

# TECHNICAL BULLETIN

FOR RESIDENTIAL SURVEYORS

## MOISTURE BALANCING ACT

JAPANESE KNOTWEED

UNSAFE GAS  
INSTALLATIONS

FINDING AND  
CONVERTING LEADS

SAP 10

SEPTIC TANKS



# THE TECHNICAL BULLETIN

FOR RESIDENTIAL SURVEYORS

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Welcome to the Technical Bulletin for Residential Surveyors. This Bulletin is designed for residential practitioners who are members of RICS and/or the Sava Scheme.

Produced jointly by BlueBox partners and Sava here you will find technical articles, updates on convention changes and best practice. We hope you will find this useful in your day-to-day work and we welcome any feedback you may have and suggestions for future publications.

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# MOISTURE BALANCING ACT

## CONSIDERATIONS FOR SURVEYORS

**JAMES BERRY ACABE, BSC HONS, CSRT, CSSW TECHNICAL MANAGER, PROPERTY CARE ASSOCIATION**

A growing population, high property values, housing shortages, and increased occupation density have contributed to marked changes in the way we occupy homes in the UK. Alongside these changes other factors have impacted on the internal environment of homes. For example, the cost of fuel has risen rapidly which has helped to drive measures for greater fuel efficiency supporting international obligations on carbon reduction. These Government backed programmes that deliver insulation and draught proofing have also changed the ability for some buildings to shed atmospheric moisture. As a result, moisture related issues such as condensation and mould are becoming more commonplace in UK dwellings and disputes between landlords and tenants over causes of dampness are happening more frequently.

Moisture held in the air has always been of great importance to all surveyors. Whilst the ventilation industry and building regs has moved a very long way to satisfy the needs of housebuilders, people in older houses and flats still struggle with moisture-related problems such as condensation and mould.

In the past, condensation and mould growth problems have rather flippantly been dismissed as a problem created by the occupant. However, these problems can be complex

with alteration to moisture production impractical. In many instances, adjustments to heating and ventilation are easier than moisture production alterations if there is no obvious excessive source of moisture.

Understanding how to balance moisture production, insulation, energy input (heat) and ventilation as well as a good technical understanding of the science of air moisture and condensation is the key to eliminating condensation and mould.

Condensation and mould growth problems are often multifaceted and a whole house approach should be adopted to establish the root cause of the problem. This should include the entire building envelope and not just the internal atmospheric conditions.

For example, during the external inspection it is vital to identify variations in construction which may result in areas of different thermal properties. For example, outriggers on Victorian terrace properties are frequently constructed of 4.5 inch (112mm) single skin brick work and are a classic example of variations in construction which may contribute to mould growth.

External observations may help assist in identifying possible cold bridges, for example, concrete lintels above windows and doors. Notes of these areas should be made on the site notes and checked internally for temperature differentials.

**Insulation**

The drive to reduce energy use and increase thermal performance in dwellings has, in part, been achieved by the control of draughts and the controlled release of moisture through the fabric of the building. In some situations, this has resulted in properties that are incapable of managing atmospheric moisture during periods of high moisture production. It therefore follows that the planned management of atmospheric moisture through forced or passive ventilation must be designed around the use and occupation style of the dwelling.

Any retrofit insulation measures should be noted during the external checks. Whilst the insulation helps to regulate internal temperature, the surveyor should be ensuring that the insulation is continuous and that no cold bridges have

been formed as a result of discontinuity in the insulation. These are typically found around windows or at the base of walls where the insulation has been terminated above the level of the damp proof course.

**Relative Humidity**

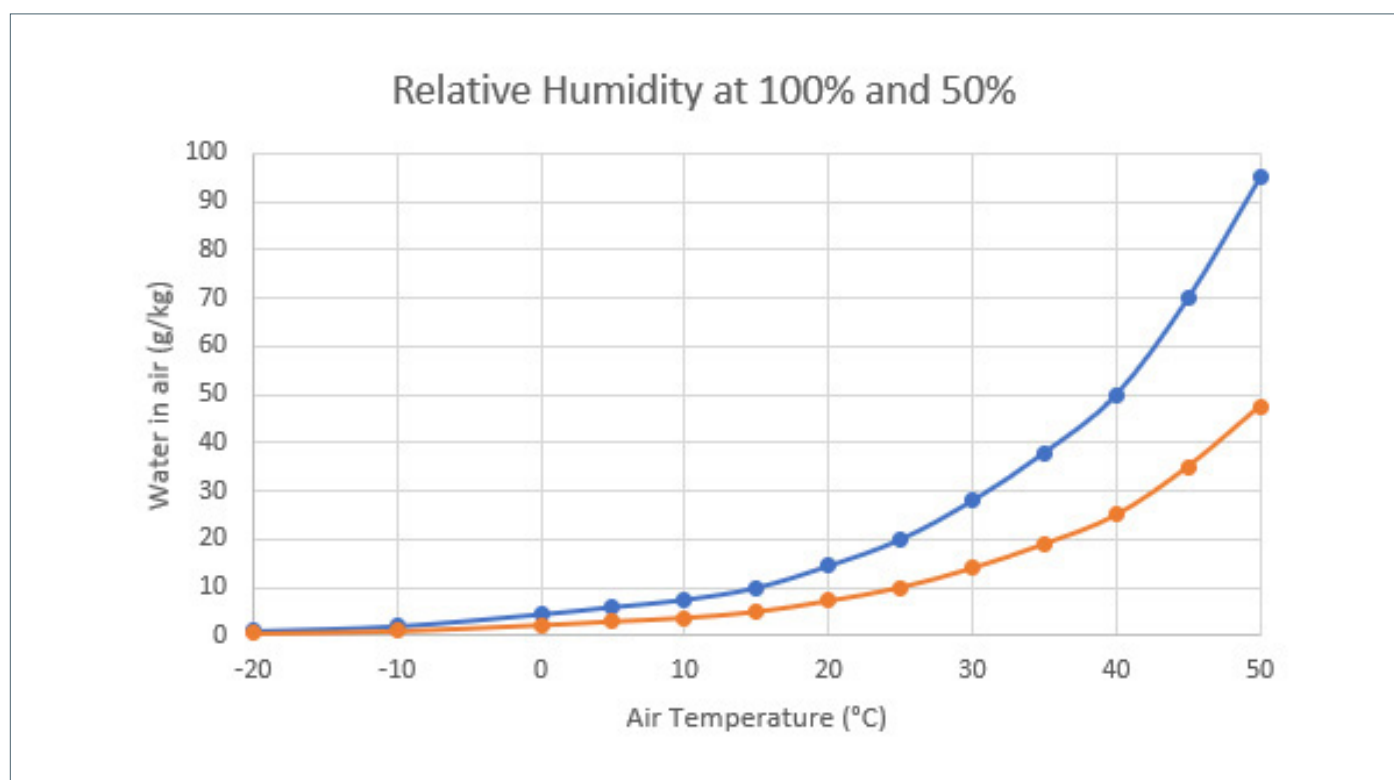
Relative humidity is one of the key factors in mould growth and provides a good indicator of the environmental conditions.

Air normally contains water vapour in varying quantities and its capacity to do so is related to temperature. The warmer the air the greater its capacity to hold moisture. The amount of moisture in the air is usually expressed as Relative Humidity (RH), which is a percentage of the maximum amount of water vapour the air has the capacity to hold at a given temperature.

Air is saturated when it cannot contain any more water vapour at the existing temperature; under these conditions it is said to have reached a relative humidity of 100%.

If the temperature of the air falls until saturation point, the air is at a critical temperature at which it cannot hold any more water. This temperature is known as the dew point. At this temperature it will result in water vapour being forced to condense out as liquid water. Figure 1 shows the variation in the amount of water air can hold across a range of temperatures. We can see that at 20°C a kilogram of air can hold a maximum of around 15g of water. Relative humidity of 50% at this temperature means the air is holding around 7.5g of water. The graph also shows that as the temperature drops the dew point of the air also drops. This explains why warm, moist air ‘hitting’ a cold wall/window will cause condensation.

Figure 1



As RH is governed by temperature, care should be taken when using RH in isolation as variations may be a result of varying temperature and not an increase in moisture.

**Mould**

The main requirement for the development of mould is a source of moisture. However, food, oxygen and temperature are also important. The susceptibility of a material to allow mould growth will vary.

Approved Document F gives an indication that if the relative humidity is sufficiently high for prolonged periods, then mould growth can occur. The table below is taken from Approved Document F and indicates the relative humidity criteria required for mould growth to occur. This table also highlights the significance of time in the potential for mould growth.

Indoor air relative humidity	
<i>Moving average period</i>	Room air relative humidity
1 month	65%
1 week	75%
1 day	85%

One important factor is that these figures are considerably less than the 100% RH that is required for surface condensation to occur. The presence of liquid water is not required for mould growth. With a suitable substrate and adequately high relative humidity levels, mould spores will germinate and growth will occur.

**Using RH whilst surveying**

Armed with the information above it is possible to determine if condensation is occurring at the time of a survey. However, as previously indicated due to the time constraints and the fluctuating nature of RH, long term monitoring provides a better indication if the conditions are consistent enough for mould growth.

With the aid of a surface thermometer and hygrometer to measure wall temperature and relative humidity within a room, it is a comparatively simple matter to establish whether the surface temperature is at or below the dew point, and this will help determine where condensation is possible. Due to restricted airflow in corners and behind furniture, these areas are typically cooler and would be a logical first place to take surface temperature readings. Taking readings from the centre of the wall will not necessarily be representative of these areas. It therefore goes without saying that a hygrometer and surface thermometer are essential pieces of diagnostic equipment for any surveyor who evaluates defects in the built environment.

**Vapour pressure and moisture production**

Vapour pressure or equilibrium vapour pressure is the pressure at which water vapour above water is in thermodynamic equilibrium with its liquid state. At a higher

pressure the water vapour would condense. See Figure 2.

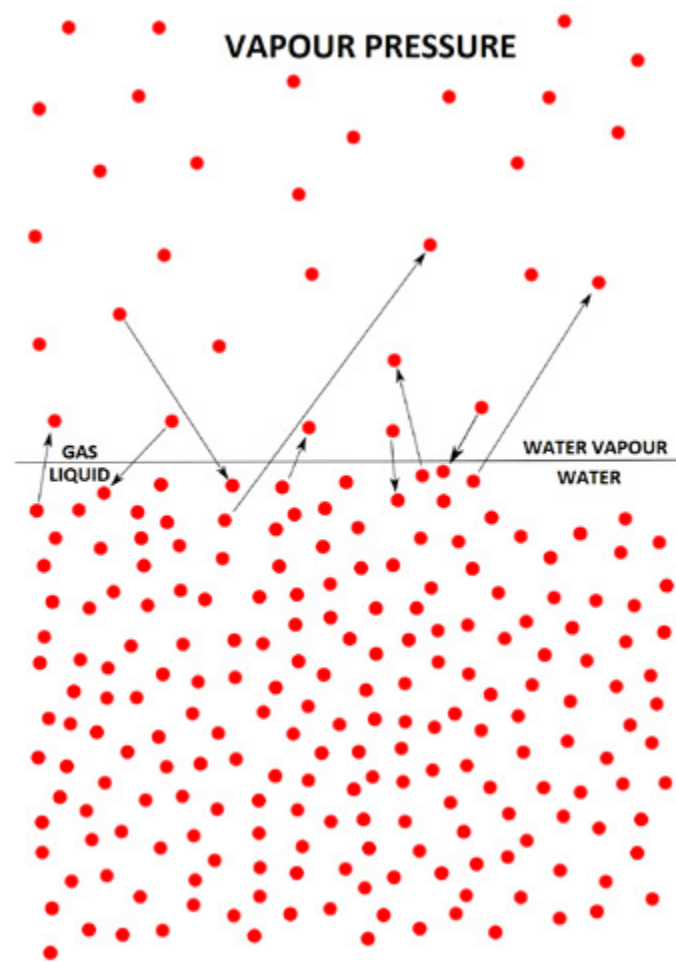


Figure 2

Unlike relative humidity, vapour pressure represents a quantifiable amount of moisture, not a proportion, and can be used to determine levels of moisture production in relation to ventilation. This can be determined by establishing the internal relative humidity and temperature and using a conversion factor to determine the vapour pressure. This exercise is repeated with external relative humidity and temperature.

