# Maintenance Guide

**Models Covered**

- KHD -16, KHD - 32 Steam Generators

**Document Control**

- Date of Issue: *22/02/2026*
- Version: *Rev. 2.0*
- Valid for: until superseded

**Manufacturer**


- Manufacturer: Keith Handy Design Limited
- Address: Unit 12/13 Emerald Way, Stone, United Kingdom, ST15 0SR
- Website: khdtechnology.com
- Email: sales@khdtechnology.com
- Phone: +44 1785 811443


**Relevant Directives**

- Pressure Equipment Directive (2014/68/EU)
- Machinery Directive (2006/42/EC)
- Low Voltage Directive (2014/35/EU)
- Electromagnetic Compatibility Directive (2014/30/EU)
- RoHS Directive (2011/65/EU)

**Legal & Safety Notice**

- This guide must be read in conjunction with the User Manual and Safety Instructions.
- Failure to follow the described maintenance procedures may compromise operator safety, void the manufacturer's warranty, and affect UKCA/CE compliance.

# Table of Contents

# 1. Introduction

## 1.1 Purpose of this guide

This guide provides all necessary instructions for the routine maintenance and safe operation of the KHD steam generator by the end user or operator. It outlines the required daily, weekly, and periodic tasks that help ensure the machine operates safely, reliably, and within its designed performance limits.

Regular maintenance—particularly drain down—is critical to prevent limescale build-up, maintain heating efficiency, and preserve the integrity of pressure-bearing components.

This document is intended for trained operators and does **not** cover internal servicing or inspection tasks.

## 1.2 Intended Audience

This guide is intended for trained operators and maintenance staff responsible for the routine upkeep of the KHD steam generator. Users must have received **manufacturer-approved training** and be familiar with basic industrial safety practices, including the handling of pressurised equipment and hot surfaces.

It is not intended for untrained users or those performing internal servicing, diagnostics, or electrical work. Any such work must be carried out by authorised service technicians according to the manufacturer's instructions.

## 1.3 Overview of User Maintenance Tasks

The KHD steam generator has been designed to require minimal day-to-day maintenance. User maintenance tasks can be performed without opening the enclosure or interacting with internal components. These tasks are essential for ensuring safe and reliable operation, preventing limescale build-up, and extending the service life of the unit.

The following tasks may be performed by trained operators:

- **Drain-down**: Performed daily or after every 8 hours of use to remove water and suspended scale from the vessel.
- **Visual checks**: Weekly inspections of external components, pressure gauge, steam hose, and safety labels.
- **Flushing**: Periodic flushing of the system to reduce scale formation, especially in hard water environments.
- **Cleaning**: Wiping down the external enclosure and controls to maintain hygiene and visibility of warning labels.

Operators are **not permitted** to access internal components or modify any electrical, pressure, or temperature control systems. If a fault is suspected or performance declines, the unit must be referred to an authorised service technician—**typically KHD or an authorised distributor**.

## 1.4 Safety Notice and PPE Requirements

Before performing any maintenance task on the steam generator, it is essential to follow the safety instructions below to prevent injury or equipment damage.

- Always ensure the heaters are off, the machine is fully cooled down, and the pressure gauge reads 0 bar before beginning any maintenance procedure.
- With the exception of flushing, the steam generator must be **completely disconnected from power** before any work is carried out.
- During **flushing**, operators must wear **protective gloves**. While the system should be depressurised and cooled, this precaution protects against the unlikely event of user error leading to residual steam release.

Operators must also follow general site safety rules and wear any additional PPE required by local risk assessments or company policy.

## 1.5 Summary of Routine Maintenance Tasks

The following routine maintenance tasks must be performed to ensure the safe and reliable operation of the steam generator. Most tasks are carried out by trained operators during daily or weekly use. More complex servicing tasks, including internal inspection and performance testing, must be carried out by KHD or an authorised distributor as part of the annual service schedule.

Regular maintenance helps to:

- Prevent limescale accumulation
- Maintain system efficiency and safety
- Extend the operational life of the machine
- Ensure continued compliance with safety requirements

### Maintenance Task Summary Table

| Task | Frequency | Responsible Party |
|---|---|---|
| Drain-down | Daily / every 8 use hours (which ever is soonest) | Operator |
| Visual inspection | Daily & Weekly | Operator |
| System flushing (hard water) | As required | Operator |
| External cleaning | As needed | Operator |
| Safety label visibility check | Monthly | Operator |
| Full service (internal checks, relief valve test, basic hydrostatic test, electrical safety test etc.) | Annually | KHD / Authorised Distributor |
| Replacement of worn components | As required | KHD / Authorised Distributor |

# 2. Draining Down (daily)

## 2.1 Purpose

Draining down is the **single most critical maintenance task** required to keep the KHD steam generator operating safely and reliably.

