

## **Decontamination and flushing of Dental Unit Water Lines in LTHT**

### **Clinical SOP/Protocol Detail**

Ownership: Leeds Teaching Hospitals Trust

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### **Aim**

To minimise the risk of infection to dental patients and staff by reducing the microbial contamination of Dental Unit Waterlines (DUWL)

### **Background**

Dental unit water line systems are used to irrigate the oral cavity during dental treatment. Water delivered from these devices is not sterile and can contain high numbers of bacteria, mainly because of formation of biofilms within the pipework. Some of these bacteria can be pathogenic to humans (e.g. *Pseudomonas aeruginosa*, *Legionella* species, non-tuberculous mycobacteria). In 2009 guidance from the Department of Health (HTM 01-05: Decontamination in primary care dental practices) set an expectation: that the quality of DUWL water, where monitored, would lie in the range of less than 200 colony forming units per millilitre (cfu/ml) (i.e. it meets drinking water standards). The guidance also recommended untreated DUWLs should be flushed for at least two minutes at the beginning and the end of the day and after any significant period when they have not been used (for example, after lunch breaks). In addition they should be flushed for at least 20 seconds between patients.

**The agreed DUWL standards for the Leeds Dental Institute, Seacroft Orthodontic Unit and Westmoreland Unit are:**

- **Water quality <100 cfu/ml**
- **DUWLs should be flushed for 30 seconds at the beginning and the end of the day and if used for treatment for 30 seconds between patients**
- **The quality of DUWL water should be monitored quarterly**

To achieve the above water quality standard all dental units within the Dental Institute, Seacroft Orthodontic unit and the Westmoreland unit have an independent bottled water system, and the following two chemical biocide products are used:

- BRS Forte - removes existing biofilms

- Alpron - A continuous dosing system of a 1% solution that aims to maintain the microbial count at the acceptable level of <100cfu/ml.

If the following procedures for decontamination and flushing of the independent bottled water systems are adhered to, a consistently high standard of clean water delivery to the hand-piece and triple syringe (3 in 1) can be maintained.

### **DUWL Initial treatment phase**

Initially, all DUWLs require treatment with the product 'BRS-Forte' to remove existing biofilms. This includes new unused units (units are wet tested at manufacture and on installation on site). The initial and subsequent treatment with the product 'BRS-Forte' will be undertaken by the maintenance/estates staff.

### **DUWL Maintenance**

A continuous 1% solution of Alpron is essential to maintain the DUWLs and the unit bottle should not be left empty. It is the Dental Nurses' responsibility to check and replace (if required) the unit bottles at the end of the day and to ensure sufficient diluted product is prepared and available in the dispensaries. Diluted Alpron can be stored for up to 4 weeks at room temperature once mixed.

### **Preparation of 1% Alpron solution**

Check the expiry date (allow 4 weeks mixed product expiry date) and read the instructions on the bottle prior to starting. **Appropriate Personal Protective Equipment (PPE) must** be worn during decontamination/disinfecting procedures. Avoid contact with skin and clothing.

### **Equipment**

Bottle of undiluted Alpron solution  
Water from designated drinking water supply  
5 litre storage canister  
2 litre (2000ml) measuring jug  
Funnel

### **To mix 1 litre of 1% Alpron solution:**

1. Place the graduated bottle cap from the Alpron bottle onto a flat surface, measure out **10 ml of undiluted Alpron** and pour this into the measuring jug.
2. Carefully fill the jug with water from the designated drinking water tap, exactly to the **1 litre (1000ml)** mark.
3. Pour the mixture into the 5 litre storage canister, using the funnel to prevent spillage. Legibly label the storage canister with your name, date, time of mixing and the expiry date of the mixed product (four weeks from mixing date).
4. Attach the drain tap

5. Place the 5 litre canister onto its side; use the tap to fill the Dental unit bottle with the solution, cap the bottle, label and place in the designated area in dispensary for collection.

**To mix 5 litres of 1% Alpron solution:**

1. Measure out 50mls of undiluted Alpron and pour directly into the 5 litre canister
2. Carefully fill the canister with water from the designated drinking water tap exactly to the 5 litre mark on the side of the canister (4,950 ml of water). Legibly label the storage canister with your name, date, time of mixing and the expiry date of the mixed product (four weeks from mixing date).
3. Attach the drain tap
4. Place the 5 litre canister onto its side; use the tap to fill the Dental unit bottle with the solution, cap the bottle, label and place in the designated area in dispensary for collection.