Subtracting the external vapour pressure from the internal will provide a vapour pressure differential. Due to moisture production created by human activity in winter months within the built environment e.g. showering, cooking etc, moisture levels within the indoor environment are normally higher than external.

Average vapour pressure differentials of 0.45kPa (kilopascal) might be acceptable, although other data may be required to build up a more detailed picture. Below 0.45kPa would typically be considered “dry” or acceptable where ventilation balances moisture production. Above 0.6 kPa would be considered “wet occupancy.”

It is critical to remember that RH and vapour pressure data obtained during the course of a snapshot survey will also be limited in its nature. Furthermore, it is rare that the surveyor is on site at the optimum time when the conditions for

condensation and mould growth are occurring. In addition, the use of purge ventilation such as opening windows is commonly used when an inspection is anticipated which results in data which is not reflective of the occupant's day to day living. Data logging over extended periods of time can provide better quality information and help to build a more accurate picture of the typical moisture production within the property.

### Ventilation

Ventilation plays a vital role in the control of humidity. Failure to adequately ventilate a property properly can result in indoor air quality issues including condensation and mould growth. On the other hand, too much ventilation may result in heat loss and reduced energy efficiency.

The amount of fresh air required will be dependent on the dwelling and the number and lifestyle of occupants within it. An appropriate supply of fresh air is also important to control pollutants and to ensure the safe and efficient operation of some combustion appliances i.e. gas fires etc.

### Building Regs

Approved Document F – Means of Ventilation is perhaps the least enforced of all the building regs, which seems a little strange when we consider the significant impact it can potentially have on the health of the occupant.

The requirements in Building Regulations Approved Document F have made strides in reducing the problems in the modern housing stock. However, houses that predate the current 2010 version of this document (that's the vast majority of the UK housing stock) may have inadequate ventilation.

In theory, properties built after 2010 should comply with the Building Regulations and be provided with adequate means of ventilation. The reality is that there is very little enforcement of the regulations, and problems in properties since this date may arise.

A logical place to start in post-2010 properties with mould would be to see if the system has been installed and commissioned in accordance with Approved Document F. A record of this should have been provided to the occupants.

Judging the right amount of ventilation can be difficult – essentially the only guidelines which are available are in Approved Document F. Ideally a surveyor should always be equipped with a hygrometer to determine the efficiency of a ventilation system.

### Ducting

A number of recent studies have found that ducting is one of the single biggest causes of ventilation failing to meet the minimum standards with flexible ducting being one of the worst offenders.

### Heating

The heating system can play a significant role in dampness problems and should be able to maintain constant air and surface temperatures. This will assist in the prevention of problems associated with excessive moisture. A modest but constant background heat is preferable to intermittent heating since this will help to maintain a higher ambient

temperature in the fabric of the building. The surveyor should take note of the type of system and location of heating elements. During a “snapshot” survey it may be difficult to determine problematic heating regimes, whilst long term monitoring will provide a better picture of the heating regime.

Different heating methods pose different problems, but the inconsistent use and nature of some heating methods can be one of the biggest causes of problems with condensation and mould growth.

Heating the air alone is unlikely to be a satisfactory solution, not only on grounds of cost but also of practicality. Unless cold surfaces are eliminated, condensation at some point is inevitable. Any remedial action, therefore, must involve lowering the moisture levels and the elimination of cold surfaces.

### Never one dimensional

Condensation and mould growth problems should never be considered one dimensional. A surveyor must consider the entire building envelope as well as a number of internal parameters. The heating regime plays an equally important role to the ventilation and likewise with moisture production.

This article has focused solely on investigation rather than remediation and for good reason. These problems can be complex, and we should be moving away from the idea that a “one shot kill” is the best way forward and place greater value in long term monitoring. This approach is frequently desirable as the better the quality of diagnostics, the more effective the remediation strategy that can be adopted.

### James Berry Bsc Hons ACABE

James is the Technical Manager at the Property Care Association, the trade association representing specialists across the UK that deal with damp control and waterproofing, timber preservation, structural repair and invasive plant control.



# JAPANESE KNOTWEED

## WHERE ARE WE NOW?

DR DAN JONES PHD, MSC, BSC, GCIEM ADVANCED INVASIVES

Japanese knotweed has a demonstrable impact on the built environment and the native ecology and environment of the UK. Following the House of Commons Science and Technology Committee report, this article takes stock of where we are and how our approach to knotweed may change in the future.

### Perception and Reality

Few invasive species capture the attention of the general public in the way that Japanese knotweed has in the UK. Public perception of the issue is not improved by hysterical headlines such as ‘The dreaded alien eating your garden and home... but don’t dare try to kill the Japanese knotweed’<sup>1</sup> on the one hand, and contrarian declarations on the other, ‘Is Japanese knotweed driving you wild? Don’t curse it – cook it’<sup>2</sup>.

The truth lies somewhere in between these polarised positions. Japanese knotweed has demonstrable (Figures 1 and 2), though it can be argued, somewhat overstated impacts on the built environment<sup>3</sup> and knotweeds have well-proven negative impacts on UK native ecology and the environment.<sup>4</sup>, <sup>5</sup> Eating is certainly not recommended as a control method as the plant accumulates heavy metals and may have been treated with herbicide (rendering it toxic); further, it won’t actually

control the plant as invasive knotweeds possess an extensive rhizome (root) system that will take decades of hard work (and knotweed crumbles!) to deplete of resources.



Figure 1: Japanese knotweed causing superficial damage to a wall in Cardiff. In this case, it was likely that contaminated soil was included in the mortar.  
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1 Derbyshire, D (2013). Mail Online. Available from: <https://dailym.ai/2YKjUlw> [Accessed 26/01/18]

2 Sanderson, D quoting Fowler, A (2018). The Times. Available from: <https://bit.ly/2YCTEt4> [Accessed 30/05/18].

3 Fennell M, Wade M & Bacon KL (2018) Japanese knotweed (*Fallopia japonica*): an analysis of capacity to cause structural damage (compared to other plants) and typical rhizome extension. PeerJ 6:e5246; DOI 10.7717/peerj.5246.

4 Dawson, FH & Holland, D (1999). The distribution in bankside habitats of three invasive plants in the U.K. in relation to the development of control strategies. *Hydrobiologica* 415: 193-201

5 Bailey, JP, Birnóvá, K & Mandak, B (2009). Asexual spread versus sexual reproduction and evolution in Japanese Knotweed s.l. sets the stage for the ‘Battle of the Clones’. *Biological Invasions* 11: 1189-1203.





Figure 2: Japanese knotweed rhizome (root) growth causing the collapse of a section of wall in Stranraer (courtesy of Brian Taylor). © The Knotweed Company 2019

While it is easy to highlight misconceptions and deliberate distortion of the issues within the news media, Japanese knotweed is a complex topic that crosses many different fields of expertise, ranging from ecology, herbicide chemistry and civil engineering through to the property and legal sectors.

### Biology

In the UK, invasive knotweeds spread principally by the movement of the rhizomes (root material). Rhizomes are modified stems which run underground. They strike new roots down into the soil, but they also shoot new stems up to the surface. This characteristic of rhizomes represents a form of plant reproduction. The rhizomes are also very efficient plant larders, in effect long term energy and nutrient stores. As seed does not germinate in our relatively mild and wet winters, it is rhizomes that cause the plant to spread and it only needs a small section of the rhizome for new growth to be successful.

Because of this method of reproduction, rivers and people are the main means by which the plant spreads. The knotweed rhizome is transported, either unintentionally or occasionally maliciously, via watercourses or in soil. In addition, it has been discovered that in some circumstances, even where herbicide-based control appears to have killed the aboveground parts of the plant, the belowground rhizome is still alive in a dormant state, from which it can still regenerate and regrow if treatment is halted too soon.

For this reason, killing knotweed is not quite so cut and dried. When you kill other plants (such as a tree or a buddleia), when it dies it does not come back. Knotweed on the other hand might just be ‘dormant’ and it is for this reason that we made the statement that managing Japanese knotweed is about long term control and management, not eradication.

### Japanese knotweed and property – a potted history

Japanese knotweed has been affecting the UK property market since the 1930s, where it devalued a property in Cornwall to the tune of £100 and earned it the moniker of ‘Hancock’s Curse’. It is worth bearing in mind that this occurred just 50 years after knotweed escaped from cultivation in Maesteg, Wales in 1886.

Through the 1980s and 1990s, legislation was introduced by Government with the intention of slowing the relentless spread of Japanese knotweed. The legislation reflects the biology of the plant. Through the 1990s and 2000s legal restrictions were introduced on the movement and disposal of Japanese knotweed contaminated soil.

However, in our opinion a lack of clarity about how knotweed should be managed using herbicides (and other control and remediation methods) resulted in some lenders overcorrecting on the knotweed issue. Today, lender positions still vary widely from outright refusal where knotweed is present in or near a property, to lending only when a knotweed management plan and insurance-backed-guarantee (IBG) is in place.

In 2012, RICS UK published an information paper entitled ‘Japanese knotweed and residential property’ that introduced a risk assessment framework for Japanese knotweed. This pragmatic framework included a proximity threshold for knotweed growing within seven metres of habitable structures (the ‘7 metre rule’), combined with an appraisal of actual damage to structures. Four risk categories were defined, with the most severe (Category 4) encouraging ‘further investigations’ by qualified surveyors, to ensure that valuation and lending decisions were based on reliable evidence.

