Who am I?

United Kingdom Water Treatment Association
1976

MY WIFE ANN BOUGHT A WATER SOFTENER
1977
1978
HEAVY 25kg TABLET SALT

LIGHT 8kg BLOCK SALT
HARVEY’S BLOCK SALT SOFTENER
EXPORTING TO EUROPE VIA JOINT VENTURE
6 years experience installing central heating systems

33 years manufacturing and installing water softeners
Why am I here?
I will request the motion

The boiler manufacturers reserve the right to specify the system fill water, but nevertheless recognise that there should be a standard for softened water inhibitors and request BuildCert to prepare a CIAS test method.
IMPORTANT

This boiler has an aluminium alloy heat exchanger. If water system cleaning and/or water inhibitor treatment is used Limited recommend only the use of the products listed below.

Heating System Flushing: As part of the boiler installation and commissioning procedure heating water system MUST be thoroughly flushed of flux residues and debris.

Heating System Cleaning: If boiler is to be installed into an existing heating system where water system sludge/debris is evident, chemically cleanse central heating water system using cleaning products listed below. BS 7593 : 1992 details the steps necessary to clean a domestic heating system. When replacing an existing boiler if possible clean water system before installation of replacement unit.

Heating System Water Treatment: Specify only water inhibitor products listed below. If installing boiler in an existing system any unsuitable additives MUST first be removed by thorough cleansing in accordance with BS 7593 : 1992.

<table>
<thead>
<tr>
<th>FERNOX</th>
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<td>Heating System Cleaner</td>
<td>RESTORER HEAVY DUTY UNIVERSAL CLEANER</td>
<td>X300 UNIVERSAL CLEANER</td>
</tr>
<tr>
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</tr>
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<td>GUARD SYSTEM INHIBITOR</td>
</tr>
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</table>

Any other treatment for this product will render the guarantee of INVALID.

NOTE: ARTIFICIALLY SOFTENED WATER SHOULD NOT BE USED IN THE SYSTEM

This label should not be removed from the boiler

The boiler MUST NOT be operated with this sealing panel removed

L.P.N. 112 334 AD5

Wednesday, 15 June 2011
**Heating System Water Treatment:** Specify only water inhibitor products listed below. If installing boiler in an existing system any unsuitable additives MUST first be removed by thorough cleansing in accordance with BS 7593: 1992.

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X400 SLUDGE REMOVER | SALAMANDER CORROSION GUARD SYSTEM CLEANER |
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MB1 CENTRAL HEATING PROTECTOR  
COPAL CENTRAL HEATING PROTECTOR | X100 INHIBITOR | SALAMANDER CORROSION GUARD SYSTEM INHIBITOR |

ANY OTHER TREATMENT FOR THIS PRODUCT WILL RENDER THE GUARANTEE INVALID.

**NOTE:** ARTIFICIALLY SOFTENED WATER SHOULD NOT BE USED IN THE SYSTEM.

---

**Wow!**

*Why do they say that?*
This is damaging our industry through lost sales and cancelled orders.

Because the plumber tells the customer “You can’t have a water softener”.

Plumbers now believe that SOFTENED water is corrosive.
Hot water loss of efficiency
Softened water maintains efficiency
A band A boiler drops from SEDBUCK A to SEDBUK C in a few weeks in a hard water area.

25% increase in fuel over the life of the boiler see BATTELLE study www.wqa.org/battelle
Why do some boiler manufacturers believe that softened water causes corrosion?
And they politely told me to go and look at BS 7593:1992
BS 7593:1992

Code of practice for Treatment of water in domestic hot water central heating systems

Water supplied via a water soften should not be used in any central heating system unless:

BS 7593:1992

BS 7593:1992

BS 7593:1992
Water supplied via a water softener should not be used in any central heating system unless a corrosion inhibitor specifically formulated for the purpose has been added. Base exchange softening tends to raise the pH of the system water, which is unacceptable where the system contains aluminium, and softened water should not under any circumstances be supplied to such a system.

Wow!
Why did they write that?
So we attended the next BSI revision committee and asked:

“Why had it been included in the previous standard”.

The reply,

“It seemed like the right thing to do”.

Wow!
What was the real reason?
THE TESTING OF CORROSION INHIBITORS FOR CENTRAL HEATING SYSTEMS

P. MUNN

Fernox Manufacturing Co. Ltd, Clavering, Essex, U.K.
“the chelating agents may be able to interfere with the passivation process sufficient to cause active corrosion.”

Wow!

An inhibitor can cause corrosion!
have developed in the cistern can enter the system with the make-up water and produce debris. Such debris can cause blockages and is liable to foul the boiler heat exchanger. Under-floor heating and other systems which operate at lower temperature (below 60 °C) can also be prone to microbiological fouling. Even the high temperature in the boiler heat exchanger might not be sufficient to kill all micro-organisms.

Anaerobic bacteria can thrive in both open and sealed systems fouled with corrosion and other debris, beneath deposits where the temperature might be lower and there is an absence of oxygen. This can give rise to microbiological corrosion of ferrous metals.

5 Treatment of water

5.1 General

In most cases, the quality of the water used in the central heating system is determined by supply to the premises and this will vary across the United Kingdom. Water treatment should be applied to all primary systems except for single feed indirect hot water cylinders.

Consideration should be given as to whether the water is hard or soft, as this might influence the approach to water treatment and the choice of proprietary product. Refer to the manufacturer’s specifications.

5.2 External

Naturally soft waters of low alkalinity or those supplied via a base-exchange resin softener have an increased potential for corrosion and, if they are to be used in any central heating system, a corrosion inhibitor specifically formulated for the purpose1 should be added and properly maintained.

5.3 Internal

To minimize the likelihood of corrosion, scale and sludge formation, the system water should be treated with an inhibitor. Before the inhibitor is added to the system, the first step should be to render the system in a condition free from foulants. Foulants in new systems can include corrosion debris, flux residues, grease, installation debris, metal swarf, solder pieces, stamping oil and welding rod. Existing systems might also contain black magnetic sludge and scale. If microbiological fouling is found within a system, (often detected by the presence of organic slime or a foul odour), the system should be disinfected using a proprietary disinfectant and a biocide added for ongoing protection.

6 Cleansing

6.1 General considerations

Before cleansing, the system should be examined to determine the system configuration and the age and overall condition of components, in order to ascertain the cleansing regime required. For example, the procedure could remove corrosion debris covering pin-holes in radiators and this could result in leaks.

