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## Water quality requirements for Logano plus GB312

For heating contractors

Please read carefully prior  
to commissioning and  
servicing

# 1 Water quality

As pure water cannot be used for heat transfer, water quality is important. Poor water quality can damage heating systems due to scale formation and corrosion.

## About this publication

This operator's log contains important information regarding the treatment of water for boilers containing aluminium materials.

This document shows you how to keep a log of water treatment. It explains with the aid of an example how to make the necessary calculations and record the figures.

A record book table is included at the end of this publication.

This operator's log is intended for the system user as well as qualified heating engineers, who – as a result of their training and experience – are skilled in dealing with heating systems.

Warranty claims in respect of GB312 boilers are only valid in conjunction with the requirements specified herein and properly completed annual service records in the operator's log (Chapter 2, page 5) and the servicing and maintenance log (part of installation and servicing manual).

## 1.1 Maintenance of user manual

In addition to the quantity of first-fill and replenishment water added to the system, you should also record its calcium carbonate [ $\text{CaCO}_3$ ] concentration (hardness) in this log book (Chapter 2 "Operator's log", page 5).



### USER NOTE

You can find out the  $\text{CaCO}_3$  concentration (hardness, unit ppm or mg/l, 1 grain/gal = 17.1 ppm or mg/l) from your water company, see "Calculation basis", page 3.



### USER NOTE

The water quality is an important factor in increasing the economy, operating safety, service life and operational readiness of a heating system.

- Record the values required to confirm the water quality in the record book.

## 1.2 Prevention of damage by corrosion

### Additional protection against corrosion

Corrosion damage occurs if oxygen constantly enters the heating water due, for example, to:

- undersized expansion vessels
- faulty expansion vessels
- open-vented systems.

If the system cannot be constructed as a sealed system, anti-corrosion measures such as system separation by means of a heat exchanger are necessary.

### Installing in existing heating systems / y-strainer



### USER NOTE

If the appliance is installed in an existing heating system, dirt may accumulate in the boiler, leading to localised overheating, corrosion and noise.

Installing a dirt trap like an y-strainer and a desludging device is required. This must be installed in the heating system in the immediate vicinity of the boiler, in an easily accessible position between the boiler and the lowest point in the return of the system, and cleaned at every annual service.

## 1.3 Water hardness

Use only clean municipal water to fill the system.

In order to protect the appliance against limescale damage over its entire service life and in order to ensure trouble-free operation, the total amount of limescale-forming substances in the first-fill and replenishment water used in the heating system must be limited.

## 1.4 Checking the maximum quantity of first-fill water based on water quality



### USER NOTE

If the system capacity exceeds the calculated allowable water volume  $V_{\max}$ , damage to the boiler can result.

To check the permissible water quantities based on water quality, either use the following calculation method or consult the graph.

### Calculation basis

The first-fill and replenishment water has to meet certain requirements that are dependent on the total boiler output and the resulting total volume of water in the heating system. Use the following formula to calculate the maximum quantity of fill water that may be introduced without treatment:

$$V_{\max} \text{ (gal)} = 0.1818 \times \frac{Q_{\text{Out}} \text{ (Btu/h)}}{\text{CaCO}_3 \text{ (ppm)}}$$

Fig. 1 Formula for calculating the maximum quantity of (untreated) water that may be introduced

$V_{\max}$  = maximum volume of untreated first-fill and replenishment water in gal that may be introduced into the system over the entire service life of the boiler (1ft<sup>3</sup> = 7.48 gallon)

$Q_{\text{Out}}$  = Total boiler output in Btu/h (see Tab. 1)

$\text{CaCO}_3$  = Calcium carbonate concentration (hardness) in ppm (1ppm = 1mg/l, 1 grain/gal = 17.1 ppm or mg/l)

Information about the calcium carbonate ( $\text{CaCO}_3$ , hardness) concentration of the mains water can be obtained from your water company.

Example calculation:

Calculation of the maximum permitted quantity of first-fill and replenishment water,  $V_{\max}$ , for a heating system with a total boiler output of 955,400 Btu/h (boiler size 280–8).

Water hardness analysis figures quoted in ppm ( $\text{CaCO}_3$ ).

$Q_{\text{Out}} = 955,400 \text{ Btu/h}$

Hardness ( $\text{CaCO}_3$ ) = 280 ppm

Maximum permissible water volume  $V_{\max}$

$$V_{\max} = 0.1818 \times \frac{955,400 \text{ Btu/h}}{280 \text{ ppm}} = 620 \text{ gal}$$

Boiler size	Boiler output $Q_{\text{out}}$ [Btu/h] 122/86°F
90-4	307,100
120-4	409,500
160-5	545,900
200-6	682,400
240-7	819,000
280-8	955,400

Tab. 1 Boiler output

## Limit curves

As an alternative to calculation, the  $V_{max}$  figure may be taken from the following graphs.