### Legislation Summary

Japanese knotweed is subject to legislation, some of which is relevant to discussion of the effects in the built environment:

- Japanese knotweed is listed in Schedule 9 of The Wildlife and Countryside Act 1981—this legislation makes it an offence to plant Japanese knotweed or cause it to grow in the wild
- However, it is not illegal for Japanese knotweed to be on private land and there is no legal obligation to remove or control knotweed on private land. There is also no requirement to report that Japanese knotweed is present on the land. That said, allowing contaminated soil or plant material from any waste transfer to spread into the wild could lead to a fine of up to £5,000 or a prison term of up to two years. Privately, actions by landowners of adjacent properties seeking damages should Japanese knotweed be allowed to spread onto their property are, of course, well known.
- Japanese knotweed is classed as ‘controlled waste’ so must be disposed of safely at a licensed landfill site in accordance with the Environmental Protection Act (Duty of Care) Regulations 1991. This does not just apply to the plant material above ground. Soil containing the rhizome root material may be regarded as contaminated and, if taken off a site, must be disposed of onsite by encapsulation or deep burial (to a depth of at least 5 metres) or offsite at a suitably licensed landfill site. Section 33 of the Environmental Protection Act states that it is an offence to deposit, treat, keep or dispose of controlled waste without a licence.

It therefore goes without saying that having Japanese knotweed on land carries ‘risk’, hassle and cost.

### The House of Commons Science and Technology Committee

Because knotweed is such a complex issue covering legal, property valuation and liability, herbicide chemistry, civil engineering and ecology issues, the problem was acknowledged by Government and in late 2018 a House of Commons Science and Technology Committee Inquiry was launched – ‘Japanese knotweed and the built environment’.

A range of professional and commercial organisations was included in the Committee's enquiry, including 'Advanced Invasives', which was invited to present both written and oral evidence to the enquiry.

The enquiry published its findings in May 2019<sup>6</sup>. It is hoped that the key recommendations of the report, which focus on cross-disciplinary academic and industry research, will help to demystify Japanese knotweed for UK homebuyers and the wider property industry.

The Committee report concluded that:

- Despite the anxiety it can cause householders, latest research suggests that knotweed causes no more 'damage' to property than other disruptive plants
- However, it is particularly difficult to eradicate, and effective control requires a multi-season herbicide management programme
- There is a risk that treated plants will regrow
- There is surprisingly little research on the physical effects of knotweed on the built environment
- The Environment Agency should convene a meeting with major knotweed remediation firms to explore how a dataset could be assembled to contribute to this ongoing research
- Mortgage lenders in other countries do not treat the plant with the same degree of caution so Defra should commission a study of international approaches in the context of property sales to inform discussion of this issue
- RICS and the Law Society should consult on a revision of the wording on the Property Information Forms in particular to determine if there is a need to declare previous problems with the plant if the plant has been treated by appropriate excavation and there has been no regrowth within a given period of time
- The RICS risk assessment has enabled lenders to lend on affected properties where there is a treatment plan backed by an insurance guarantee in place
- The RICS 7-meter rule is a bit of a blunt instrument and a more nuanced and evidence-based risk framework is needed and they hoped that this work would be completed before the end of the year
- Government should produce additional guidance on dealing with litigation that results from dispute between landowners due to Japanese knotweed

As we know, the RICS Japanese knotweed risk assessment framework was somewhat overtaken by events unfolding in common law knotweed cases across the UK.<sup>6,7</sup> While high profile cases such as *Williams & Waistell v Network Rail Infrastructure Ltd.* attract headlines in the media, these represent only a subset of those settled out of court. Against this backdrop of growing legal liability, property surveyors have increasingly practiced more defensively. Consequently, the RICS framework which was intended as a descriptive framework to better reassure lenders has become a prescriptive label, whereby lenders may automatically reject loans on properties within 7 metres of a knotweed infestation.

### Where does this leave property surveyors?

Following the recent House of Commons enquiry, RICS is now heading the Japanese Knotweed Leaders Forum, to review industry knotweed guidance. However, we believe this remains some way off and even when agreed, it is widely acknowledged

that surveyors will still be required to identify knotweed during property surveys. Getting this right is essential for minimising surveyor legal risks in this area.

### How do you identify Japanese knotweed during a survey?

Identifying invasive knotweeds in the UK can be problematic for non-specialists. To begin with, there are four different species of knotweed:

- Japanese knotweed
- Dwarf knotweed
- Giant knotweed
- Bohemian knotweed

Though each of the four species share many common features, they are often confused with native UK weeds and garden plants, even by contractors within the knotweed remediation industry. Additionally, the appearance of invasive knotweeds changes through the year – particularly in the winter months, when the leaves have fallen and all that remains is the dry, dead stems (Figure 3).



Figure 3: Japanese knotweed growing along the banks of the River Taff in Cardiff; (A) in the summer and (B) during winter, following die-back.

© Daniel Jones 2019

Identification of invasive knotweeds is tricky at the best of times. This is made more difficult as many property vendors are aware that at the present time divulging the presence of knotweed on their property<sup>9</sup> could reduce its marketability and sale value. Consequently, knotweed may be intentionally

<sup>6</sup> House of Commons Science and Technology Committee Inquiry: Japanese knotweed and the built environment (2019). Available from: <https://bit.ly/2vZIU5F> [Accessed 16/05/19].

<sup>7</sup> Clargo, J. (2018). Japanese knotweed nuisance in the light of *Waistell and Smith v Line*. Available from: <https://bit.ly/2M3go42> [Accessed 11/11/15].

<sup>8</sup> Creer, A. (2018). Oh, that Knotweed! Sorry, didn't I mention it?. Available from: <https://bit.ly/2WfqRxp> [Accessed 11/11/15].

<sup>9</sup> The Law Society TA6 property information form and LPE1 leasehold property enquiries form.

disguised (indeed Sava has investigated several claims against surveyors where this has evidently been the case). Figure 4 highlights two examples of this in Southampton and Bristol, respectively. In both cases, concrete has been used to unsuccessfully cover knotweed growth – at Advanced Invasives we know of examples of bark chip, gravel and plastic coverings also being used for this purpose.



Figure 4: Japanese knotweed growth from unsealed gaps in laid concrete; (A) Southampton and (B) Bristol.  
© Daniel Jones 2019

To complicate identification further, invasive knotweeds look very different following herbicide application, even if this has been successful. Figure 5 highlights two very different growth forms of Japanese knotweed following treatment with glyphosate-based herbicide. These growth forms are not only

difficult to identify but are also low growing and often obscured by growth of other vegetation, making spotting them difficult.



Figure 5: Two different deformed Japanese knotweed growth forms following treatment with glyphosate-based herbicide in Cardiff. Would you spot these?  
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**Next Steps**

We look forward to receiving the revised industry guidance from RICS but in the meantime Advanced Invasives is exploring with Sava a series of professional development courses and training content leading to smaller competency based qualifications designed to assist surveyors with the identification, survey and appraisal of invasive knotweeds in the property context.

**About Dr Dan Jones  
PhD, MSc, BSc, GCIEM**

Dan Jones is the Managing Director of Advanced Invasives and also an Honorary Researcher at Swansea University, with over ten years’ experience across the ecological sector. He founded Advanced Invasives to bring evidence-led thinking to the forefront of the commercial management of invasive plant species and is one of the UK’s leading authorities on the strategic control of Japanese knotweed and the ecological dynamics and mechanisms of non-native plant invasion.



At Advanced Invasives, Dan leads the development of in-house best practice for the management of Japanese knotweed across large infrastructure and heads up the novel research into herbicide effectiveness and sustainable use. He is chief expert witness and a sought-after speaker on Japanese knotweed ecology.

## How Sava is Supporting the Surveying Profession with their Training and Development needs

You probably know that Sava has been delivering the Diploma in Residential Surveying and Valuation for the past 5 years. The Diploma continues to be extremely popular with firms of all sizes who are looking to upskill staff or recruit from a new pool of surveying talent.

After talking to employers it has become apparent that many firms have staff who are skilled in focussed areas but need additional training in other areas. For example, you may have a RICS qualified surveyor who is able to carry out valuations but lacks enough construction and pathology knowledge to carry out HomeBuyer Surveys. It is to help people like this that we have developed several, new, smaller qualifications.

- Diploma in Residential Surveying - An in-depth training programme for those who wish to undertake residential condition surveys. Ideal for those who are already a member of the RICS but lack a construction and building pathology background.
- Certificate in Residential Surveying - A training programme for those who wish to undertake residential condition surveys and gain knowledge on residential construction and pathology with limited assessment. Ideal for those returning to the residential surveying sector.
- Certificate in Residential Valuation - A qualification for existing professionals (e.g. RICS or CIOB members) who now wish to offer valuations on residential property. Mapped against the RICS Valuer Registration Scheme.

In response for the need for all residential professionals and others to be able to identify Japanese Knotweed and other problem plant species, new for 2020 will be:

- Japanese Knotweed (and other invasive species) - An online training course to give you confidence in identification throughout the year. This is essential for everyone involved in the sale and management of land and property.

Hilary Grayson, Head of Surveying Services at Sava, says:

“The world is rapidly changing and talking to industry and listening to our customers reminds us that we must continually develop our range of products and services so that we can continue to support the Residential Surveying Industry. The Certificate in Valuation was a significant milestone for us, as it’s the first qualification we have created as a completely online and app-based learning experience using our newly developed educational platform ‘Sava Learn’. Modern learning culture is changing dramatically, and we feel that starting to utilise technology to not only enhance the overall learning experience but to also enable complete freedom of movement when it comes to when or where people choose to consume their learning time is going to be vital to any busy professional. We are delighted to be looking at how more of our training offerings can be delivered this way in the future and look forward to working with Dan Jones to create an interactive online course on the identification of Japanese Knotweed.”

Joe Arnold, BSc (Hons) MRICS Registered Valuer, Managing Director at Arnold & Baldwin Chartered Surveyors says:

“At Arnold & Baldwin we recruit top quality candidates from a variety of backgrounds. We recognise the transferable skills from other industries and professions, such as estate agency.

The knowledge our current Sava alumni [who have completed the Diploma in Residential Surveying and Valuation] possess is very impressive. We want all our surveyors to have the same level of knowledge. We are currently putting 3 members of staff through the Certificate in Residential Surveying”

To find out more about these qualifications please visit [www.sava.co.uk](http://www.sava.co.uk) give our course advisors a call on 01908 442158 or email us at [hello@sava.co.uk](mailto:hello@sava.co.uk).



# UNSAFE GAS INSTALLATIONS

## UNDERSTANDING AND IDENTIFYING

ANDY FLOOK BUSINESS DEVELOPMENT DIRECTOR, SAVA

Negotiating your way through a property whilst giving due consideration to any gas installation can be a tough challenge, and while a Gas Safe registered engineer is sufficiently qualified to inspect gas installations, it is worth residential practitioners ensuring a high level of appreciation and understanding of what a safe installation should look like, and more importantly what an unsafe installation looks like.

### Where to start?

Aside from the gas safety installation and use regulations, which underpin much of the legislative requirements around gas installation, there is also a normative reference document called '[Gas industry unsafe situations procedure](#)'<sup>1</sup>, which is specifically used by gas engineers to interpret and decide on required action based on the severity of any unsafe situation. It's a useful document for anyone working in the built environment.

The following insight is very much a brief, snapshot interpretation of the procedures, and should in no way be given precedence over the legislative document.

### Legislation

The 'Gas safety installation and use' regulations encompass all areas of gas safety in a domestic dwelling (they do not cover commercial property, unless there are areas of

<sup>1</sup> <https://www.gassaferegister.co.uk/media/2622/igem-g-11-gas-industry-unsafe-situations-procedure-april-2018-amendments.pdf>

a commercial property which are legitimately used as sleeping accommodation).