1 Check inhibitor product specification
5.2 External

Naturally soft waters of low alkalinity or those supplied via a base-exchange resin softener have an increased potential for corrosion and, if they are to be used in any central heating system, a corrosion inhibitor specifically formulated for the purpose should be added and properly maintained.

Use the correct inhibitor!
So we wrote to Worcester Bosch again
Can we come and see you?

And they politely told me to go and look at BS 6798:2000
BS 6798: 2000

5.4.3 Corrosion

5.4.3.1 A corrosion inhibitor and biocide shall not be provided where the boiler manufacturer specifies the use of such a product, or where corrosion has been identified as a problem. The inhibitor and biocide application to the boiler and to the system in the system, e.g. fuel, support or alimentary, shall be introduced into the system according to the manufacturer’s instructions and a label indicating that the system has been treated shall be attached to the system. The label shall include the system designation and the date of treatment.

CONSIDERATION AND RECOMMENDATIONS ON 5.4.3.1

Experience has shown that corrosion within a well-designed and installed system is extremely low and inhibitors are not normally required for the general heating system provided that adequate flushing has been carried out in the commissioning stage. If corrosion is identified as a problem, the boiler manufacturer’s instructions should be followed for the prevention of corrosion problems. The use of corrosion inhibitor and biocide application to the boiler and to the system in the system, e.g. fuel, support or alimentary, shall be introduced into the system according to the manufacturer’s instructions and a label indicating that the system has been treated shall be attached to the system. The label shall include the system designation and the date of treatment.

5.4.3.2 Inhibitors and biocides shall not be used where single fuel oil or similar devices, e.g. single fuel emergency power units, are fitted in a system.

CONSIDERATION AND RECOMMENDATIONS ON 5.4.3.2

Design that depends upon air bubbles or an physical barrier between the two circuits could otherwise be from the central heating circuit to contaminate the domestic hot water supply.

5.4.3.3 Water supplied by a water heater shall not be used in any central heating system unless a corrosion inhibitor specifically formulated for the purpose has been added. Softened water shall not be used in the central heating system.

5.5 Gas supplies and pipework

5.5.1 First and second family houses

5.5.1.1 Where a gas service to the premises is to be provided for 1st or 2nd family houses, the gas pipe pressure shall be controlled in the boiler manufacturer’s instructions.

5.5.1.2 Where a service pipe exists, the installer shall confirm with the gas supplier or public gas transportation that the pipe is of sufficient size for the maximum gas rate of the whole installation.

5.5.1.3 When a meter is fitted by a gas supplier or public gas transportation, the installer shall confirm that the meter is of sufficient capacity for the maximum gas rate of the whole installation.

CONSIDERATION AND RECOMMENDATIONS ON 5.5.1.3

In addition to the requirements of BS 6609 or protection, attention should be given to the protection of pipes within the house and in the outside of the house, and the pipes and connections at the meter orGay should be protected against the risk of damage by frost. A suitable method of protection is to wrap the pipe with a protective band.

5.5.1.4 All gas installation pipes shall be sized and installed in accordance with BS 6609 or ISO 15845, as appropriate.

CONSIDERATION AND RECOMMENDATIONS ON 5.5.1.4
5.4.5.3 Water supplied by a water softener shall not be used in any central heating system unless a corrosion inhibitor specially formulated for the purpose has been added. Softened water shall not be supplied to any system that contains aluminium.

Wow!
There it is again.
BS 6798:2009

Specification for installation and maintenance of gas-fired boilers of rated input not exceeding 70 kW net

Was changed.
6.2.1.3 Water supplied by a water softener shall not be used in any central heating system unless a corrosion inhibitor specially formulated for the purpose has been added.

Use the correct inhibitor!
So we wrote to Worcester Bosch again-again
Can we come and see you?

And they politely told me to go and look at the new Building Regs Guidance document.
I admire your tenacity however, now the Building Regulations say what they say, are you fighting a losing battle?
Table 1: Recommended minimum standards for efficiency, system circulation, hot water storage, system preparation and commissioning for gas-fired wet central heating systems (continued)

<table>
<thead>
<tr>
<th>Gas-fired wet heating</th>
<th>New systems</th>
<th>Replacement systems</th>
<th>Supplementary information</th>
</tr>
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<tbody>
<tr>
<td><strong>4.0 System preparation and water treatment</strong></td>
<td>a. Central heating systems should be thoroughly cleaned and flushed out before installing a new boiler.</td>
<td>a. As for new systems.</td>
<td>Inhibitors should be a minimum be BuildCert approved. Limescale can be controlled by the use of chemical limescale inhibitors, combined corrosion and limescale inhibitors, polyphosphate dosing, electrolytic scale reducers or water softeners. The relevant standard for water treatment is BS 7593:2006 “Code of practice for treatment of water in domestic hot water central heating systems”. BS 7593 notes that soft water has an increased potential for corrosion, and this may influence the choice of corrosion inhibitor. Where water is artificially softened, it is advisable to feed softened water not only to domestic hot water heater systems, but also to the boiler primary circuit. In soft water areas, the boiler manufacturer should be consulted for advice. In order to avoid loss and consequent replacement of circulating fluid and water treatment when removing radiators for service or maintenance, it is advisable to install radiator valves that can isolate not only the heating circuit but also seal off the radiators.</td>
</tr>
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<td></td>
<td>b. During final filling of the system, a chemical water treatment inhibitor meeting the manufacturer’s specification or other appropriate standard should be added to the primary circuit to control corrosion and the formation of scale and sludge.</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>c. Installers should also refer to the boiler manufacturer’s installation instructions for appropriate treatment products and special requirements for individual boiler models.</td>
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<td></td>
<td>d. Where the mains total water hardness exceeds 200 parts per million, and if required by the manufacturer, provision should be made to treat the feed water to water heaters and the hot water circuit of combination boilers to reduce the rate of accumulation of limescale.</td>
<td></td>
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<td>e. For solar thermal systems, see Section 11.</td>
<td></td>
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</tr>
</tbody>
</table>
Where water is artificially softened, it is advisable to feed unsoftened water not only to the drinking water taps, but also to the boiler primary circuit.