The primary purpose of drain-down is to remove water and suspended limescale from the pressure vessel before it can accumulate into hard deposits. This routine action prevents internal blockages, maintains efficient steam generation, and protects components from premature wear.

The more regularly this procedure is performed, the **smoother**, **safer**, and **more reliable** the machine will be. Operators are strongly advised to follow the recommended schedule without exception.

⚠️ Failure to perform regular drain-down will lead to:

- Internal **blockages**
- **Steam leaks** caused by scale buildup on seals and fittings
- **Component failure** caused by scale ingress
- **Heating element failure** due to scale insulation and overheating

Proper drain-down also prepares the machine for safe servicing and helps extend its overall lifespan.

## 2.2 When to drain down

The steam generator must be drained down **at least once per shift** or **after every 8 hours of use**, whichever comes first.

The **best time to perform drain-down is at the start of the shift**, before cleaning begins—when the machine is cold, depressurised, and powered off. This allows for a safe and efficient procedure without waiting for cooldown.

Although it can be done at the end of the day, this is less convenient as the machine must be allowed to cool completely before draining.

Operators may drain down **more frequently** to further improve reliability and reduce limescale build-up, especially in hard water environments or in machines used for extended periods.

## 2.3 Safety precautions

Drain-down must be done **carefully and correctly** to avoid injury from hot water or steam. The following precautions are mandatory:

- **Only trained personnel** may carry out the drain-down procedure.
- Ensure the drain-off area is clear of people and sensitive equipment.
- Follow all site-specific PPE requirements and risk assessments.
- Ensure the machine is completely powered off before starting.
- **Wait until the machine is cold and the pressure gauge reads 0 bar**.
    - ⚠️ *While it is possible to drain down under some pressure please note the following!*

      *Draining down under pressure will be **extremely loud** and **alarming**, **scalding water** will escape from the bottom of the steam generator. Draining down under pressure requires explicit training and a risk assessment. If you require to drain down under pressure please contact your seller as we are able to provide more advanced models with advanced accelerated cold drain down facilities which are more appropriate.*
- **Wear protective gloves** to protect against residual heat or accidental steam release.
- Only remove the drain cap using the correct **Allen key**. The cap design prevents casual access to reduce the risk of accidental opening.
- Ensure the drain tap is fully closed and the cap is securely replaced and tightened with the Allen key after draining is complete.
- Do **not tamper with or bypass** any safety covers or fittings during drain-down.

## 2.4 Step by step guide

Follow the steps below carefully. This procedure should only be carried out by trained personnel.

**Before you begin, ensure:**

- The machine is **cool to the touch**
- The pressure gauge reads 0 bar
- The machine is fully disconnected from power
- You are wearing protective gloves
- The unit is on stable, level ground
- The **drain tap is in the closed position** (handle parallel to the ground – see **Figure 1**)

**Step-by-step:**

1. Follow the “Before you begin” procedure above.
2. Use the provided key to unlock the lever on the back
3. Move the lever 90 degrees to open the taps
4. Check water is draining from all taps (if no water is draining out of one or more of the taps then please refer to the next section).
5. Gently rock the machine to free up mineral deposits
6. Close the lever and lock with the key

## 2.5 What to check for during drain down

Draining the machine is not only about removing water and minerals — it's also an important opportunity to monitor the internal condition of the steam generator. The following signs may indicate limescale build-up or inadequate maintenance frequency:
Watch for:

- **Milky or discoloured water**
  This suggests mineral content or suspended scale. If the water appears cloudy or dark, it's a sign that **drain-down is not being done frequently enough**.
- **Debris or flakes in the water**
  These are typically mineral deposits that have broken loose from the internal surfaces. Regular drain-down helps prevent these from accumulating and damaging components.
- **No water flow (tap blocked)**
  If water does not begin draining, the tap may be obstructed with hardened scale. Gently insert a screwdriver into the outlet to dislodge the blockage, and **shake the machine lightly** to help release internal build-up.

⚠️ If you observe excessive discolouration, visible debris, or repeated blockage, this is a clear indication that the drain-down schedule is insufficient. You should increase the frequency and also carry out the flushing procedure detailed later in this guide.

# 3. Visual Inspection (daily & weekly)

## 3.1 Mains Cable & Plug (daily)

**Check:** Prior to use, Inspect the mains cable and plug for damage and to ensure that that connections are firm and in tact.
**Why:** Damage may compromise electrical safety and is not acceptable under any circumstances.