**Flushing DUWL**

There are four makes of dental chairs within the Dental Institute, Seacroft Orthodontic Unit and the Westmoreland Unit. The Planmeca units have automated flush cycles, whereas the KAVO, A-Dec and Belmont units do not.

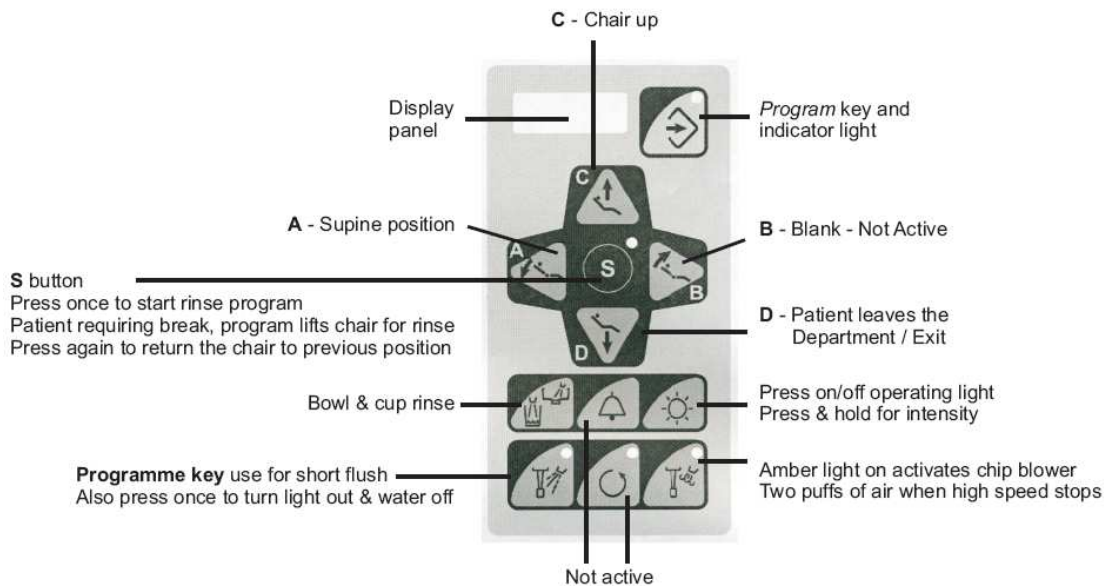
**Recommended Flushing instructions for the Planmeca units (short flush)**

**Chair numbers: 1-26, 33-78, 89-136, 138 and 139**

**Appropriate PPE must** be worn when preparing your unit for use. This procedure must be followed at the beginning of the session, between each patient treatment and at the end of the session.

1. Press program key D to lower chair, ensure water bottle has sufficient Alpron 1% solution in to flush lines, move spittoon to the right to allow a view of the flush holder cover

## CONTROL PANEL



2. Remove cover and insert high speed, slow speed and piezon (if applicable) waterlines into two/three of the larger holders (do not use the small holders at the rear of the holder)
3. Press program key (bottom left on key pad) for approximately 3 seconds (until signal bleep is heard). Flushing will begin; each line is flushed for 30 seconds consecutively (the display panel will indicate time count down). At the same time hold both 3 in 1 syringes over the spittoon and manually flush for 30 seconds (when the flush cycle is complete HE36 will appear in display panel).
4. Return all waterlines into correct position on the hand piece holder. Replace the flush holder cover and return spittoon into position

### **Alternative Flushing instructions for the Planmeca units (short flush)**

**Appropriate PPE must** be worn when preparing your unit for use. This procedure must be followed at the beginning of the session, between each patient treatment and at the end of the session.