Wow!
There is is again, with additions!
Table 1: Recommended minimum standards for efficiency, system circulation, hot water storage, system preparation and commissioning for gas-fired wet central heating systems (continued)

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| **4.0 System preparation and water treatment** | a. Central heating systems should be thoroughly cleaned and flushed out before installing a new boiler.  
  b. During final filling of the system, a chemical water treatment inhibitor meeting the manufacturer’s specification or other appropriate standard should be added to the primary circuit to control corrosion and the formation of scale and sludge.  
  c. Installers should also refer to the boiler manufacturer’s installation instructions for appropriate treatment products and special requirements for individual boiler models.  
  d. **Unless the manufacturer gives guidance to the contrary**, where the mains total water hardness exceeds 200 parts per million provision should be made to treat the feed water to water heaters and the hot water circuit of combination boilers to reduce the rate of accumulation of limescale.  
  e. For solar thermal systems, see Section 11. | a. As for **new systems**. | **Inhibitors should be BuildCert approved or equivalent.**  
Limescale can be controlled by the use of chemical limescale inhibitors, combined corrosion and limescale inhibitors, polyphosphate dosing, electrolytic scale reducers or water softeners.  
The relevant standard for water treatment is BS 7593:2006 “Code of practice for treatment of water in domestic hot water central heating systems”.  
BS 7593:2006 notes that “naturally soft waters of low alkalinity or those supplied via a base-exchange resin softener have an increased potential for corrosion and, if they are used in any central heating system, a corrosion inhibitor specifically formulated for the purpose should be added and properly maintained.” Manufacturers should be consulted for advice.  
In order to avoid loss and consequent replacement of circulating fluid and water treatment when removing radiators for service or maintenance, it is advisable to install radiator valves that can not only isolate the heating circuit but also seal off the radiators. |
BS 7593:2006 notes that “naturally soft waters of low alkalinity or those supplied via a base-exchange resin softener have an increased potential for corrosion and, if they are used in any central heating system, a corrosion inhibitor specifically formulated for the purpose should be added and properly maintained.” Manufacturers should be consulted for advice.

Use the correct inhibitor!
The lesson we have learned is

“If you are not at the table, you are on the menu!”
So we wrote to Worcester Bosch again-again-again
Can we come and see you?

They politely replied, Yes you can!
So we finally met;
And Martyn said...
Thank you Martyn

And thank you technical committee for agreeing to see me
Since 1992 you have been told that:

Softened water causes corrosion

Chemical inhibitors prevent corrosion.

I am now going to tell you that:

Softened water does not cause corrosion

Chemical inhibitors can cause corrosion.
My mission today is to present evidence to convince you that

Softened water is not more corrosive in central heating primary circuits

That softened water is better

That all we need is a standard for softened water inhibitors

Especially for aluminium heat exchangers
There is currently no approval scheme for an inhibitor formulated for softened water
A quick survey of the some boiler manufacturers positions
**Heating System Water Treatment:** Specify only water inhibitor products listed below. If installing boiler in an existing system any unsuitable additives MUST first be removed by thorough cleansing in accordance with BS 7593: 1992.

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**ANY OTHER TREATMENT FOR THIS PRODUCT WILL RENDER THE GUARANTEE OF LIMITED INVALID**

**NOTE:** ARTIFICIALLY SOFTENED WATER SHOULD NOT BE USED IN THE SYSTEM

*No!*
Dear Sir,

I can confirm that it is ok to use a water softener with the [redacted] boiler, if you are in a hard water area then this will help with the life span of the heat exchanger in the boiler by reducing scale build up.

Kind Regards
Thank you for your email.

Our boilers are compatible with all types of water softeners and we have tested our boilers with both Fernox and Sentinel inhibitors and cleansing products and both are compatible.

Regards

Technical dept.

YES
Thank you for your enquiry

We do not recommend the use of artificially softened water in the primary side of our boilers, it is acceptable for domestic use.

If at all possible the system fill point should be taken from an unsoftened source. If this is not possible it is imperative that the system corrosion inhibitor levels are correct and are monitored and replenished as necessary.

Using artificially softened water will not invalidate the warranty except for preventable defects that are directly attributable to the use of softened water.

Regards
From: Hugh Peate <PeaH@viessmann.com>
Date: 18 May 2010 11:15
Subject: comp soft
To: shash.k@gmail.com

We recommend that our boilers and central heating systems are filled with softened water in hard water areas. The softener needs to be operating correctly.

Kind regards,
Hugh Peate
Technical Advisor
Viessmann Ltd
Hortonwood 30
Telford
TF1 7YP
01952 675070
Email: peah@viessmann.com
web: www.viessmann.co.uk

Yes!
Different associations have published standard values for the water quality in heating and boiler systems:
The VDI in its Directive 2035, the German Standardisation Institute in the DIN EN 14868, the VdTÜV in datasheet VdTÜV 1453 and 1466 and the Steam Vessel Committee in the TRD 611 [all Germany].
Observing the requirements listed in these instructions is necessary to safeguard your warranty rights.
The manufacturer’s warranty excludes damage due to corrosion and scaling.
Standard values for water quality

The service life of any boiler, as well as that of the complete heating system is influenced by the quality of the water. In many cases, the cost of a water treatment facility is less than the cost of repairing defects on your heating system. For filling and commissioning, a mobile water softening device can be hired from Visumann.

Heating systems with rated operating temperatures up to 100 °C (VDI 2035)

Prevention of damage due to scaling

The depositing of scale (calcium carbonate) on the heating surfaces should be prevented. For heating systems with operating temperatures up to 100 °C, the VDI guidelines 2035 Sheet 1 "Prevention of heating system damage - scaling on ZrH and hot water heating systems" apply (in some countries together with the following standard values (see also the full explanations in the original guidelines).

<table>
<thead>
<tr>
<th>Total output in kW</th>
<th>Total alkaline earths in mmol / l</th>
<th>Total hardness in °d</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 50</td>
<td>no requirements</td>
<td>no requirements</td>
</tr>
<tr>
<td>50 to 200</td>
<td>≥ 0.2</td>
<td>≥ 0.3</td>
</tr>
<tr>
<td>200 to 600</td>
<td>≥ 0.5</td>
<td>≥ 1.3</td>
</tr>
<tr>
<td>≥ 600</td>
<td>≥ 0.8</td>
<td>≥ 1.5</td>
</tr>
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</table>

The standard values are defined as follows:

- The volume of fill and top-up water will not exceed three times the water content of the heating system during the service life of the system.
- The specific system volume is less than 20 kWh output. In multi-boiler systems, the output of the smallest boiler.
- All measures to prevent corrosion on the water side in accordance with VDI 2035 Sheet 2 have been implemented. Soften the fill & top-up water in heating systems with the following conditions:
- The total of alkaline earths in the fill & top-up water exceeds the standard value.
- Higher fill & top-up water volumes are expected.
- The specific system volume is in excess of 20 kWh output. In multi-boiler systems, apply the output of the smallest boiler.
- When designing the system, observe the following:
- Install shut-off valves in different sections. This prevents the risk of damage to the entire heating water in case of repairs or for every system expansion.
- In systems ≤ 500 kW, install a water meter to record the volume of the fill & top-up water. Enter the volume of water and the water hardness into the boiler service checklist.
- For systems with a specific system volume in excess of 20 kWh output, apply the output of the smallest boiler in multi-boiler systems apply the requirements of the next higher group of total output (in accordance with the table). In case of severe excess (> 50 kWh), soften the water down to a total of alkaline earths ≤ 0.8 mmol / l.
- For systems with instantaneous water heaters with a total output ≤ 50 kW and total alkaline earths in the fill & top-up water ≥ 1.0 mmol / l, implement one of the following measures:
- Softening of the fill & top-up water is preferable.
- Installation of a filter or a separator facility in the heating flow.