**Action if issue found:**
- Stop using the machine.
- Refer to site Electrician / Engineer.

## 3.2 External Housing and Steam Hose (weekly)

**Check:** Inspect the outer casing for cracks, dents, or other mechanical damage. Check the steam hose for cuts, bulging, or abrasion.
**Why:** Damage may compromise electrical or pressure safety and is not acceptable under PED/ LVD requirements.

**Action if issue found:**
- Stop using the machine.
- Replace damaged hoses or fittings immediately.
- Report significant housing damage to KHD.

## 3.2 Steam leaks (weekly)

If steam is escaping from any part of the system, the generator must **not** be used until the fault has been rectified. Most leaks are caused by limescale build-up in the steam hose fittings at the front of the generator. Over time, limescale deposits place additional stress on the O-rings, eventually leading to failure.

If a steam leak occurs, the following actions should be taken before the next use:

1. **Identify the source** – determine the exact point of leakage. The most common location is an O-ring failure at the main steam fitting.
2. **Replace the O-ring** – fit a new part of the correct specification (contact KHD if you are unsure).
3. **Inspect for limescale** – check the surrounding area for mineral deposits.
    - If limescale is detected, either:
        - Arrange an early service and notify KHD with details of the issue, or
        - If competent, carefully dislodge the deposit manually (e.g. using a suitable drill bit turned by hand).
4. **Flush the system** – once the leak has been addressed, carry out the flushing procedure in **Section 5**.
5. **Adjust maintenance** – increase the frequency of drain-down cycles to prevent further limescale accumulation and reduce the risk of repeat failures.

⚠️ **Important:** Operating the generator with steam leaks is prohibited under the Pressure Equipment Directive (2014/68/EU). All leaks must be rectified prior to further use.

## 3.3 Pressure Gauge Function (weekly)

**Check:** Ensure the pressure gauge returns to zero when the unit is unpressurised and rises smoothly during operation.
**Why:** A faulty gauge can give misleading information and prevent the operator from recognising unsafe conditions.

**Action if issue found:**
- Do not operate the unit.
- Replace the gauge before next use.

## 3.4 Water Leaks and Corrosion (weekly)

**Check:** Look around joints, fittings, drain points, and the boiler vessel for any signs of water leakage, rust, or staining.
**Why:** Water leaks can accelerate corrosion and indicate failing seals or weakened components, compromising long-term vessel integrity.

**Action if issue found:**
- Stop use until checked.
- Tighten fittings or replace seals if minor.
- If corrosion or structural damage is visible, notify KHD and arrange inspection/service before further operation.

## 3.5 Safety Labels and Markings (weekly)

**Check:** Verify that all safety and warning labels, rating plates, and directional markings are present, intact, and legible.
**Why:** Clear labelling is required for safe operation and compliance with CE and/or UKCA directives.

**Action if issue found:**
- Replace missing or illegible labels before next use.

# 4. Cleaning the enclosure

**Procedure:** Wipe down the external surfaces of the steam generator using a clean cloth lightly dampened with a suitable disinfectant solution.

Important:

- **Do not use sprayed water, pressure washers, steam or excessive liquid.** Moisture ingress may damage internal components and create electrical safety hazards.
- Take care not to rub off or obscure any safety labels, rating plates, or warning markings. If labels become loose or illegible, they must be replaced before the unit is returned to service.

**Frequency:** Perform as required to maintain hygiene and cleanliness, with particular attention in food-processing environments.

**Action if issue found:** If cleaning reveals damaged housing, peeling labels, or signs of water ingress, stop use and follow the appropriate inspection procedure in Section 3.

# 5. Flushing the system (optional)

In most cases, carrying out the **drain-down procedure** at the recommended frequency is sufficient to keep the generator reliable between annual services. However, in some units excessive **limescale build-up** can occur, leading to operational problems if not properly managed.

- **Magnetic cartridge function:** The steam generator is fitted with a magnetic cartridge designed to convert limescale into a soft, non-sticky sludge. This sludge should be removed through the drain tap during normal drain-down.
- **Blocked drain tap:** If excessive sludge accumulates, it may block the drain tap. In such cases, the blockage can be cleared by carefully using an Allen key or screw driver to poke through the tap.
    - ⚠️ **Note:** If this step is required, it indicates that drain-down has not been carried out frequently enough.
- Consequences of sludge build-up:
    - Sludge splashing onto the **level sensor** may cause false readings and pumping issues.
    - Deposits on the **heating elements** will lead to reduced efficiency, lower pressure output, and ultimately premature element failure.
    - Component damage due to lime-scale ingress
- Corrective action:
    - Clear the sludge if necessary.
    - Perform a full flushing procedure to remove residual deposits.
    - Increase the frequency of drain-down in line with the water hardness in your area.
- **Hard water areas:** In locations with high mineral content, operators should consider performing the flushing procedure on a **regular schedule (e.g. bi-weekly or monthly)** in addition to standard drain-down.