1. Press program key D to lower chair, ensure water bottle has sufficient Alpron 1% solution in to flush lines, move spittoon to the right to allow a view of the flush holder cover
2. Remove cover and insert high speed, slow speed and piezon (if applicable) waterlines into two/three of the larger holders (do not use the small holders at the rear of the holder) Remove the 3 in 1 syringe from the Q.D cartridge, place the 3 in 1 syringe on the bracket table and place the Q.D cartridge into the insert at the rear of the holder, taking care to locate correctly (once located the Q.D cartridge will flush until removed) repeat for the second 3 in 1 syringe
3. Press program key (bottom left on key pad) for approximately 3 seconds (until signal bleep is heard). Flushing will begin; each line is flushed for 30 seconds consecutively (the display panel will indicate time count down)

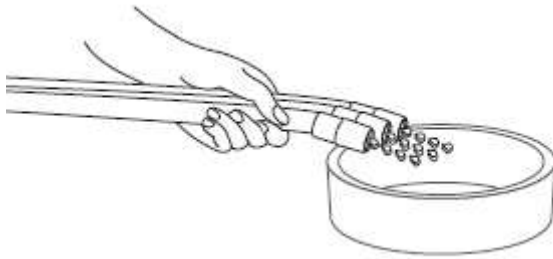
4. Following flushing, remove the Q.D cartridges and replace the 3 in 1 syringes Return all waterlines into correct position on the hand piece holder. Replace the flush holder cover and return spittoon into position

### **Flushing instructions for the A-Dec units**

**Chair numbers:49-52, 79-88,137 and 140 and Westmoreland Unit, Bexley Wing**

**Appropriate PPE must** be worn when preparing your unit for use. This procedure must be followed at the beginning of the session, between each patient treatment and at the end of the session.

1. Press the down arrow key on the touch pad to lower chair; ensure water bottle has sufficient Alpron 1% solution in to flush lines.
2. Remove high, slow speed and piezon waterlines from the hand piece holder; hold them over the spittoon, so that they are directed away from you



3. Either, locate the toggle on the back of the control head (denoted by two wavy lines), hold down for 30 seconds, release the toggle; or flick the control switch on the foot control to blue and depress the pedal to activate, flush for 30 seconds,
4. Replace the high, slow speed and piezon waterlines to the hand piece holder
5. Remove the 3 in 1 syringes from the hand piece holders, hold over the spittoon, so that they are directed away from you and manually flush for 30 seconds
6. Replace the 3 in 1 syringes to the hand piece holder

### **Flushing instructions for the Belmont units**

**All chairs at Seacroft orthodontic unit**

**Appropriate PPE must** be worn when preparing your unit for use. This procedure must be followed at the beginning of the session, between each patient treatment and at the end of the session.

1. Ensure the water bottle has sufficient Alpron 1% solution in to flush lines.
2. Remove high speed and ultrasonic waterlines from the hand piece holder; hold them over the spittoon, so that they are directed away from you.

3. Flick and hold the toggle switch located on the underside of the bracket table to activate, flush for 30 seconds.
4. Replace the high speed and ultrasonic waterlines to the hand piece holder
5. Remove the 3 in 1 syringes from the hand piece holders, hold over the spittoon, so that they are directed away from you and manually flush for 30 seconds
6. Replace the 3 in 1 syringes to the hand piece holder

### **Flushing instructions for the KAVO units**

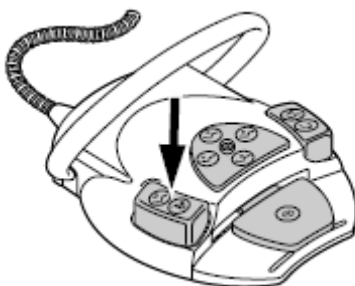
#### **Chair numbers: 27-32**

The automated flushing cycle for the KAVO unit has been disabled; the water lines should all be flushed manually.

**Appropriate PPE must** be worn when preparing your unit for use. This procedure must be followed at the beginning of the session, between each patient treatment and at the end of the session.

1. Ensure water bottle has sufficient Alpron 1% solution in to flush the lines.
2. Remove the 3 in 1 syringes from the hand piece holders, hold over the spittoon, so that they are directed away from you and manually flush for 30 seconds
3. Remove each high and low speed waterline instrument separately from the hand piece holder (if more than one instrument is removed, the control will not allow flushing to occur) hold over the spittoon, so that the waterline is directed away from you. To activate flushing depress the small button on the left of the foot pedal twice (A), then press the main foot pedal (B), manually flush for 30 seconds, following flushing return the high/slow speed waterline to the hand piece holder.