Operating information:

- During expansion or repair work, only drain the necessary sections.
- Filters, dirt traps and other blow-down or separating facilities in the heating water circuit must be checked, cleaned and activated more frequently after the initial start-up or new installations.
- On an output to the water treatment plant (e.g. water softening).
- No further steps are required during commissioning. If you fill the heating system with fully softened water:
  - If the heating system is filled with fully softened water, but with water which meets the requirements in the above table, also observe the following during commissioning.
  - Take the system into use step by step, starting with the lowest boiler output and at a high heating water flow. This prevents a localised concentration of the scale deposits on the boiler heating surfaces.

In multi-boiler systems, start all boilers simultaneously to prevent the entire calcium content existing in the heat transfer area of just one boiler.

Where water treatment is required, treat even the first fill of the heating system prior to commissioning. This also applies to any subsequent filling, e.g. after a repair or system expansion and to all top-up water.

The formation of scale deposits on the heating surfaces will be minimised if these instructions are observed. Any scale deposits which have formed because the requirements of the VDI Guidelines 2035 have not been observed will in most cases already have caused a reduction in the service life of the installed heating equipment. Removing the scale deposits is one option to restore operational availability. This measure must be carried out by a specialist. Inspect the heating system prior to recommendation for possible damage. It is essential that faulty operating parameters are corrected to prevent a renewed formation of excessive scale.
Standard values for water quality

The service life of any boiler as well as that of the complete heating system is influenced by the quality of the water. In any event, the cost of a water treatment facility is less than the cost of repairing defects on your heating system. For filling and commissioning, a mobile water softening device can be hired from Viessmann.
Viessman filling instructions for water quality

- All measures to prevent corrosion on the water side in accordance with VDI 2035 Sheet 2 have been implemented. Soften the fill & top-up water in heating systems with the following conditions:
- The total of alkaline earths in the fill & top-up water exceeds the standard value.
Viessman filling instructions for water quality

vated more frequently after the initial start-up or new installa-
tions, later on subject to the water treatment applied (e.g. water
softening).

- **No further** steps are required during commissioning, if you fill
  the heating system with fully softened water.
If the heating system is filled not with fully softened water, but
with water which meets the requirements in the above table,
also observe the following during commissioning:
SAFETY PRECAUTIONS

IF YOU SMELL GAS:

DON'T SMOKE OR STRIKE MATCHES

DON'T TURN ELECTRICAL SWITCHES ON OR OFF

DO PUT OUT NAKED FLAMES

DO OPEN DOORS AND WINDOWS

DO TURN OFF THE CONTROL VALVE AT THE METER

TELEPHONE THE NATIONAL GAS EMERGENCY SERVICE ON 0800 11 999

A Benchmark Log Book is provided by the manufacturer for the installer to complete including their CORGI registration number to confirm that the boiler has been installed, commissioned and serviced according to the manufacturer's instructions.

IMPORTANT:
The completed Benchmark Checklist will be required in the event of any warranty work and may be required by the local Building Control Inspector.

HEALTH & SAFETY

The appliance contains no asbestos and no substances have been used in the construction process that contravene the COSHH Regulations (Control of Substances Hazardous to Health Regulations 1988).

COMBUSTIBLE AND CORROSIVE MATERIALS

Do not store or use any combustible materials (paper, thinners, paints etc.) inside or within the vicinity of the appliance.

Chemically aggressive substances, such as halogenated hydrocarbons containing chlorine or fluorine compounds can corrode the appliance and invalidate any warranty.

FITTING & MODIFICATIONS

Fitting the appliance and any controls to the appliance may only be carried out by a competent engineer in accordance with the Gas Safety (Installation and Use) Regulations 1998.

Flue systems must not be modified in any way other than as described in the fitting instructions. Any misuse or unauthorised modifications to the appliance, flue or associated components and systems could invalidate the warranty. The manufacturer accepts no liability arising from any such actions, excluding statutory rights.

SERVICING

Advise the user to have the system serviced annually by a competent, qualified engineer (such as British Gas or CORGI registered personnel) using approved spares, to help maintain the economy, safety and reliability of the appliance.

IMPORTANT - The service engineer must complete the Service Record in the Benchmark section after each service.

INSTALLATION REGULATIONS

Gas Safety (Installation & Use) Regulations:
All gas appliances must be installed by a competent person in accordance with the above regulations. Failure to install appliances correctly can lead to death or injury.

The appliance must be installed in accordance with, and comply to, the current Gas Safety Regulations, IEE Regulations, Building Regulations, Water By-Laws, HSE (Construction), Building Regulations (Northern Ireland), local by-laws, the Health & Safety (Electrical) Regulations 1989 (The Electricity at Work Regulations 1998) and any other local requirements.

British Standards:
The relevant British Standards should be followed, including:

BS7074:1 - Code of practice for domestic and hot water supply
BS6891:1 - Installation of low pressure gas pipework up to 28mm (R1)
BS5546:1 - Installation of gas hot water supplies for domestic purposes
EN:12828:1 - Central heating for domestic premises
BS5440:1 - Flues and ventilation for gas appliances of rated heating not exceeding 70kW (net): Flues
BS5440:2 - Flues and ventilation for gas appliances of rated heating not exceeding 70kW (net): Air Supply
BS7593:1 - Treatment of water in domestic hot water central heating systems
BS 6798:1 - Installation of gas fired boilers of rated input up to 70kW (net)

Where no specific instruction is given, reference should be made to the relevant British Standard codes of Practice.

L.P.G. Installation:
An appliance using L.P.G. must not be installed in a room or internal space below ground level unless one side of the building is open to the ground.

Timber framed buildings:
Where the boiler is to be fitted to a timber framed building the guidelines laid down in BS5440: Part 1 and IGE "Gas Installations in Timber Frame Buildings" should be adhered to.