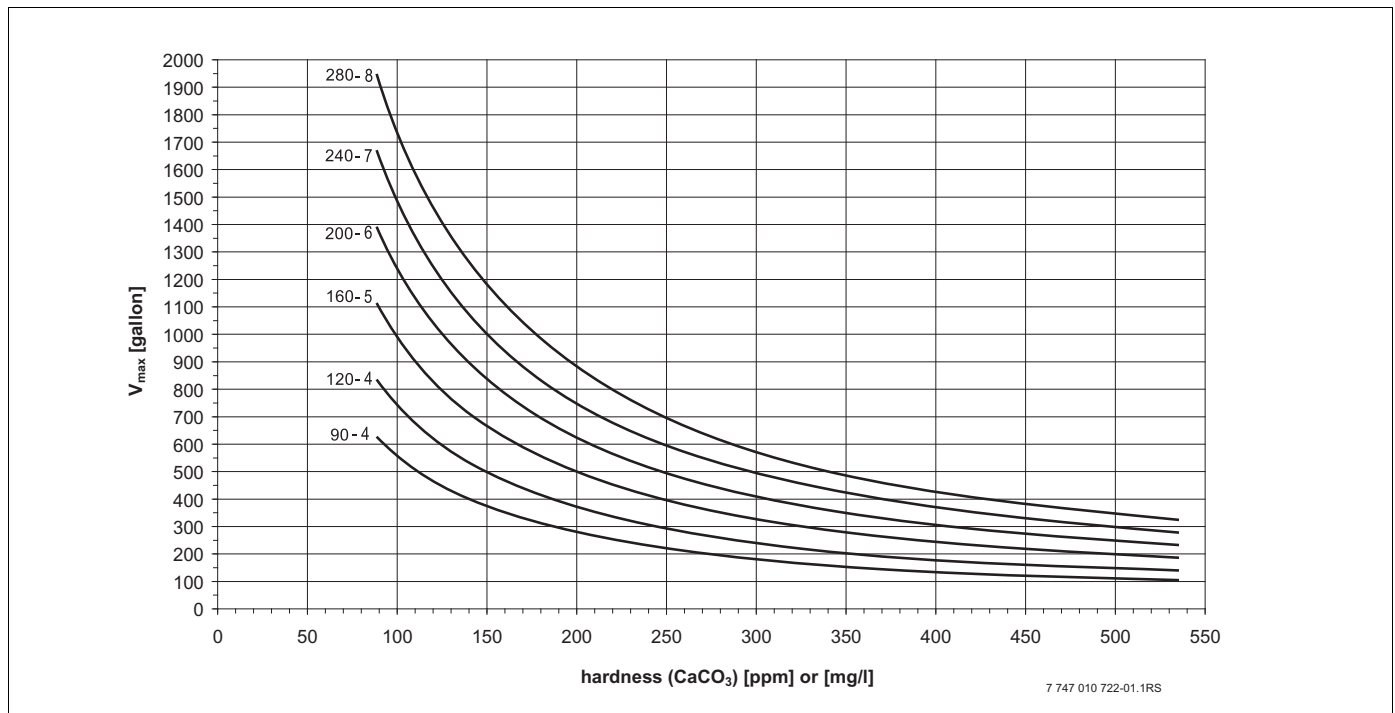


Fig. 2 Water treatment limit curves for the various boiler sizes

The rule for  $V_{max}$  is:

Above the limit curve = water treatment necessary

Below the limit curve = no water treatment necessary

(Units:  $1\text{ft}^3 = 7.48$  gallon,  $1\text{ppm} = 1\text{mg/l}$ ,  $1$  grain/gal =  $17.1$  pm or mg/l)



### USER NOTE

Any additives introduced into the heating system water must be approved by the manufacturer for use with aluminum boilers.

### When is water treatment necessary?

If the quantity of fill water actually needed is less than  $V_{max}$ , untreated water may be introduced.

If the quantity of fill water actually needed is more than  $V_{max}$ , water treatment is necessary.

To reduce the amount of scale, the two approved additives Noblecompany Noburst AL and Rhomar RhoGard may be used (this products are also used as antifreeze). They can reduce the amount of scale introduced by the fill water by 50% and 60% respectively.

Do not use water from salt bedding type exchangers (ion exchanger) used to soften water.

Use only methods approved by Buderus. Consult Buderus for details of the applicable methods.

A running record of additional fill water must be kept in the operator's log. Once the maximum total quantity of water  $V_{max}$  is reached, only treated water may be added thereafter.

## 1.5 Use of anti-freeze

Only anti-freeze fluids approved by Buderus may be used.

The following anti-freeze fluids and concentrations are approved:

- Rhomar RhoGard at a concentration range from 50 to 60% in the heating system water.
- Noblecompany Noburst AL at a concentration of 50% in the heating system water.

The concentration must not be above or below the specified level.

Follow the instructions of the anti-freeze manufacturer, especially with regard to regular annual checking of the concentration level.

Consult Buderus for details of other approved anti-freeze fluids and methods.

## 2 Operator's log

**Details of GB312 heating system:** \_\_\_\_\_  
**Date commissioned:** \_\_\_\_\_  
**Max. water volume  $V_{max}$ :** \_\_\_\_\_ gal at **CaCO<sub>3</sub> concentration of** \_\_\_\_\_ ppm  
**Anti freeze product used?** Rhomar Rho Gard (50-60% Concentration):  Noble Company Noburst AL (50% Concentration):

	Date	Water volume untreated (measured) gal	CaCO <sub>3</sub> - concentrati- on ppm	Total water volume untreated gal	Concentration of anti- freeze in system %	Company (stamp) Signature
Total fill water in gal						
Added water in gal						

Tab. 2 Record Book

**Details of GB312 heating system:** \_\_\_\_\_  
**Date commissioned:** \_\_\_\_\_  
**Max. water volume  $V_{max}$ :** \_\_\_\_\_ gal at  $\text{CaCO}_3$  concentration of \_\_\_\_\_ ppm  
**Anti freeze product used?** Rhomar Rho Gard (50-60% Concentration):  Noble Company Noburst AL (50% Concentration):

	Date	Water volume unthreated (measured) gal	$\text{CaCO}_3$ -concentration ppm	Total water volume unthreated gal	Concentration of anti-freeze in system %	Company (stamp) Signature
Total fill water in gal						
Added water in gal						

Tab. 3 Record Book



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