**A**



**B**

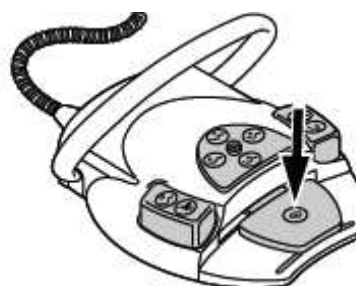


4. Alternatively, to activate flushing press the spray cooling key twice on the control panel, taking the picture from no spray to solid black (C), prior to depressing the main foot pedal (D)

C



D



### **Durr or Cattani pump failure**

In the event of a main suction pump failure, the DUWLs still require flushing at the beginning and end of the day.

#### **Planmeca unit:**

The automated cycle can be used to flush the high and low speed waterlines; place the high and low speed waterlines in a bucket before activating the cycle, and manually flush the 3 in 1s for 30 seconds into the bucket.

#### **Adec, KAVO and Belmont units:**

Manually flush all the DUWLs for 30 seconds into a bucket

### **DUWL monitoring**

Each DUWL is monitored and a water sample is taken at quarterly intervals on a rolling program. The samples are processed in the Infection Prevention Laboratory. If the bacterial counts are  $>100\text{cfu/ml}$ , the DUWLs are re-sampled to exclude sampling contamination or processing contamination in the laboratory. If the bacterial count is still  $>100\text{cfu/ml}$  the DUWLs are “shocked” with the product ‘BRS-Forte’ and re-sampled.

**Known** immune compromised patients should not be treated in dental units with bacterial counts  $>100\text{cfu/ml}$ . Results are disseminated by the Infection Prevention Nurse to the Clinical Director, Dental Nurse Manager, Lead and Senior Dental Nurses. Dental units with bacterial counts  $>100\text{cfu/ml}$  should be identified by a small laminated green square placed on the back of the unit wall by the Senior Dental Nurse.

### **DUWL sampling**

Water line samples are pooled from each dental unit, the universal sample bottle holds approximately 20mls; an equal amount of water should be taken from each line.

Planmeca and Adec units main clinics - 4 lines, 5ml per line

Planmeca units surgeries - 5 lines, 4mls per line

KAVO units - 6 lines, 3mls per line

### **Equipment**

Universal sample bottle

Relevant DUWL testing form

## Sample rack

1. Pre prepare sample bottles and forms with the date and dental chair number
2. Wear appropriate PPE
3. Prior to sampling ensure water bottle has sufficient Alpron 1% solution in to flush the lines twice
4. Planmeca unit, flush slow and high speed waterlines as above, remove the 3 in 1 syringes from the Q.D. cartridge and flush manually, hold the QD cartridge and turn the body
5. KAVO unit, flush as above
6. A-Dec unit flush as above
7. Cleanse hands
8. Write the time on the sample bottle and the form, initial the 'taken by' column
9. Remove lid and carefully place top end down onto the work top, rim exposed to the air do not contaminate the inner or rim surface
10. **Do not** over fill, touch the sides or top of the sample pot with the tip or nozzle, once the sample is obtained replace the lid carefully, taking care not to pass your hand over the exposed inner surface of the lid or sample pot. Label with time of sample and place the water sample in the rack
  - Planmeca units: restart the automated flush cycle in the unit, the slow and high speed waterlines flush consecutively, therefore remove initial waterline which is flushing to obtain the first sample, and the second once flushing commences. 3 in 1 syringes hold the Q.D. cartridge over the spittoon, turn the body to obtain sample. Replace the syringes over the Q.D. cartridge and return to hand piece holder
  - KAVO units, take a 3ml sample from each waterline, do not remove the 3 in 1 syringe
  - Adec units, take a 5 ml sample from each waterline, do not remove the 3 in 1 syringe
11. Take the completed samples and form to the Infection Prevention and Control laboratory

### **Provenance:**

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### **Target Professional groups:**

Dental nurses  
Dental staff  
Dental undergraduate and post graduate students  
Hygiene and Therapy students  
Student Dental nurses

### **Evidence base**



Resources used:  
Department of Health Guidance  
Dental chair company literature  
Expert opinion  
Journal publications  
Existing policy

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