Potable water:
All seals, joints and compounds (including flux and solder) and components used as part of the secondary domestic water system must be approved by WRAS.

CH water:
Artificially softened water must not be used to fill the central heating system.

Possible water:
All seals, joints and compounds (including flux and solder) and components used as part of the secondary domestic water system must be approved by WRAS.

CH water:
Artificially softened water must not be used to fill the central heating system.
And yes in the USA!!

3.8 Water quality

Water quality can have an impact on appliance longevity and may void the manufacturer's warranty. For water analysis data call your local water department, or if on a well, have well water analyzed periodically. If water quality exceeds one or more of the values specified below, recommends installing a water conditioner or softener.
And yes in the USA !!

6.3 Mineral scale build-up

Periodic descaling may be necessary in areas with high mineral content in the water. Scale buildup in the heat exchanger may result in lower flow rates, error codes of A7 and E9 and boiling sounds in the heat exchanger.

A water softener is required if the water hardness exceeds 6 grains/gal (103 mg/l) calcium carbonate.

Damage to the water heater resulting from hard water/scale deposits will not be covered under warranty.
Exceptions

This warranty will not apply:

1. to defects or malfunctions resulting from failure to properly install, operate or maintain the unit in accordance with the printed instructions provided;
2. to damage or abuse, accident, neglect or freezing and other acts of nature;
3. to damage resulting from operation with either the flame sensor rod or overheat sensor removed;
4. to failure of the heat exchanger resulting from the operation of the water heater in a corrosive atmosphere or at water temperatures exceeding the maximum rating, or if the water heater is not supplied with potable water;
5. to defects or damage cause by any attachment or modification, including any energy-saving device;
6. to damage resulting from scale deposits and/or highly mineralized / unsoftened water supply.
The solution to the problem?

Find and correct the cause. (Which we have done)

The cause was the original BS 7593: 1992

The first, and only time ever, that softened water has been accused of causing corrosion.

This urban myth has influenced your policies for 18 years
A recap.

BS 7593:1992 was written for commercial reasons

BS6798:2000 copied

CLG were misinformed

All now say use the correct inhibitor
Softened water is not more corrosive
Prevention of damage in water heating installations

VDI 2035 part 1
4.4.2 Water heating systems

**Softening**

Softening is a preferred method for avoidance of scaling, since it results in long-term removal of alkaline earths (Calcium and magnesium ions) from the system (see Section 5).
5 Softening and demineralization

The preferred methods for avoidance of scaling are softening and demineralization, in which calcium and magnesium ions and all ionogenic substances are removed.
On systems with recirculating water heaters and systems with electric heater elements having a total heating output < 50 kW and a sum of the alkaline earths of the filling and additional water > 3,0 mol/m³ on of the following additional precautions is necessary:

- Preferably softening or one of the other precautions in Section 4.4
- Incorporation of a filter or separator device in the heat generator (e.g. “dead” zones as a constructional measure)
- Installation of a filter or separator device in the heating flow

FROM PAGE 10
In cases, in which

- the sum of the alkaline earths from the analysis of the filling and additional water lies above the nominal value and/or
- higher filling and additional water quantities are anticipated and/or
- the specific system volume is $> 20 \text{ l/kW}$ heating output (on multi-boiler systems the smallest individual heating output is to be used),

preferably the water should be softened or one of the other precautions given in Section 4 will be necessary.

FROM PAGE 8
Physical water treatment

Physical water treatment methods can only be used to reduce scaling if their effectiveness has been demonstrated. At present there is no reproducible evidence of the effectiveness of such methods in heating water (see Section 4.4.1).

FROM PAGE 12
Institute of German Engineers

Waterside corrosion

VDI 2035 part 2
Depending on the quality of the filling water, conditioning measures may be necessary (such as softening or demineralization as specified in VDI 2035 Part 1). Treating the water by adding chemicals should be restricted to exceptional cases (Section 8.4).
• The addition of heating-water additives (chemicals) is usually only necessary with water heating installations which are open as far as corrosion is concerned. Attention should be paid to the additive manufacturer’s information. Additives can favour biofilm formation.
8.4 Water treatment

8.4.1 General information

Treating the water by adding chemicals should be restricted to exceptional cases. Treating the heating water with a view to reducing the probability of corrosion damage occurring is only necessary in installations in which it is not possible to comply with the guide values shown in Table 1.
Overdosing or underdosing chemicals should be avoided since this may increase the likelihood of corrosion. There is even a risk of underdosing, for example, when water treatment agents are used only on a temporary basis and the system is then filled with untreated make-up water.
8.4.3 Corrosion inhibitors

The heating water only needs to be inhibited when there is a constant entry of oxygen which cannot be prevented by other methods. Inhibitors form covering layers or films which can inhibit corrosion. In the case of underdosing, local corrosion (pitting) can occur.
<table>
<thead>
<tr>
<th>12</th>
<th>For installations with total heating capacity No. 1 &gt; 600 kW</th>
<th>Check: No. 8 &gt; 0.02 mol/m³ or No. 8 &gt; 0.11 °d</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>Check: Was there at least one answer of Yes to the test criteria in rows 5, 7 and 9 to 12?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No: No action necessary to prevent scale formation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes: Preferably softening required or one of the measures given in VDI 2035 Part 1.</td>
<td></td>
</tr>
</tbody>
</table>

\(^{a)}\) In installations which are, for example, being extended in stages or will be expanded later, larger quantities of make-up water may need to be taken into consideration.
<table>
<thead>
<tr>
<th>&gt; 600 kW</th>
<th>11,2°d &gt; 0,11°d?</th>
<th>X</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td><strong>Check:</strong> Was there at least one answer of Yes to the test criteria in rows 5, 7 and 9 to 12?</td>
<td></td>
</tr>
<tr>
<td>No:</td>
<td>No action necessary to prevent scale formation.</td>
<td></td>
</tr>
<tr>
<td>Yes:</td>
<td>Preferably softening required or one of the measures given in VDI 2035 Part 1.</td>
<td></td>
</tr>
</tbody>
</table>
Protection of metallic materials against corrosion

Guidance on the assessment of corrosion likelihood in closed water circulation systems

English version of DIN EN 14868

6 Role of oxygen

6.1 General

In the systems under consideration, the corrosion processes are mainly determined by the extent of oxygen ingress into the system. Generally, oxygen reduction is the driving force for anodic metal dissolution reactions. If the ingress of oxygen can be prevented, the rate of corrosion will be minimized to the extent that corrosion damages will normally not occur.

