *at work.*



SUPPORT BRITISH MANUFACTURING

British engineering excellence from Hamworthy Heating; the commercial heating and hot water specialists.