As you might imagine, it's a wide-ranging document but for the purposes of this article, I place emphasis on Regulation 29 which states:

"(9) Where a person performs work on a gas appliance he shall immediately thereafter examine –

- (a) the effectiveness of any flue;
- (b) the supply of combustion air;
- (c) its operating pressure of heat input or, where necessary, both;
- (d) its operation so as to ensure its safe functioning"

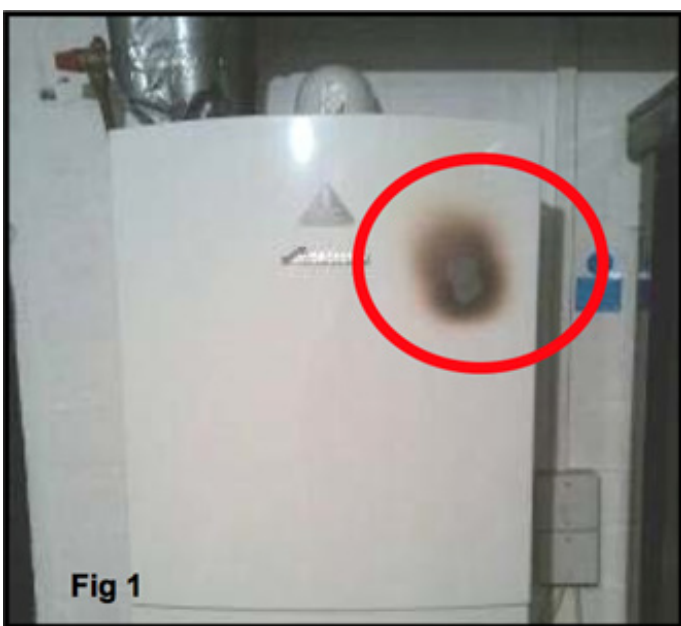
This is important because, for the most part, where any installation has suitable flue configuration to exhaust products of combustion and the appliance installed (if required) has an adequate supply of air to fuel the combustion process and is burning the right amount of fuel with no leakage of gas into the atmosphere, it's likely an installation that will not cause harm to any homeowner and

will work efficiently (subject to a regular servicing regime).

From a surveying perspective, this may be difficult to establish without a full commissioning procedure taking place, which you may not be qualified to undertake or may not be within the remit of the service or survey being carried out. However, there are several visual inspection activities which could help inform a professional opinion.

Appendix 5 of the 'Gas industry unsafe situations procedure' defines some specific visual inspections which can assist in identifying an unsafe installation operation.

**Signs of distress** – Are there any signs of distress on the gas appliance/surrounding area (e.g. discolouration/heat damage etc.) See figure 1 below.



The gas fire is showing signs of spillage of the products of combustion, suggesting that there is either inadequate ventilation in the room to assist in drawing fumes up and out of the flue/chimney, or perhaps the flue/chimney has a blockage which is preventing the flow of products out of the property. Again, without further inspection or evidence that a repair has been made and the discolouration was pre-existing, this would have to be deemed immediately dangerous.

1. **Stable/secure** – Is the appliance installation stable and secure? (e.g. will the appliance remain fixed and has it been installed in a manner that will not result in it becoming unstable?) See figures 3 and 4 for some examples.



Figure 1 and 2

Figure 3 and 4

These are relatively extreme examples. You will note the boiler shows clear discolouration without needing to remove the casing. This is a clear sign of heat damage from inside the appliance which would be considered as immediately dangerous and further investigation would be urgently required.

2. **Location** – Is the gas appliance installed in a suitable room and/or space as per regulations? For instance, an open flued appliance installed in a bathroom or shower room, or a flueless appliance installed in an undersized room would not conform to the regulations.

The majority of flueless appliances in homes are gas

cookers, although you may also come across flueless gas fires and single point water heaters. Considering a gas cooker installed in a kitchen as an example, it would need to conform to the room and ventilation requirements in figure 5 below:

Type of appliance	Maximum appliance rated input limit (net)	Room volume (m <sup>3</sup> )	Permanent vent size cm <sup>2</sup>	Openable window or equivalent also required <sup>(A) (B)</sup>
Domestic oven, hotplate, grill or any combination thereof <sup>(C)</sup>	None	<5	100	Yes
		5 to 10	50 <sup>(D)</sup>	
		>10	Nil	

(A) Alternative acceptable forms of opening include any adjustable grille or louvre, hinged panel or other means of ventilation that opens directly to the outside air. This is additional to the permanent vent requirement.  
 (B) Where no openable window direct to outside is available, other products shall be sought (see 7.4) Building Regulations advice should be followed, see 7.4 (Note: clause 7.4 is reproduced below).  
 (C) The appliance, unless a single burner hotplate/boiling ring, shall not be installed in a bed sitting room of less than 20m<sup>3</sup> volume.  
 (D) If the room or internal space containing these appliances has a door which opens directly to the outside, no permanent opening is required.

Figure 5

**3. Flueing** - If the gas appliance is flued (either open flued or room sealed) is there provision for adequate methods for the removal of the products of combustion to the atmosphere? Figure 6 below shows the ventilation requirements for flued gas appliances. A gas engineer would use this guide to accurately determine if the existing size of vent installed is adequate to provide combustion air for the appliance (this

on the appliance without removing the casing, exemplified in figure 7 below, or it can be taken from the installation

Diagram 32 Free areas of permanently open air vents for gas appliance installations (other than decorative fuel effect fires or flueless appliances)

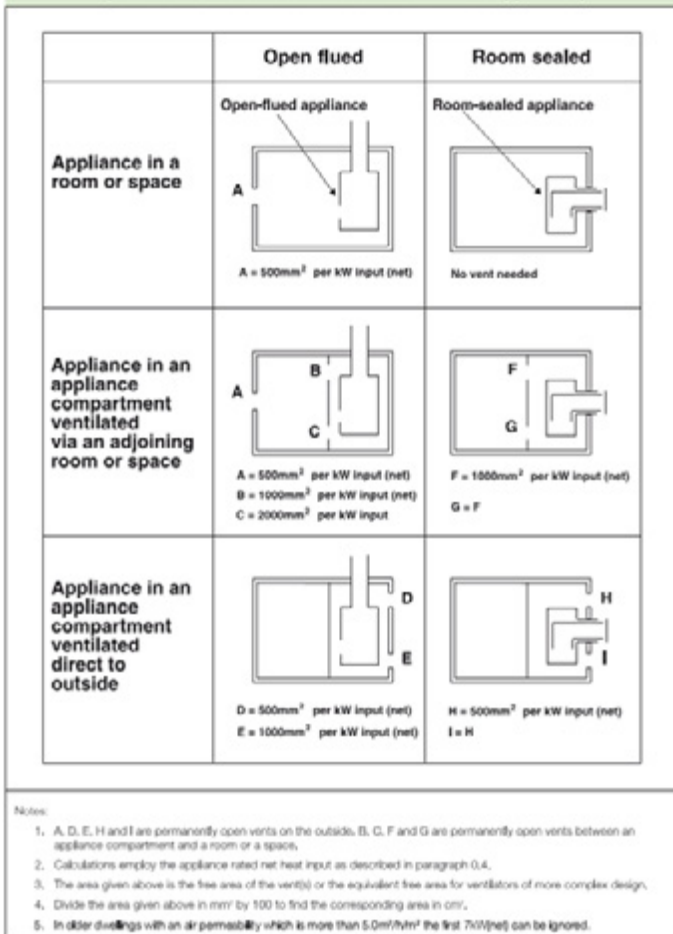


Figure 6

does not apply to decorative gas fires).

You will note that it is calculated using the net kW input of the appliance in question. This information may be visible

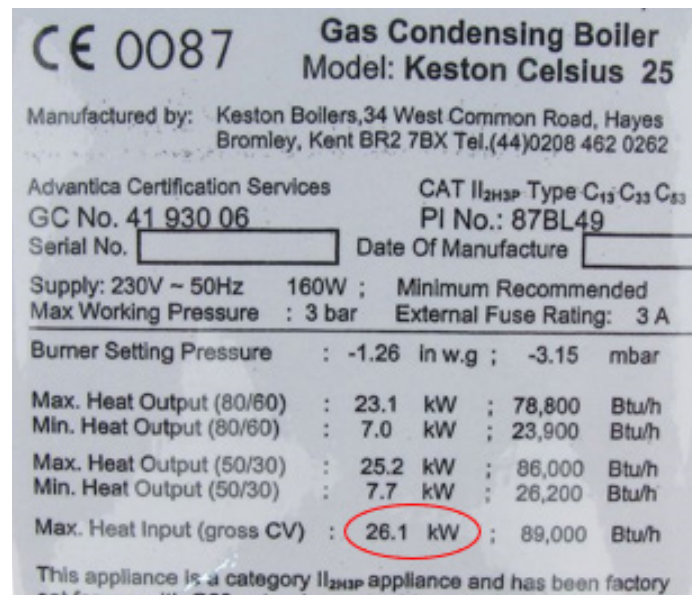


Figure 7

Appliance type	13	33	Connections		
Appliance Category	CAT I 2H		Gas Supply	- 2	
Heat Input	Max	Min	Central Heating Flow	- 2	
	kW	33.76	10.2	Central Heating Return	- 2
	Btu/h	115,200	34,840	Pressure Relief Discharge	- 1
Heat Output	(Non Condensing 70° C Mean Water Temp)		Condensate Drain	- 1	
	Max	Min	Outer Case Dimensions		
	kW	29.30	8.79	Overall Height inc Flue Elbow	- 1
	Btu/h	100,000	30,000	Casing Height	- 8
Heat Output	(Condensing 40° C Mean Water Temp)		Casing Width	- 4	
	Max	Min	Casing Depth	- 3	
	kW	31.05	9.6	Clearances	
	Btu/h	105,980	32,880	Both Sides	5mm
Max Gas Rate (Natural Gas)	(After 10 Mins)		Above Casing	200mm	
	Btu/hr	100,000	80,000	Below Casing	200mm
	m <sup>3</sup> /h	2.95	2.36	Front (For Servicing)	500mm
	ft <sup>3</sup> /h	104.2	83.3	Front (In Operation)	5mm
				Weights	kg
				Packaged Boiler Carton	54.7
				Packaged Flue Kit	3.6
				Weight Empty	49.4
				Installation Lift Weight	41
				Recommended System	

Figure 8

manual (figure 8).

Using the information highlighted, you can determine the ventilation requirement for a specific appliance. Where the boiler badge (figure 7) relates to the appliance installed and is situated in a room with ventilation directly outside, using the table in figure 6 again, we can determine that the appliance requires 500mm<sup>2</sup> (5 cm<sup>2</sup>) of ventilation per kW. As the 'Max Heat Input' is 33.76 the calculation will be 5 x 33.76 = 168 cm<sup>2</sup>.