6.3 Aluminium

6.3.1 Leakage

Leakage caused by non-uniform corrosion will not occur if potable water without further treatment is used as filling water.

Only in very soft waters with low buffer capacity, in cases of self alkalinization or when alkaline products are added, which raise the pH value above 8.5 (e.g. some alkaline inhibitors for protection of ferrous materials), is corrosion likely because of the formation of aluminium oxides and evolution of hydrogen. In such situations, leakage is usually caused by erosion corrosion in areas of turbulent flow.

10 Corrosion protection methods

10.1 General

The primary cause of corrosion problems in water circulation systems is ingress of oxygen from air or fresh water. Therefore, design, commissioning, operation and maintenance of systems are important in terms of minimizing corrosion likelihood.

10.3.2 Corrosion inhibitors

Chemical inhibitors can be used under Case II conditions to prevent corrosion damages. However, inhibitors should not be used as a substitute for physical solutions to prevent oxygen ingress. They work by adsorbing or precipitating on the metal surfaces thereby reducing the anodic and/or cathodic reaction rates. They also often contain chemicals which buffer the pH of the system water and can neutralise any residual acids. Since re-circulating heating and cooling systems contain a variety of metals including steel, cast iron, copper and copper alloys and aluminium, the corrosion inhibitor if used should be compatible with all the relevant metals in the system. Care should also be taken to ensure that the inhibitor chosen is compatible with all the non-metallic materials in the system, including plastic pipework, rubber hoses, membranes, seals, O-rings, etc.

Inhibitors which function purely by anodic action can increase the likelihood for pitting attack in restricted areas, such as in crevices or under debris. Therefore, the use of inhibitor blends which contain both cathodic and anodic inhibitors is preferred. It is favourable to use products with low toxicity and environmental impacts.

On aluminium, the passivating surface layer of aluminium oxide-hydroxide is formed spontaneously in air (with oxygen and humidity). In neutral heating water without additives (normally drinking water), this passivating layer is stable and protects against corrosion. In closed systems the passivating surface layer grows to an ultimate thickness (Case I conditions), whereas in open systems (Case II, see 9.3) in the presence of oxygen, the corrosion reaction will not stop until the system is damaged.
6 Role of oxygen

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(e.g. inhibitors for hard water corrode aluminium in softened water!)
10 Corrosion protection methods

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BS EN 14743:2005
STANDARD FOR WATER SOFTENERS

No where does it mention softened water causing corrosion
NO MENTION OF CORROSION
CURRENT MARKET 40,000 UNITS SOLD PER YEAR IN UK
USA SALES FIGURES

WATER QUALITY ASSOCIATION
4151 Naperville Road, Lisle, Illinois 60532

WATER TREATMENT PRESSURE TANK AND VALVE UNIT SHIPMENTS (U.S. ONLY)
For the Year 2006

<table>
<thead>
<tr>
<th></th>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>August</th>
<th>September</th>
<th>October</th>
<th>November</th>
<th>December</th>
<th>Total 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure tanks for water treatment: (excluding R.O. storage, swimming pool filter, well system pressure tanks, and exchange tanks, if known)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14” to 24”</td>
<td>3,670</td>
<td>2,773</td>
<td>4,116</td>
<td>4,201</td>
<td>4,414</td>
<td>4,969</td>
<td>4,729</td>
<td>4,180</td>
<td>5,455</td>
<td>4,308</td>
<td>3,204</td>
<td>2,443</td>
<td>48,462</td>
</tr>
<tr>
<td>Over 24”</td>
<td>363</td>
<td>348</td>
<td>538</td>
<td>403</td>
<td>586</td>
<td>603</td>
<td>485</td>
<td>605</td>
<td>727</td>
<td>360</td>
<td>317</td>
<td>445</td>
<td>5,780</td>
</tr>
<tr>
<td>Total Pressure Tanks</td>
<td>108,323</td>
<td>85,196</td>
<td>124,552</td>
<td>117,963</td>
<td>123,045</td>
<td>104,696</td>
<td>96,898</td>
<td>111,611</td>
<td>115,656</td>
<td>104,178</td>
<td>105,816</td>
<td>97,544</td>
<td>1,295,478</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>August</th>
<th>September</th>
<th>October</th>
<th>November</th>
<th>December</th>
<th>Total 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valves, (including softener and filter valves, excluding diaphragm operated service valves)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1” and Under:</td>
<td>89,219</td>
<td>72,619</td>
<td>105,421</td>
<td>92,908</td>
<td>91,199</td>
<td>84,369</td>
<td>79,974</td>
<td>89,914</td>
<td>92,971</td>
<td>82,991</td>
<td>87,462</td>
<td>86,653</td>
<td>1,055,700</td>
</tr>
<tr>
<td>1-1/4” and Over:</td>
<td>4,326</td>
<td>4,581</td>
<td>5,060</td>
<td>5,329</td>
<td>5,294</td>
<td>6,971</td>
<td>4,614</td>
<td>4,970</td>
<td>5,250</td>
<td>4,197</td>
<td>4,419</td>
<td>4,233</td>
<td>59,244</td>
</tr>
<tr>
<td>Total Valves (softener and filter)</td>
<td>93,545</td>
<td>77,200</td>
<td>110,481</td>
<td>98,237</td>
<td>96,493</td>
<td>91,340</td>
<td>84,588</td>
<td>94,884</td>
<td>98,221</td>
<td>87,188</td>
<td>91,881</td>
<td>90,886</td>
<td>1,114,944</td>
</tr>
</tbody>
</table>

Note 1 - This report is issued at the request of the Association office to provide a complete summary for the year 2006.

Note 2 - This report reflects all revisions submitted by participants for 2006.