## 5.1 Flush Procedure

⚠️ **Important:** Only perform this procedure when the machine is **cold** and the **pressure gauge reads 0 bar**.

1. Ensure all switches are in the **OFF** position (heaters, steam, and vacuum power).
2. Connect the supplied **hose adapter** from the **main steam socket** to a mains water tap using a suitable water hose.
3. Turn on the water tap and check all connections for leaks.
4. Switch on the **mains power** to the generator, confirming that the **heater switch remains OFF**.
5. Wait for the LCD display to read “b.off”.
6. Switch the **heaters** ON and then immediately OFF, this enables the steam.
7. Turn the **steam switch ON**. This opens the valve, allowing mains water to flush through the internal system.
8. Observe water exiting freely from the open drain taps.
9. Allow water to run for several minutes to thoroughly clear the system.
10. (Optional, for stubborn build-up):
    1. Close the drain taps briefly to let the vessels partially fill.
    2. Gently rock or shake the machine to dislodge debris.
    3. Re-open the taps to allow the water and debris to flush out with greater force.

➡️ After flushing is complete:

- Switch the steam control back **OFF**.
- Disconnect the hose.
- Close the drain taps (steps 5 and 6 of drain down procedure).

- The unit is now ready for normal filling and operation.

# 6. When to call for a service

## 6.1 Anual Service

This steam generator must be serviced at least **once every 12 months** to ensure safe and reliable operation. This requirement reflects both **manufacturer's guidance** and the **legal obligations** that apply to pressure systems in service.

- Under the **Pressure Equipment Directive (2014/68/EU)**, the machine is designed and UKCA/CE-marked to remain safe throughout its intended life, provided it is properly maintained.
- Once placed into service, the **UK Pressure Systems Safety Regulations 2000 (PSSR)** (and equivalent national regulations in other EU Member States) require periodic examinations under a Written Scheme of Examination (WSE) by a competent person. For steam systems, this interval is set at **12 months**.

As the manufacturer, **Keith Handy Design Limited (KHD Technology)** (and our authorised distributors) are the only entities formally recognised as competent to carry out this servicing. Our teams follow the full factory-approved maintenance and safety checklist, using the correct parts and procedures. We know these machines inside and out because we designed and built them. If you are considering a third-party service provider, you must contact KHD in advance to confirm whether they are recognised as competent. In most cases, the answer will be no. We have seen incidents where third-party servicing failed to complete critical checks, resulting in avoidable breakdowns and, in some cases, safety concerns.

Servicing by KHD or an authorised distributor ensures that your machine:
- Meets all legal and regulatory obligations (PED and PSSR).
- Maintains optimum performance and efficiency.
- Is inspected according to the **manufacturer's design intent** and detailed technical knowledge.

## 6.2 Early Service due to an issue

In addition to the mandatory annual service, there are circumstances where an **early service** is strongly recommended to maintain safety and reliability.

- Indicators for early service:
  - Limescale build-up observed in fittings or accessories.
  - Repeated or persistent steam leaks.
  - Water leaks from joints or housings.
  - Pumping issues or irregular performance.

If the machine is returned to **KHD Technology** for repairs, a full service will be carried out as part of the process. This resets the **annual service interval**.

- **Heavy usage:** For machines operating under particularly demanding conditions (e.g. multiple shifts or continuous production environments), we recommend increasing the service frequency to **every 6–9 months**.
- **Preventive measures:** Regular drain-down and system flushing (see Section 5) significantly reduce limescale build-up and may allow the service interval to remain at the standard annual frequency.

## 6.3 After a service

Following each service, review the **servicing notes** provided. Pay particular attention to any observations regarding **limescale build-up** or other indicators of wear.

As the manufacturer, we are able to assess during servicing how well the machine has been maintained — insights that may not be obvious to hygiene managers or operators. Where necessary, we will recommend adjustments such as:

- Increasing the frequency of drain-down.
- Performing the **flush procedure** more regularly (see Section 5).

These recommendations are based on direct inspection of your unit and are intended to keep it operating **efficiently, reliably, and safely**. It is important that this advice is acted upon.
We strongly advise relaying these findings to the **hygiene team** and, if required, providing additional training in drain-down and routine maintenance procedures. This ensures that best practice is consistently followed, reducing the risk of breakdowns and extending the life of the machine.