**4. Flame Picture** – If the flame picture is visible on the boiler, is it correct for the appliance type?

Many modern boilers have no way of viewing the flame picture whilst burning, however, many more traditional boilers do. If you can see the appliance and it is in operation, can you see a crisp blue flame? This demonstrates the gas and air mixture is sufficient to adequately oxygenate the flame. When the flame is starved of oxygen, the flame picture can start to turn much more floppy and yellow. For a radiant gas fire, cooker or boiler, a yellow, floppy flame indicates a combustion issue.

An exception to the rule applies to decorative fuel effect gas fires. As they are designed to provide a realistic 'coal like' flame, they tend to have a much higher gas rate and so effectively burn much 'richer' to provide a floppier flame.

**Conclusion**

Clearly, wherever there is any level of doubt or uncertainty, then recommending the need for a competent gas engineer will be essential, however, like all aspects of effective surveying, it is building up a story of all these incremental elements that starts to better inform you as to what the issue might be and what course of action might be required.

However, I believe it is also essential that surveyors and other property professionals have a basic understanding of how services work and can recognise the indicators that suggest they might be dangerous. While it is unlikely that installations with the failings illustrated in this article would have a gas safe certificate, it is not impossible. Things can change – and the certificate is only valid on the date of the inspection. In such a situation, an occupant might be at risk of injury or worse, and as property experts I believe we owe owners and occupants alike a duty of care to be able to point out things that need urgent attention.

**Andy Flook**

Andy heads up our market development and customer management team. Andy's career started as an apprentice engineer with British Gas, after which he set up his own nationwide engineering training company and certification body for the Energy and Utility industry before joining Sava in 2013.

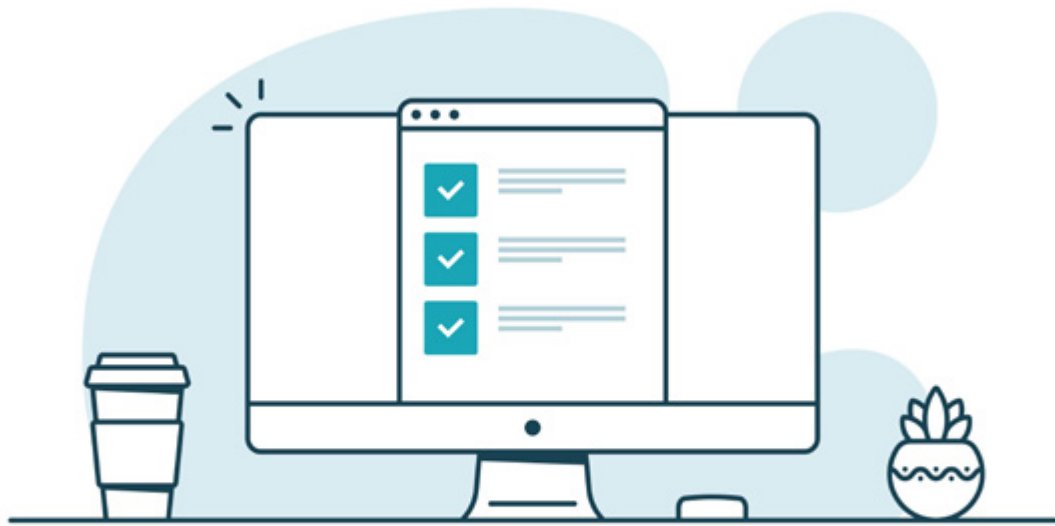


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# FINDING AND CONVERTING LEADS

## ARE YOU WORKING SMART?

**MATT NALLY** FOUNDER, SURVEY BOOKER

Are you spread thinly and having to manually source, compete and convert leads? In this article, Matt Nally, Founder of Survey Booker and Surveyors Near Me has put together three simple steps that could help you boost your leads and increase your conversion rates with next to no costs involved.

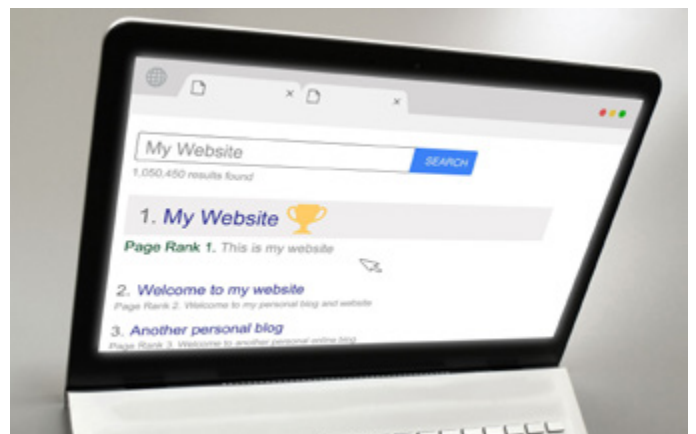
As a tech focused business specialising in the surveying industry, I have identified a few areas that may need some improvement. For those wondering if this is going to be a technical piece, do not worry. I have broken our tips, tricks and knowledge, backed by national statistics, into bite-sized and digestible pieces.

If you are doubtful about the changes you could make, our guide includes small tweaks that you can make to traditional lead acquiring methods, designed to help accelerate the level of leads you receive and improve conversion rates.

Before we start, I ask you to consider this article from two perspectives – that of your business and your customers. We live in a customer-centric age where Trustpilot reviews can make or break a business and where work hours are extended to allow for busy daytime schedules. Anything you could possibly want in a lifetime is available to buy online with next day delivery and our phones now offer 24/7 access to information and services from anywhere in the world. With all these changes in place, supposedly bettering the “user experience”, my first tip is to contemplate your own customers’ journey.

### **STEP 1. WEB PRESENCE & SEO**

Sometimes websites are not a priority for a business, and they underperform because of the lack of planning that has gone into them. There’s a misconception that you’ll need to throw further money at a website to gain any traction up the Google ladder, but here are some ways you can climb up the Google rankings with very little time, money and effort.



### Google and potential customers

We are assuming you are online and part of the www revolution but if not, then in my view, this is essential for a modern business.

As many surveyors' websites have been created with generic informative copy offering the same explanations of the services they provide, Google has no reason to rank your website over another. The words within the website aren't always "enriched" – or as the techies like to say, "search engine optimised" (SEO). Small edits such as the locations and services you cover on your home page will make a world of difference. So, I recommend adding those as a priority. Also, make sure your content is original because Google loves this.

Another key trick is to check what keywords your customers are searching for the services you offer in your area. Whilst you might come top for your own company name, most customers don't know about you yet, so you need to be on page 1 results for other phrases. You can easily find these out via an online "keyword planner". Once you've found the most searched for phrases, drop them into your website copy ready for the next Google sweep (search engine bots trawl sites roughly once a month). You'll need to use your chosen phrases enough times so Google can recognise that a page offers detail about a given subject, but don't overuse them because if it doesn't read well Google (and potential customers) will mark you down. Be patient and you'll be pleasantly surprised at the results within two to three months.

### Keep your site fresh

Google favours sites that put up regular content, so this is the perfect excuse to show the world your expertise and indulge in a little self-promoting content from time to time. Every couple of weeks post a blog entry, for example, on a common issue you find on surveys that your customers might find frightening. Damp springs to mind as it is a big keyword that many customers find horrifying and search for, but they may not need to be so worried. Your post does not need to be complex, just a snappy title containing the keyword with no more than a 2-minute read on Problem, Opinion and Solution and/or advice, for example. Remember to mention the main keyword (topic) several times naturally throughout the post. The goal is to improve traffic because, the more traffic to your site, the higher you rank.

### What to do with those leads

Take a moment to review your website and ask yourself what is the call to action for potential clientele? Are they required to make a further call or email or to type away in an online "contact us" form? It's best not to dress up a contact form with the words "Get a Quote" as a lot of customers can tell if it's a quote form or not, and if they can't you can leave them feeling misled. Consider if the current method requires further work (for both you and the customer) to convert the lead and if they must wait for you to call or email them back about the next steps. Having reviewed hundreds of websites, we find this is often the case, taking us back to "manually source, compete and convert leads". If you want to rid yourself of the timely tasks within your day allowing you to focus on surveying and surveying alone whilst enhancing your customers' journey from start to finish, then keep reading.

### Nitro boost and minimise workload

The consumer can now source, view, get a mortgage, make an offer and buy a property all on an iPad from the comfort of their home. So, getting your online setup correct makes your life and your customers' easier.

Integrated facilities such as online quote, buy and tracking services are now available for surveyors looking to modernise and offer a service similar to those available in the home buying process – and the offerings do not stop there. Referral accounts can be integrated into your site allowing estate agents and conveyancers to easily refer your services and track the customer's progress; CRMs for surveyors and administrators can provide private file notes which can be accessed on the go; and there are online messaging facilities, report uploading and progress tracking to make life easier for you and the customer. There is even business and user-friendly technology that generates leads, increases conversion rates and integrates with your accountancy software directly from your website.

### Our summary is simple

Using all these advances in technology means not only is your website enriched, the customer journey is too. The peak online search hours are between 6pm and 11pm, so you need a website that can service your customers and save you time without having to work those unsociable hours. With a little investment and considering the long-term benefits, we say let technology do it for you. So, go ahead and check out what tech facilities are available to you and your business.

### STEP 2. ADVERTISING AND PAID LEADS

Let us now consider the traditional 'paid print' advert, which today may not prove to be so pocket-friendly in comparison. According to the marketing pro's, paid print has had its day, but if it's not broken why fix it? Local property related publications do have a market and if it works for you, keep it going. But, if you're splashing the cash, why not use your knowledge gained from step 1 and put some serious consideration into paid google ads as this may prove to be a much more targeted and cost-effective way of promoting your business. The joy of ad campaigns, other than the ease of setting them up, is that you can easily work out costs, set daily caps and monitor the reach of your advert(s) via your personal account. Check out the costing relative to your keywords and working area radius. Small budgets can go far – just



use those keywords in your adverts and you'll appeal to the audience you want in the areas you cover. Plus, you'll help to save a few trees.

**Are your listings pointing you in the right direction?**

Going back to tradition, paid print directories and directories in general are increasingly a thing of the past. The Yellow Pages is a shadow of its former self (no one is going to win an award for tearing that in half these days). Google is the world's directory now with 92.15% of people in the UK using it as their go-to search engine, so list with as many free, online directories as possible. Most directory listings link back to your website and this magically propels your own website's ranking on Google. Keep your address, phone number and website consistent because Google can mark you down if each listing is different. If you're following these steps, you won't need an all singing and dancing, upgraded listing, the free one will be sufficient, although be aware - they may contact you to up-sell and I generally say steer clear, but this is up to you.

**The paid leads race**

Many surveyors use pay per lead services and whilst they create opportunities and generate leads, there are a few evident drawbacks. For example, you pay for each lead regardless of the outcome; it's competitive, requiring the ability to promote yourself and your services; and lastly, it's a short-term solution with no long-term benefit - once you stop paying, the leads stop coming! Knowing all of this but appreciating the power of paid lead referrals, we have outlined a few tips on how you can better compete and convert your "pay per leads" with greater ease.