Compiled for the Association by BrookWeiner L.L.C.
Chicago, Illinois 60606-4497
February 7, 2007

Wednesday, 15 June 2011
<table>
<thead>
<tr>
<th>August</th>
<th>September</th>
<th>October</th>
<th>November</th>
<th>December</th>
<th>Total 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>106,826</td>
<td>109,474</td>
<td>99,510</td>
<td>102,295</td>
<td>94,656</td>
<td>1,241,236</td>
</tr>
<tr>
<td>4,180</td>
<td>5,455</td>
<td>4,308</td>
<td>3,204</td>
<td>2,443</td>
<td>48,462</td>
</tr>
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<td>105,816</td>
<td>97,544</td>
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</tr>
</tbody>
</table>

Pressure tanks for water treatment:
(excluding R.O. storage, swimming pool filter, well system pressure tanks, and exchange tanks, if known)


14” to 24” 3,670 2,773 4,116 4,201 4,414 4,969 4,729 4,180 5,455 4,308 3,204 2,443 48,462

Over 24” 363 348 538 403 586 603 485 605 727 360 317 445 5,780

Total Pressure Tanks 108,323 85,196 124,552 117,963 123,045 104,696 96,898 111,611 115,656 104,178 105,816 97,544 1,295,478

Valves,
(including softener and filter valves, excluding diaphragm operated service valves)

1” and Under: 89,219 72,619 105,421 92,908 91,199 84,369 79,974 89,914 92,971 82,991 87,462 86,653 1,055,700

1-1/4” and Over: 4,326 4,581 5,060 5,329 5,294 6,971 4,614 4,970 5,250 4,197 4,419 4,233 59,244

Total Valves (softener and filter) 93,545 77,200 110,481 98,237 96,493 91,340 84,588 94,884 98,221 87,188 91,881 90,886 1,114,944

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Chicago, Illinois 60606-4497
February 7, 2007

OVER ONE MILLION RESIDENTIAL WATER SOFTENERS INSTALLED A YEAR IN USA

INSTALLED BASE IN EXCESS OF TEN MILLION 10,000,000
July 28, 2010

Guy Franklin
Managing Director
BuildCert Ltd
30 Fern Close, Pen-y-Fan Industrial Estate
Oakdale, Gwent, NP11 3EH
United Kingdom

Dear Dr. Franklin,

I am writing in response to your question of whether or not the NSF/American National Standard for the evaluation and certification of residential cation exchange water softeners incorporates methods and criteria related to corrosivity of the treated water towards plumbing materials resulting from the water softening process.

The applicable NSF/ANSI Standard is titled Residential Cation Exchange Water Softeners, and carries the designation NSF/ANSI-44. The most current edition is dated 2009. The original year of publication was 1987, and eleven additional versions have been published since then. This Standard is recognized throughout North America as the proper method of product evaluation and demonstration of minimum performance. It carries similar recognition in many other countries and regions worldwide. As with all the NSF Standards, it is developed through an open consensus process involving product, health and safety experts.

The Standard encompasses requirements for the health safety of wetted materials, structural performance and integrity, electrical safety, water softening and contaminant reduction claims verification, instructions for proper installation, operation and maintenance, and other product related requirements.

With respect to corrosivity, NSF/ANSI-44 has no methods for evaluating this condition and no requirements of performance. If the committee was of the opinion that the product created a condition of corrosivity or had identified problems in the field with these products causing corrosion, it is reasonable to expect that there would be requirements in the standard with respect to product design and performance. The absence of such requirements suggests it has not been identified as a concern.

There are well in excess of 1,000 individual product models certified currently to this Standard by NSF and other certifiers in the U.S. It is a well established standard.

I hope the above addresses your question. If I can be of further assistance, please let me know.

Sincerely,

Thomas J. Bruursema
General Manager
Drinking Water Treatment Unit Program

P.O. Box 130140 Ann Arbor, MI 48113-0140 USA
734-769-8010 1-800-NSF-MARK Fax 734-769-0109
E-Mail: info@nsf.org Web: http://www.nsf.org

What about standards and regulations in the USA where they have an installed base of circa 10,000,000?
July 28, 2010

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USA
c10,000,000 Water Softeners and no corrosion.
GOVERNMENT REPORT
1949

WATER SOFTENING

REPORT OF THE
WATER SOFTENING
SUB-COMMITTEE OF THE
CENTRAL ADVISORY
WATER COMMITTEE

Note. This Report has been prepared by the Water Softening Sub-
Committee of the Central Advisory Water Committee appointed by
the Minister of Health under Section 2 of the Water Act, 1945. The
Report was adopted unanimously by the main Committee.

LONDON: HIS MAJESTY'S STATIONERY OFFICE
1949

NO MENTION
OF
CORROSION
UNITED WATER SOFTENERS LTD.

WATER PURIFICATION
The above illustration shows the “PERMUTIT” installation being delivered, consisting of two 8’ 6’’ diam. x 15’ c’ long units, for treatment of the entire town supply of MEXBOROUGH, Yorks.

Capacity = 480,000 gallons per day.
"PERMUTIT" installation, comprising a battery of seven horizontal units each 8' 6" x 6' 6" long, at the Artificial Silk Works of BRITISH BEMBERG, LTD., DONCASTER.

Capacity = 2,400,000 gallons per day.
DOMESTIC & INDUSTRIAL WATER SUPPLIES

All waters may be regarded as pure rain water contaminated by contact with the ground, and by passage through the atmosphere.

To illustrate:

Typical analyses of rain water contaminated by atmosphere in London and an industrial area of Northern England are:

RAIN WATER (First Washings of the Air), LONDON, S.W.

<table>
<thead>
<tr>
<th>Substance</th>
<th>Grains per gallon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silica</td>
<td>.01</td>
</tr>
<tr>
<td>Oxide of Iron</td>
<td>.1</td>
</tr>
<tr>
<td>Sulphate of Lime</td>
<td>1.66</td>
</tr>
<tr>
<td>Sulphate of Magnesia</td>
<td>1.96</td>
</tr>
<tr>
<td>Nitrate of Ammonia</td>
<td>.08</td>
</tr>
<tr>
<td>Sulphate of Ammonia</td>
<td>.55</td>
</tr>
<tr>
<td>Carbonate of Ammonia</td>
<td>.61</td>
</tr>
<tr>
<td>Chloride of Ammonia</td>
<td>.45</td>
</tr>
<tr>
<td>Chloride of Sodium</td>
<td>.11</td>
</tr>
<tr>
<td>Organic matter</td>
<td>.90</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1.74</td>
</tr>
</tbody>
</table>

ACID RAIN WATER (YORKSHIRE)

<table>
<thead>
<tr>
<th>Substance</th>
<th>Grains per gallon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silica</td>
<td>.11</td>
</tr>
<tr>
<td>Oxide of Iron</td>
<td>.19</td>
</tr>
<tr>
<td>Sulphate of Lime</td>
<td>1.16</td>
</tr>
<tr>
<td>Sulphate of Magnesia</td>
<td>.97</td>
</tr>
<tr>
<td>Chloride of Ammonia</td>
<td>.89</td>
</tr>
<tr>
<td>Chloride of Sodium</td>
<td>.90</td>
</tr>
<tr>
<td>Sulphuric Acid</td>
<td>.01</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>4.08</td>
</tr>
</tbody>
</table>

