

Appendix



**Introduction**

This document has been developed as an aid to support good clinical practices in reducing potential problems with air in line alarms.\*

Volumetric infusion pumps typically have 2 types of air in line alarm:

- Single bubble alarm
- Bubble accumulator alarm

Depending on the specifications and configuration of the infusion pump one or both of the alarm types may be available.

Air in the line is measured in microlitres, and the alarm limits are therefore set in microlitres (100 microlitres = 0.1ml).

# Managing Air-in-line Alarms

**Clinical Practices**



**Single bubble alarm**

The single bubble alarm can be configured to alarm at detected bubble sizes from 50 to 500 microlitres.

The air-in-line alarms will be triggered when a single bubble of a specific size e.g. 100 microlitres passes the air detector. The pump will stop infusing, and the user will need to investigate and then make a decision to either allow the air bubble to infuse into the patient or clear the air from the infusion set before restarting the infusion.



**Bubble accumulator alarm**

This works on a cumulative effect. Detectable bubble volumes will be cumulated and size measured as they pass the air-in-line detector until they reach a specific volume of air e.g. 1ml in a 15 minute time window.

When this air volume is reached the pump will alarm and stop infusing. This may lead to some confusion as the user will most likely not see a large bubble that they think caused the pump to alarm and may treat it as a nuisance alarm.



## Tips to help manage and reduce air-in-line issues\*



### Prime the line slowly.

Priming is the most common cause of air-in-line problems. The faster the line is primed the more air bubbles are generated in the line. However, if the line is primed slowly it will reduce fluid turbulence and the majority of the air will be removed from the set. Spending extra time priming the set slowly will save a significant amount of time attending to air-in-line alarms.



### Load set into pump as per Directions for Use

Raising the height of the fluid container above the pump (it should be at least 30cm above the pump) and positioning the pump at the level of the patient may reduce the formation of bubbles in the solution by increasing the pressure of the fluid in the line.



### Allowing medication that has been refrigerated to reach room temperature and tapping the bag prior to priming the line.

This will allow any gas bubbles that have been generated during the change in temperature to be removed from the fluid and not enter the IV infusion set.

Note: Not all infusions can be allowed to come to room temperature. Please refer to your Pharmacy department.



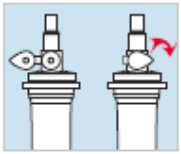
### Vigorous shaking or mixing of intravenous fluids may encourage the formation of air bubbles in some types of infusions.

Follow drug manufacturer's directions for use when mixing or compounding intravenous infusions. Gentle introduction of additional intravenous fluids will reduce turbulence and therefore the formation of foam and air bubbles.



### Ensuring the drip chamber is always filled to the mark or least half-full if there is no mark.

When the fluid bag empties the fluid level in the chamber drops. This can result in air being drawn down with fluid. If the fluid level in the chamber is always returned to half full when a new bag is put up the risk of air in the line is reduced.



### Confirming that the air inlet is shut.

If you are not infusing from a glass bottle or semi-rigid container the air inlet on the drip chamber needs to be closed.



### Air may become trapped in the ports and in-line filters during priming of the infusion set and then become dislodged during an infusion.

For ADULT patients: invert and tap the port(s)/valve(s) while priming. For PAEDIATRIC patients: once the set is primed attach a syringe and aspirate air through the port(s)/valve(s). In-line filters should be primed in the vertical position (inlet port up). DO NOT INVERT THE FILTER TO PRIME UNLESS SPECIFIED. Refer to filter directions for use.



### Attach an anti-siphon valve (ASV) to male luer on the pump set.

Fitting an ASV to an infusion set will increase the downstream pressure in the pump set. As a result the likelihood of the fluid degassing will be reduced.

Note: Remove the anti-siphon valve to use the infusion set for gravity infusions

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\*This tip sheet is not intended to be the comprehensive instructions for the set-up and operation of any of the Alaris® Volumetric Pumps. For complete pump information, refer to the Alaris® Volumetric Pump Directions for Use of the specific pump you are using. Prior to use all persons operating any Alaris® pump should consult the Directions for Use for that pump.

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