Quick communication is key and statistics state that calls made within the first 5 minutes of receiving a "hot" lead results in a 100 times higher success rate than those of calls made in the first 30 minutes. Even a quick "introduction call" arranging to speak at a later stage helps as these stats show it isn't so much that you have to be a salesman but just that you have to be first.

**Quick Tip:** If you can't get through, have a standard cut and paste message saved on your phone and once you've left a voicemail, send a quick copy of your text with a name personalisation at the top. In most cases, this will be seen before someone has the chance to pick up a voicemail and it also allows your customer to search keywords in their message folders when they are ready to call back so be sure to add "survey" or "surveyor" and/or the survey type they have requested. The seconds it takes you to carry out this step may just be the thermos flask for your hot lead!

**In summary**

Internet advertising may be daunting, and you may be bombarded with generous offerings to assist you with such things as SEO and Google Adverts from John the super specialist in Calcutta, but don't be fooled! It really can be as simple as I have described and something you are more than capable of creating and implementing yourself.

Print directories are very straightforward, but we say park the pennies and review those Google or Facebook ads, making sure you get your business and services listed on every FREE Tom, Dick and Directory.

As for advancing your paid leads, as the time goes by so does your chance of converting. So, remember it's a race and you are in it to win it. This is an inspirational article not a piece on empowerment, though we can't guarantee once you've followed these crucial self-promoting steps you won't experience feelings of self-content and satisfaction!

**STEP 3. REFERRALS AND LEVERAGING RELATIONSHIPS**

Referrals can be a bit like marmite and surveyors and estate agents each have their own views on them. The way to approach them and decide if you want to offer incentives is entirely up to you and we are not here to try and convince you either way, however we have some pointers that may help you decide.



**Let's start with the basics**

The business card: an ancient method that can unlock doors and build bridges - in the metaphorical sense of course. When collecting keys or greeting someone at a property, hand over a card. If you have a logo, use it. Make sure your card is identifiable and says what you can do for them (not just who you are).

**Get talking**

People do business with people and if you are considering acquiring referrals and/or offering incentives, talking is a nice way to ease yourself in. If you were an agent, which surveyor coming to your office would you work with; the one that smiles and takes time to speak or the one that seems rushed and just wants to get in and out? With that in mind, engage, encourage and communicate. When you drop off keys, let them know your next steps because agents like to offer vendors timescales as this in turn improves their level of service.

Now you're on a good footing with the agents, on your next visit arrange to see the branch manager. This is your opportunity to ask the question. By clearly portraying your ability, services, knowledge of the area and willingness to break down this barrier of communication between surveyor and agent, they'll be happy to consider the proposal.

**Consumer Protection from Unfair Trading Regulations 2008**  
 The National Trading Standards Estate Agency Team (NTSEAT) has produced guidance on the interpretation

and implementation of the Consumer Protection from Unfair Trading Regulations 2008.

In summary, the regulations are as follows:  
Failure to disclose referral arrangements may render an estate agent liable for criminal prosecution under the CPRs and/or action by NTSEAT for warning or prohibition under the Act.

Ultimately, only a court may decide whether any particular set of circumstances amounts to a breach of the CPRs. However, NTSEAT offers the following recommendations as a statement of desirable practice:

An estate agent should disclose in plain terms

- (a) The price of its services, including any “compulsory” extras; and
- (b) Where a referral arrangement exists, that it exists, and with whom; and
- (c) Where a transaction-specific referral fee is to be paid, its amount; and
- (d) Where a referral retainer exists, an estimate of the annual value of that retainer to the estate agent or its value per transaction; and
- (e) Where the referral is rewarded other than by payment, an assessment of the annual value of the reward or the value of the reward per transaction.

Disclosure should be made in writing, to a seller as part of standard terms and conditions and to buyers by being incorporated into or annexed with the property particulars before any ancillary services are promoted.

Further guidance can be found here:

<http://bit.ly/2LXXGcq>

It is also worth noting that conflicts of interest and referral fees are covered in the consultation currently underway on the RICS draft Home Survey Standard.

**Quick Tip:** Sending Christmas cards to those who often refer you work and small gestures such as bottles of wine or Easter eggs for the office go a long way and hand delivering will always give you an advantage; they remember your pretty face, charisma and charm. This will help to keep the relationship alive.

### The golden carrot

If you are still having an inner battle of ethics, remember incentives are being paid, maybe not by you but more than likely by the next. Also, just because you pay an agent for a lead, it does NOT mean they have any say or bearing on the quality of your work, nor do they have any impact on your allegiance to your client. It is like a lead generation site, except you aren't paying to compete with others.

Work out how you wish to structure your incentives. You can choose to add a fee on top that goes to the agent or pay it from your normal fee so that the customer pays the same as going directly to you. Either way, the agent must make this clear to the customer under new regulations (see

above). Whatever you choose, communicate to the branch manager that it is an incentive to their team and that you're seeking to build relationships with reputable local agents to ensure the surveying aspect of any transaction is as smooth and as transparent as can be.

### Let technology assist

Getting the agreement is the easier part but making it the normal process across a branch or network of branches is the challenge. People inherently forget things until it becomes routine, but technology can make it easier for agents to integrate referrals into their routine for example, by being able to see who has instructed, who has had reports and more. Services such as Survey Booker allow referral accounts to be integrated into your website so estate agents and conveyancers can easily refer your services and track customer progress. Larger agencies have formalised their online referral process due to the ease of passing on details and tracking progress and the same setups are now within the reach of small and medium businesses. Incorporating technology doesn't have to mean paying incentive fees, the additional quality of service and customer journey alone may be enough to clinch partnerships.

### To summarise

There you have it, our three effective steps on how to win more business and generate more leads. Addressing our friend, the tech atheist, that wasn't so bad right? And if you don't yet have a website, I hope this has inspired you to join the online revolution. I hope this guide has given you an insight into how the internet, alongside integrated technology, can assist and improve your business and that the tips will better your odds of success rates. Lastly, I hope these tips will better your everyday work life and customer journey!

### About Survey Booker

Survey Booker provides online technology that gives surveyors the tools to boost leads, take care of customers and halve their time on administrative tasks.

Their unique software integrates with the surveyor's website to provide a whole host of features and benefits for both surveyor and customer alike. Developed by surveyors for surveyors, the facility gives greater visibility of website traffic, helps boost conversion rates and reduces the time spent on sales and admin.

From quote and purchase of the services, all the way through to automated lead and customer nurturing, they can incorporate a host of web traffic conversion tactics. Survey Booker enables progress tracking for consumers and referrers ensuring a consistent customer journey. Referral accounts enable easy promotion of services supported by accounting software integrations, automated payments and e-signed terms of engagement.

Contact Survey Booker to find out more: [surveybooker.co.uk](http://surveybooker.co.uk)

### Surveyors Near Me

Powered by SurveyBooker, Surveyors Near Me is a success-based comparison site for residential surveyors. They are launching a free directory for RICS, RPSA and Sava residential surveyors in the next couple of months to help increase exposure – pre-register for your free account and listing now: [www.surveyorsnearme.com/manage-surveys/registration](http://www.surveyorsnearme.com/manage-surveys/registration)

# KEY DATES

## DIPLOMA IN RESIDENTIAL SURVEYING AND VALUATION

The Diploma in Residential Surveying and Valuation provides an innovative way to train residential surveyors. Part-time learning is delivered over 24 months and offers direct entry into RICS at Associate level. Both small independent firms and the larger corporate employers are supportive of the Diploma and have been extremely impressed at the level of training offered and resulting qualified surveyors.

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**BIRMINGHAM** - 4th September 2019

**YORK** - 23rd October 2019

**MILTON KEYNES** - 21st November 2019

**SOUTHAMPTON** - 12th December 2019

## DIPLOMA BRIEFINGS

Find out more about the Diploma at a briefing. You can book your free place here: [www.sava.co.uk/find-out-more](http://www.sava.co.uk/find-out-more).

**Southampton**, Wednesday 4th September, 11am-1.30pm  
Holiday Inn Eastleigh, Leigh Road, Eastleigh, SO50 9PG

**Milton Keynes**, Wednesday 11th September, 11am-1.30pm  
Kents Hill, Timbold Drive, Milton Keynes, MK7 6BZ

**York**, Wednesday 25th September, 11am-1.30pm  
The National Agri-Food Innovation Campus, York, YO41 1LZ



## CHANGES TO HEATING PATTERNS

**DR LISA BLAKE** TECHNICAL MANAGER, SAVA

In our last Technical Bulletin, we described the changes to the hot water calculations for SAP 10. In this issue, we will be taking a closer look at the changes to the heating patterns.

### Background

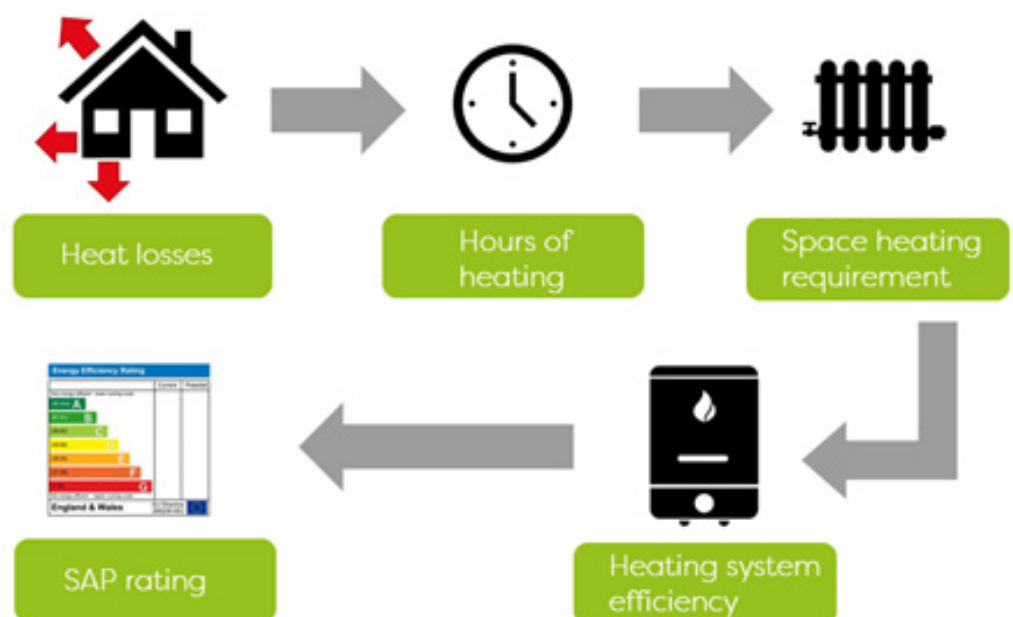
As explained in our [previous article](#), the Standard Assessment Procedure (SAP) methodology maintained by BRE is due to be defined and adopted following changes to the building regulations. Therefore, the current version, SAP 2012<sup>1</sup>, will eventually be superseded by SAP 10<sup>2</sup>.

### Heating patterns in SAP

In simplified terms, you can see in figure 1 (right) how the heating patterns fit into the SAP calculation.