The increase of impurities by reason of flow over ground surface, as in the case of Rivers—or percolation through the ground as in the case of Springs or waters derived from Wells may be shown by the four following analyses, in which
### RIVER WATERS

#### RIVER IRWELL (RADCLIFFE)

<table>
<thead>
<tr>
<th>Substance</th>
<th>Grains per gallon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silica</td>
<td>.10</td>
</tr>
<tr>
<td>Oxide of Iron</td>
<td>.20</td>
</tr>
<tr>
<td>Sulphate of Lime</td>
<td>.12</td>
</tr>
<tr>
<td>Carbonate of Lime</td>
<td>.06</td>
</tr>
<tr>
<td>Sulphate of Magnesia</td>
<td>.01</td>
</tr>
<tr>
<td>Sulphate of Sodium</td>
<td>.09</td>
</tr>
<tr>
<td>Chloride of Sodium</td>
<td>.01</td>
</tr>
<tr>
<td>Hardness 16.90°</td>
<td>23.65</td>
</tr>
</tbody>
</table>

#### RIVER THAMES AT EGHAM

<table>
<thead>
<tr>
<th>Substance</th>
<th>Grains per gallon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silica</td>
<td>.15</td>
</tr>
<tr>
<td>Oxide of Iron</td>
<td>.09</td>
</tr>
<tr>
<td>Sulphate of Lime</td>
<td>1.00</td>
</tr>
<tr>
<td>Carbonate of Lime</td>
<td>3.17</td>
</tr>
<tr>
<td>Sulphate of Magnesia</td>
<td>1.55</td>
</tr>
<tr>
<td>Nitrite of Sodium</td>
<td>.97</td>
</tr>
<tr>
<td>Sulphate of Sodium</td>
<td>1.00</td>
</tr>
<tr>
<td>Chloride of Sodium</td>
<td>4.00</td>
</tr>
<tr>
<td>Hardness 18.10°</td>
<td>21.83</td>
</tr>
</tbody>
</table>

#### WELL WATER (MANCHESTER)

<table>
<thead>
<tr>
<th>Substance</th>
<th>Grains per gallon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium Carbonate</td>
<td>25.00</td>
</tr>
<tr>
<td>Magnesium Carbonate</td>
<td>12.17</td>
</tr>
<tr>
<td>Sodium Sulphate</td>
<td>7.70</td>
</tr>
<tr>
<td>Sodium Chlorate</td>
<td>3.54</td>
</tr>
<tr>
<td>Sodium Bicarbonate</td>
<td>5.14</td>
</tr>
<tr>
<td>Hardness 27.37°</td>
<td>16.19</td>
</tr>
</tbody>
</table>

#### WELL WATER (LINTHWAITE)

<table>
<thead>
<tr>
<th>Substance</th>
<th>Grains per gallon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium Carbonate</td>
<td>16.95</td>
</tr>
<tr>
<td>Magnesium Sulphate</td>
<td>5.11</td>
</tr>
<tr>
<td>Magnesium Chloride</td>
<td>5.74</td>
</tr>
<tr>
<td>Sodium Chloride</td>
<td>5.18</td>
</tr>
<tr>
<td>Hardness 18.15°</td>
<td>26.19</td>
</tr>
</tbody>
</table>
CORROSION

In certain districts, the available feed may not contain any quantity of dissolved solids, but owing to the nature of the ground over which it passes it is contaminated with peaty or other organic acids. If such a water is used for boiler feeding in its natural state, rapid pitting and corrosion of the tubes and plates will occur; or again, the water may contain nitrate of lime or chloride of magnesium. These salts, under the influence of boiler temperature and pressure, dissociate with the liberation of free acid, which in its turn will set up rapid corrosion in the boilers.

Not a few boiler users are of the opinion that because a water is soft, therefore it is corrosive, and hence dangerous to use as a boiler feed. Such is not necessarily the case. A water which is naturally soft is more than likely to be corrosive, not because it is soft, but because it is probably acid owing to the ground through or over which it has passed; this is very different from a water which is soft because it has had the hardness forming salts removed in a water softening plant.
A water which is *naturally* soft is more than likely to be corrosive, not because it is soft, but because it is probably acid owing to the ground through or over which it has passed; this is very different from a water which is soft because it has *had the hardness forming salts removed* in a water softening plant.
The softer the water, provided that it is also slightly alkaline, the better for boiler feed purposes. The idea that a boiler feed water can be rendered too soft has proved to be a relic of the days before the introduction of the scientific softening of hard water.
1921

FIRST COLOUR ADVERT IN HOMES AND GARDENS

The "PERMUTIT" Household Water Softener takes up little more room than an umbrella and to run it will cost you no more than your newspaper does.

It pays for itself by saving 50% of Soap, 80% of Soaks and 90% of Tea, and in gives you the precious boon of increased health and comfort for nothing.

UNITED WATER SOFTENERS LTD., Aldwych House, London, W.C.2

One of the early advertisements to appear in Homes and Gardens. This one stands out in the era of colour. A top quality, top grade product. A true household helper. - The Editor, Homes and Gardens.
The Permutit ion exchange process was invented in 1903 by Robert Gans in Germany.

The first domestic water softener was installed in England in 1916.

We have over 100 years experience.

We ought to know what we are talking about?

And finally.
The Energy Saving Trust wants to endorse water softeners because it is the most effective energy saving domestic appliance.
The Energy Saving Trust wants to endorse water softeners but...

1.3 To be eligible for endorsement, all inhibitors need to demonstrate suitability for use with artificially softened water, following the BuildCert testing standard\(^2\).

We need an inhibitor that is approved.
The motion

The boiler manufacturers reserve the right to specify the system fill water, but nevertheless recognise that there should be a standard for softened water inhibitors and request BuildCert to prepare a CIAS test method.
A quick recap

BS 7593 says use the correct type of inhibitor

BS 6798 says use the correct type of inhibitor

BS 14648 says use the correct type of inhibitor

CLG says use the correct type of inhibitor

EST says we’ll approve you with a standard

We need a standard, please say yes.
WARNING

This house is fitted with a water softener. We recommend only the following boilers:

Ferroli                          Viessman                          Vaillant

NOTE: BOILERS WITH ARTIFICIAL ALUMINIUM NOT PERMITTED

A label for water softeners? ;-)
We want to be friends
The motion

The boiler manufacturers reserve the right to specify the system fill water, but nevertheless recognise that there should be a standard for softened water inhibitors and request BuildCert to prepare a CIAS test method.
On behalf of

Thank you