



**Using vacuum flasks and travel formula systems when making up  
infant formula  
February 2016**

**This statement offers advice to professionals who may be asked about making up powdered infant formula away from home or using vacuum flasks to make milk up at night.**

### **1. Vacuum Flasks**

The Department of Health recommend that the safest way to make up feeds from powdered infant formula (PIF) when away from home is to make the feed up freshly using a vacuum flask of boiled water. The boiling water should kill any bacteria present in the flask. The feed can then be made up in a sterilised feeding bottle using PIF pre-measured into a small, clean, dry container and the correct amount of boiled water from the vacuum flask. The Department of Health state that vacuum flasks, if full and securely sealed, will keep the water temperature above 70°C for several hours<sup>1</sup>.

We have tested a typical 17.5oz (500ml) vacuum flask and a 33oz (1000ml/1 litre) vacuum flask filled with boiling water. Both were typical stainless steel flasks. The flasks were tested filled with boiling water, and the smaller flask was also tested when smaller volumes of water were used. This is because it has been reported that some families take just the amount of water they need for a feed in a flask, and it is important to note how quickly smaller volumes of water cool.

The thermos flasks were both warmed for 1 minute with boiling water before use and the flasks were stored at an ambient temperature of about 19°C. The tests were conducted three times, with each time test completed on a freshly stored batch of boiling water.

Table 1 shows the results for the 500ml flask and Table 2 for the 1litre flask. Please note these are just estimates made by us in a domestic kitchen, and others may find they get different readings depending on types of flasks and thermometers used.

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<sup>1</sup> [http://www.nhs.uk/start4life/documents/pdfs/start4life\\_guide\\_to\\_bottle\\_feeding.pdf](http://www.nhs.uk/start4life/documents/pdfs/start4life_guide_to_bottle_feeding.pdf)

**Table 1.**  
**Boiling water stored in a 500ml vacuum flask**

| Amount of water in the flask                 | Temperature when boiling water first added to flask °C | Temperature after 30 minutes °C | Temperature after 1 hour °C | Temperature after 2 hours °C | Temperature after 3 hours °C |
|--|--|---------------------------------|-----------------------------|------------------------------|------------------------------|
| Full flask:<br>(approx.<br>17.5oz,<br>500ml) | 94   | 92                              | 90                          | 86                           | 76                           |
| 10oz<br>(280ml)                              | 93   | 80                              | 74                          | 72                           | 66                           |
| 5oz<br>(140ml)                               | 92   | 72                              | 70                          | 64                           | 58                           |

The 10oz flask of water was also tested at 2 hours and 30 minutes and the temperature had dropped to an average 68°C. This suggests that if smaller volumes are used, a minimum of 10oz of water should be carried in a flask, and that water should be used within 2 hours. Smaller amounts of 5oz will only remain at the correct temperature for about an hour.

A full flask of water securely sealed as suggested by The Department of Health remains at >70°C for at least 3 hours, and in our tests was still above 70°C after 4 hours.

**Table 2.**  
**Boiling water stored in a 1 litre (1000ml) vacuum flask**

| Amount of water in the flask                | Temperature when boiling water first added to flask °C | Temperature after 3 hours | Temperature after 5 hours | Temperature after 6 hours | Temperature after 7 hours |
|---|--|---------------------------|---------------------------|---------------------------|---------------------------|
| Full flask:<br>(approx.<br>33oz,<br>1000ml) | 94   | 86                        | 82                        | 78                        | 75                        |

If a 1 litre flask is filled with boiling water, it is likely that the water remains at above 70°C for at least 7 hours. This provides an option for parents who want to make up bottles of milk on longer outings, or during the night.

Care must be taken to avoid scalds when handling hot water, especially when a full litre flask of water is being used. Great care must be taken that the milk prepared for the infant is at the correct temperature. Run the prepared bottle of formula under a cold tap to cool and always test the milk on the inside of the wrist.

We have been asked whether it is possible to make up powder with smaller volumes of hot water to kill any bacteria present and then top up the bottle with cool, boiled water. There is however no evidence to suggest how much hot water is needed to mix with the powder to ensure that the powder has sufficient exposure to water at 70°C, and therefore standard advice remains to add the powder to the full volume of hot water, shake thoroughly, and then cool.

## 2. Travel formula systems. Combined formula mixer and bottle insulator: 'Myyfeed'



The *Myyfeed* formula mixer and bottle insulator at £24.99 (excluding the infant milk bottle). It is marketed as making the process of preparing a formula feed more convenient when outside the home. The product combines a container for pre-measured amounts of PIF which sits inside a bottle insulator above the feeding bottle of warm water. Placing the PIF container over the neck of the bottle and clicking a button on the container releases the PIF into the bottle, avoiding any spillage of the powder. The bottle must then be shaken to mix the PIF with the warm water.

Provided that the water has been previously boiled before being measured into the bottle and placed in the insulator, and the PIF is added when the water is not below 70°C, the product allows formula milk to be prepared according to current guidance (DH, 2012).

The manufacturers' suggest that the insulator will keep a 9 fluid ounce (210ml) bottle of water above 70°C for up to two hours but do not caution against smaller amounts which may be commonly measured into the bottle for a feed. There are other factors that will influence the rate at which the water cools including the temperature of the water when it was put in

the bottle, the volume of water and the ambient temperature and these factors may reduce the window of opportunity in which the water may be safely used.

We have taken the temperature of the water in the bottle using different amounts of water over different lengths of time, using 9oz/210ml of water suggested by the manufacturer and a smaller volume that parents of younger babies may measure into the bottle. We followed the procedures used for the vacuum flask work above and had the following average results. Please note these are our estimates, others may get different results.

| <b>Amount of water in the bottle</b> | <b>Temperature when boiling water added to bottle °C</b> | <b>Temperature after 30 minutes °C</b> | <b>Temperature after 1 hour °C</b> | <b>Temperature after 2 hours °C</b> | <b>Temperature after 3 hours °C</b> |
|--------------------------------------|--|--|------------------------------------|-------------------------------------|-------------------------------------|
| 9oz/210ml                            | 92   | 74                                     | 70                                 | 66                                  | 60                                  |
| 5oz/150ml                            | 92   | 72                                     | 68                                 | 60                                  | 56                                  |

We would conclude that this system is less effective than carrying water in a thermos flask, and the time saving of the automatic mixing, compared to using a pre-measured volume of powder in a small container seems minimal. If these flasks are used then a full bottle of boiling water should be used, and then some water discarded before the powder is added, and water should not be held in the container for more than 2 hours. Larger volumes than 9oz are not possible in a bottle held in this flask.