SAP model (simplified)

Figure 1 – SAP model heating calculation (simplified)



<sup>1</sup> <https://www.bregroup.com/sap/standard-assessment-procedure-sap-2012/>

<sup>2</sup> <https://www.bregroup.com/sap/sap10/>

The dwelling's heat losses are calculated first using the U-values of the windows, walls, roof and any ventilation losses. To work out the space heating requirement, the calculation then uses the hours of heating: the number of days, how long for and to what temperature. Additional heating hours will increase the space heating requirement. The methodology then uses the heating system efficiency to calculate the energy requirement, with fuel costs and CO<sub>2</sub> emissions factors, and the SAP rating and EI rating are generated.

In SAP 2012, the heating season runs for 8 months from October through to May. The SAP model sets the zone 1 temperature (the dwelling living area) at 21°C and the zone 2 (the rest of the dwelling) at 18°C. On weekdays, the hours of heating are 9 hours – from 7am until 9am and from 4pm to 11pm. On the weekends, there is a single heating period of 16 hours a day from 7am until 11pm. This is based on the assumption that occupants are at work Monday to Friday and at home on the weekends.



Figure 2 – SAP 2012 heating pattern

In SAP 10, the heating seasons and zone temperatures will not change, and the weekday heating hours will continue to be 9 hours per day. However, the weekend heating hours will be reduced to 9 hours per day, instead of 16 hours. This means that there will be 14 hours less heating per week during the heating season.

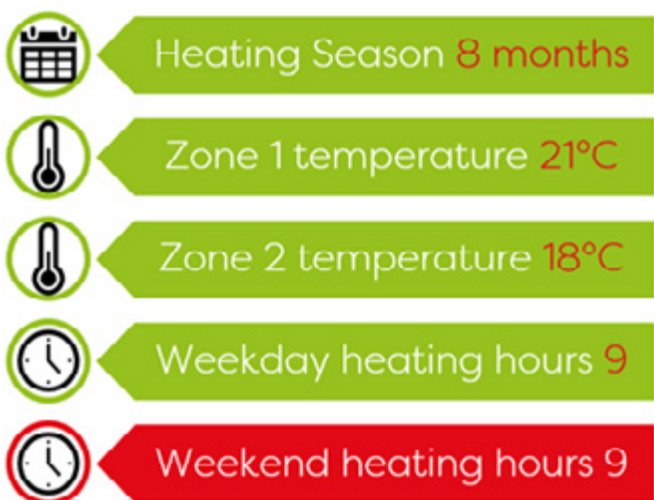


Figure 3 – SAP 10 heating pattern

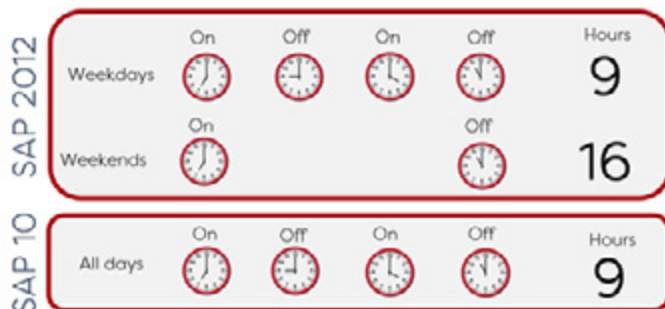


Figure 4 – SAP 2012 heating patterns vs SAP 10 heating patterns

### Why change?

The SAP heating patterns have not changed since the first edition of SAP which was published in 1993. In 2011, the **Energy Follow up Survey (EFUS)**<sup>3</sup> was carried out to supplement the **English Housing Survey (EHS) 2010/2011**<sup>4</sup> which compiled information from 13,300 homes. The EFUS collected data from a sub-set of 2616 households that were part of the EHS, and the report was published in 2014. The households had temperature loggers placed in three separate rooms which recorded room temperatures every twenty minutes for around one year, and electricity consumption monitors were installed to provide information on how much electricity and gas was actually being used. In addition, a sub-sample of 79 homes had electricity profiling equipment installed which examined patterns of lighting, appliance and electrical cooking use. Using these measures, the survey was able to accurately analyse actual gas and electricity usage for these households and data from both the EFUS and the EHS were combined, providing a richer data source for analysis.

The survey results showed that nearly 70% of respondents reported they did not have a different heating pattern on the weekend, probably reflecting the change in modern living and working patterns. For instance, more companies are offering flexible working hours and the evolution of technology and meeting software allows people to work from home. On the weekends, people may be out shopping, especially since many shops are open later and on Sundays. The fitness industry is continually growing, and cheaper gym memberships and 24-hour gyms mean more people are able to join the gym and go in out-of-office hours. Interestingly, the survey also reported that there was only a small difference between daytime occupied households who had the heating on for 9.4 hours a day and households that were not at home during the day who had the heating on for 8 hours. This is contrary to the belief that householders who were at home all day had the heating on all day.

### How much difference does it make?

The 8-month heating season means there are 69 weekend days and 174 weekday days. Using SAP 2012 heating patterns, that adds up to 2670 annual heating hours. Using the SAP 10 heating pattern, there are 2187 annual heating hours, reducing the heating hours by 483 annually, giving an 18% reduction.

<sup>3</sup> <https://www.gov.uk/government/statistics/energy-follow-up-survey-efus-2011>

<sup>4</sup> <https://www.gov.uk/government/statistics/english-housing-survey-homes-report-2010>

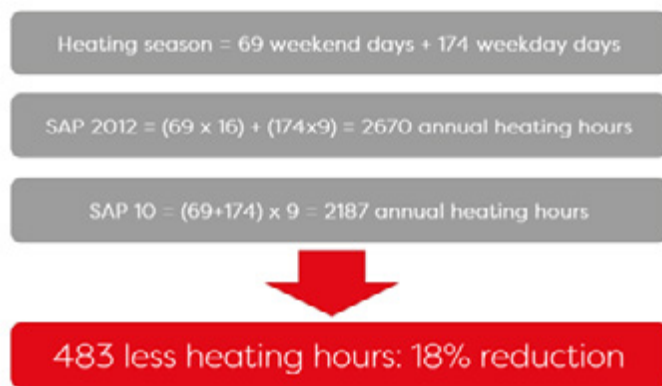


Figure 5 - Heating pattern difference

We were able to estimate the impact on the SAP rating of this change to the heating hours by altering only the heating pattern in the SAP 2012 model. We found that, in isolation, this change to the SAP model increased the SAP rating by 1-5 SAP points, the greater increase for unresponsive heating systems.

With an unresponsive system such as storage heaters, the dwelling is often overheated by overshooting the 21° as the system isn't well controlled. Therefore, the reduction in heating hours will have a bigger impact on such systems.

### Summary

We found that the heating hour reduction in SAP 10 is likely to impact poorly insulated properties with unresponsive heating systems in comparison to efficient properties with a responsive heating system where the increase in the SAP rating was less pronounced. Our analysis looked at the heating pattern change in isolation and found an increase in the SAP. Some of the other additions to the SAP methodology will have a converse effect. You can try SAP 10 for yourself using BRE's iSAP here: <https://www.isap.org.uk/>. Their software enables you to model both SAP 2012 and SAP 10.

Although the SAP 10 specification is published, SAP 10 will not be in use until after the Building Regulations Part L consultation which is expected to take place this year. It is likely that following the consultation, there may be amendments to the published SAP 10 methodology.





# SEPTIC TANKS

## DISCHARGING DIRECTLY TO SURFACE WATER

**TECHNICAL TEAM, SAVA**  
**MIKE RIDGELL MSC, MRICS**

If a septic tank discharges effluent directly to surface water, it will need to be upgraded or replaced by 1 January 2020 or when the owners of the septic tank sell the property, whichever is sooner. This is the result of legal requirements that were issued by the Environment Agency in 2015, under the general binding rules. In this article we summarise how septic tanks work and focus on the rule relating to septic tanks discharging directly to surface water and consider what surveyors should be aware of.

### How do septic tanks work?

As defined in Part H of the Building Regulations, a septic tank 'provides suitable conditions for the settlement, storage and partial decomposition of solids which need to be removed at regular intervals.'

Septic tanks are made up of underground chambers with air vents and a system of pipes. Some septic tanks have one chamber and can be shaped like an onion, others have two chambers. For the purposes of this description, we will describe how a two-chamber system operates.

The first chamber collects new effluent – heavy solids sink to the bottom and lighter waste such as grease floats to the surface. The surface waste is in contact with the air which results in aerobic bacterial breakdown resulting in a crust forming at the top. The air vent allows sewer gases to dissipate to the outside air and lets air in (the more air in,

the better).

The pipes within the chamber work by ensuring the 'crust' or surface layer is undisturbed. As the contents are not in contact with the air, anaerobic bacteria break down the waste resulting in a dense sludge forming at the bottom. In the past, it was common for an animal carcass to be added to provide extra bacteria. Another set of pipes connecting the first chamber to the second chamber allow any excess to flow into the second chamber. It is here where the finer solids are broken down further by anaerobic bacteria, resulting in a partially treated liquid outflow.

Up to this point, the waste has only received a basic level of treatment and, as per the new rules, further treatment is needed before the waste can be discharged either to the ground or to surface water such as a stream, river or ditch. **For the purposes of this article, we will only be**

referring to discharges to surface water.

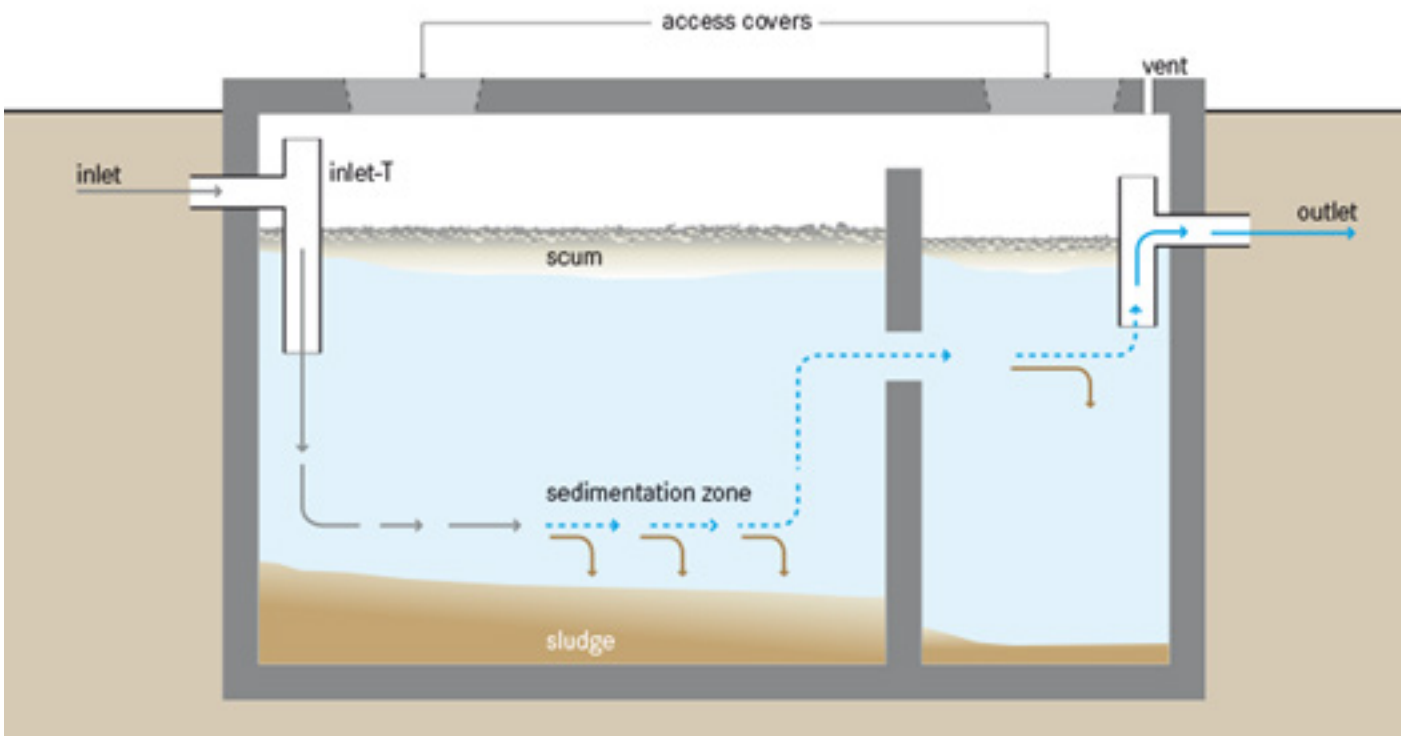


Figure 1 – diagram a of two-chamber septic tank

**Sewage treatment plants**

A small sewage treatment plant or ‘package treatment plant’ treats the waste so it is clean enough to be discharged to surface water (or to ground). The treatment process collects waste in a similar way to septic tanks but is more advanced and often uses electricity to run internal mechanical parts (unlike a septic tank) although bio rock systems can provide secondary treatment without using electricity or mechanical parts.

With a mechanically operated plant, the solids and liquids separate in the primary chamber. The liquid then passes into the biozone and it can be biologically treated using a filter bed, rotating disc media or air injection, for example. By introducing air, aerobic bacteria break down the waste. This is more effective than septic tanks alone and creates a cleaner liquid, allowing it to be discharged into a water course (or to ground).

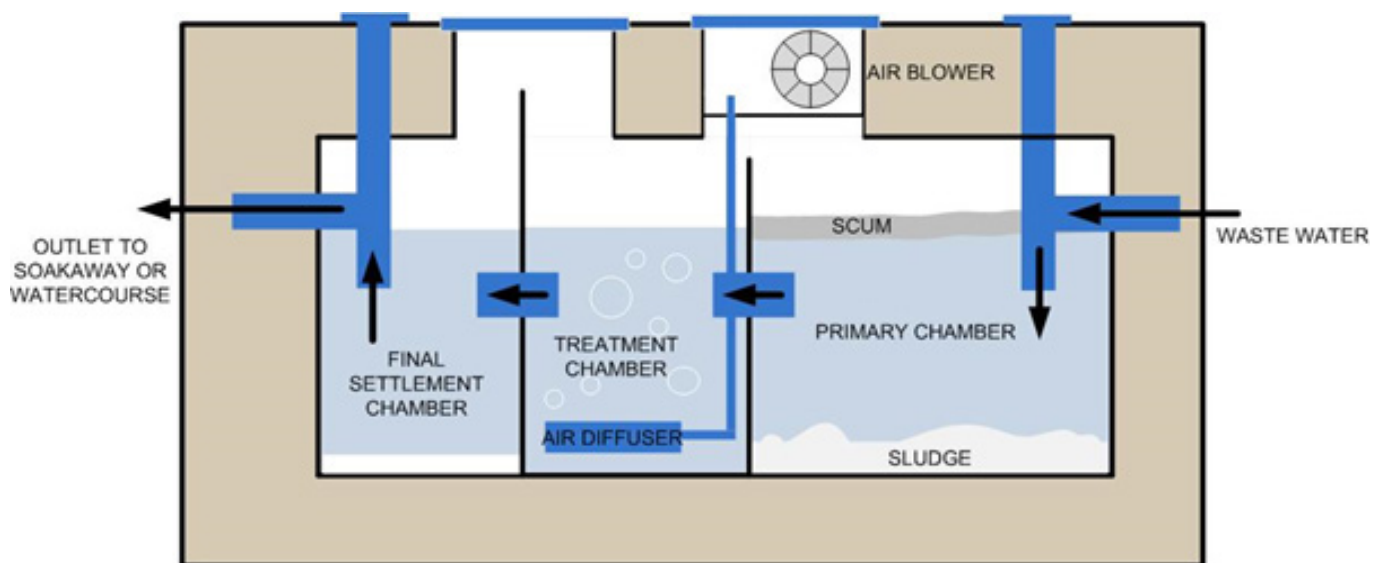


Figure 2 – diagram of a sewage treatment plant

### What are 'general binding rules'?

General binding rules (GBRs) are legally binding requirements in regulations that set the minimum standards or conditions which apply. The general binding rules for small sewage discharges set out the conditions that need to be met in order to be used without an environmental permit and they have been specified by the Environment Agency. The full set of rules for septic tanks or small sewage treatment plants discharging to surface water can be found here: <https://www.gov.uk/guidance/general-binding-rules-small-sewage-discharge-to-a-surface-water>

### What's the correct treatment system?

The GBRs state that discharging effluent directly from a septic tank to surface water is not allowed. The reason for this is to reduce the amount of pollution entering surface water throughout the UK, and ultimately to reduce the pollution entering our bathing beaches.

*"You must use a small sewage treatment plant to treat the sewage if you're discharging to a surface water such as a river or stream. A small sewage treatment plant (also known as a package treatment plant) uses mechanical parts to treat the liquid so it's clean enough to go into a river or stream.*

*Discharges from septic tanks directly to a surface water are not allowed under the general binding rules."*

If a septic tank does discharge directly to surface water, the responsible person will need to replace or upgrade the system by 1 January 2020 or earlier if the Environment Agency establish the septic tank is causing pollution.

The rules also explain: "Where properties with septic tanks that discharge directly to surface water are sold before 1 January 2020, responsibility for the replacement or upgrade of the existing treatment system should be addressed between the buyer and seller as a condition of sale."

If the discharge is directly to surface water, there are several possible solutions:

- Replace or upgrade the system with a sewage treatment plant
- Connect to a mains sewer if possible
- Install a drainage field/infiltration system and then the discharge will be to ground (and therefore the general binding rules relating to discharges to ground will apply)

The homeowner can also apply for a permit if they do not meet the general binding rules; however, permits are only granted in exceptional circumstances. The Environment Agency can provide further information. If upgrading the system by installing a septic tank conversion unit, homeowners should contact the Environment Agency to ensure it meets the required standard and a permit will still be necessary.

### New or existing?

The GBRs explain that if the system was installed and discharging on or after 1 January 2015, the discharge is

'new'. Any system installed before this date is 'existing'. However, a change in discharge from surface to ground or vice versa would be considered a new discharge. In addition, if a new drainage pipe is installed which discharges more than 10 metres away from the existing one or which goes to a different surface water, it would also be considered a new discharge.

If the system was installed on or after 1 January 2015, then planning permission and building regulation approval is required. If permission and approval was not granted, the responsible person must apply retrospectively for both.

You should note there are additional rules for new treatment systems installed and in use on or after 1 January 2015.

### Building Regulations

The Building Regulations 2010, Drainage and Waste Disposal, Approved Document H includes practical guidance with respect to the requirements of Schedule 1 and Regulation 7 of the Building Regulations 2010 (SI 2010/2214) for England and Wales. Section H2 includes guidance on treatment systems including septic tanks, infiltration systems and packaged treatment works. Whilst they have not been changed following the general binding rules published in 2015, new discharges must comply with building regulations as well as the general binding rules.

### The surveyor's role

Chartered Surveyor, Mike Ridgell MSc MRICS, advises how he reports on private drainage:

"If you come across a private drainage system at an inspection, you should conduct a simple risk assessment to try and establish what system is in place and to establish if there is a treatment plant present or not.

If it is a septic tank, you should consider whether it is old or new, the type of system you're looking at, and if it is shared and the components are within the property boundaries and whether there is access to empty it.

Check the chamber cover of what is, in effect, a deep pit and establish if there is a **screwed down or safe** cover to stop a person falling in.

Inspect the area to establish if discharge is to either water or ground. Is there a stream or ditch nearby? It's not as common for septic tanks to be connected to water in my area, but they can be.

You should explain in the report the likely component parts and ask that the legal adviser confirm the legal position. You should also reiterate that the survey is non-invasive and you can only conduct a visual inspection. As you are unable to inspect a buried drainage system, it is likely that you will recommend further investigation which, for a Home Condition Survey, justifies a Condition Rating 3.

You can enquire about the drainage system with the current vendor, although you should not rely solely on this information when informing your client."

## CASE STUDY

Last year, Sava handled a complaint about a Home Condition Survey on behalf of one of our members. The complaint was made because a septic tank was found to be draining directly to a stream at the bottom of the garden. The clients were only made aware of this when they requested a quote from a contractor to extend the drainage system to allow an extra toilet to be installed.

The surveyor did report in the Home Condition Survey about the discharge by explaining that they could not definitively confirm the function of a pipe near the stream. The surveyor confirmed the toilets were flushed and observations were made and there was no indication that any discharge was entering the stream via the pipe or elsewhere. The surveyor also obtained an old Exemption Certificate for the address from a government sponsored website which stated: "Existing discharge to ground of two cubic metres or less", further suggesting that there was a discharge to ground and not to surface water. The vendor also confirmed to the surveyor that the pipe near the stream was not connected to the septic tank. Whilst this would not be relied upon alone, this statement, along with the description on the certificate and the lack of water discharging from the pipe when the toilet was flushed several times, did not give any cause for concern. Nonetheless, the surveyor did confirm that a definitive answer could not be given.

When the complaint was escalated to Sava, we responded to the complainant with our findings, concluding that whilst we sympathise with the situation, the surveyor had not been negligent and reported on the findings within the remit of a non-invasive survey. We also pointed out the requirements of the homeowner as described in the general binding rules which explain that from June 2015, if a homeowner is selling their property, they must tell the new operator (the owner or person responsible for the septic tank or small sewage treatment plant) in writing that a sewage discharge is in place. They should include:

- a description of the treatment plant and drainage system
- the location of the main parts of the treatment plant, drainage system and discharge point
- details of any changes made to the treatment plant and drainage system
- details of how the treatment plant should be maintained, and the maintenance manual if available
- maintenance records if they have them

The complainant responded to say they would discuss the matter further with their solicitors and we did not hear any more. This case shows that, even when a surveyor is diligent, complaints can still arise, so it is important to ensure you have inspected and reported appropriately in order to defend yourself if a problem arises for the client. However, as described above, the seller has a legal obligation to confirm to

the buyer the details regarding the drainage system and the conveyancer acting for the client also has a duty of care to raise sufficient enquiries to the seller regarding the private drainage.

## Other information

Our factsheet on private drainage includes more detail on how private drainage systems work and the maintenance required, which you can download [here](#).

