

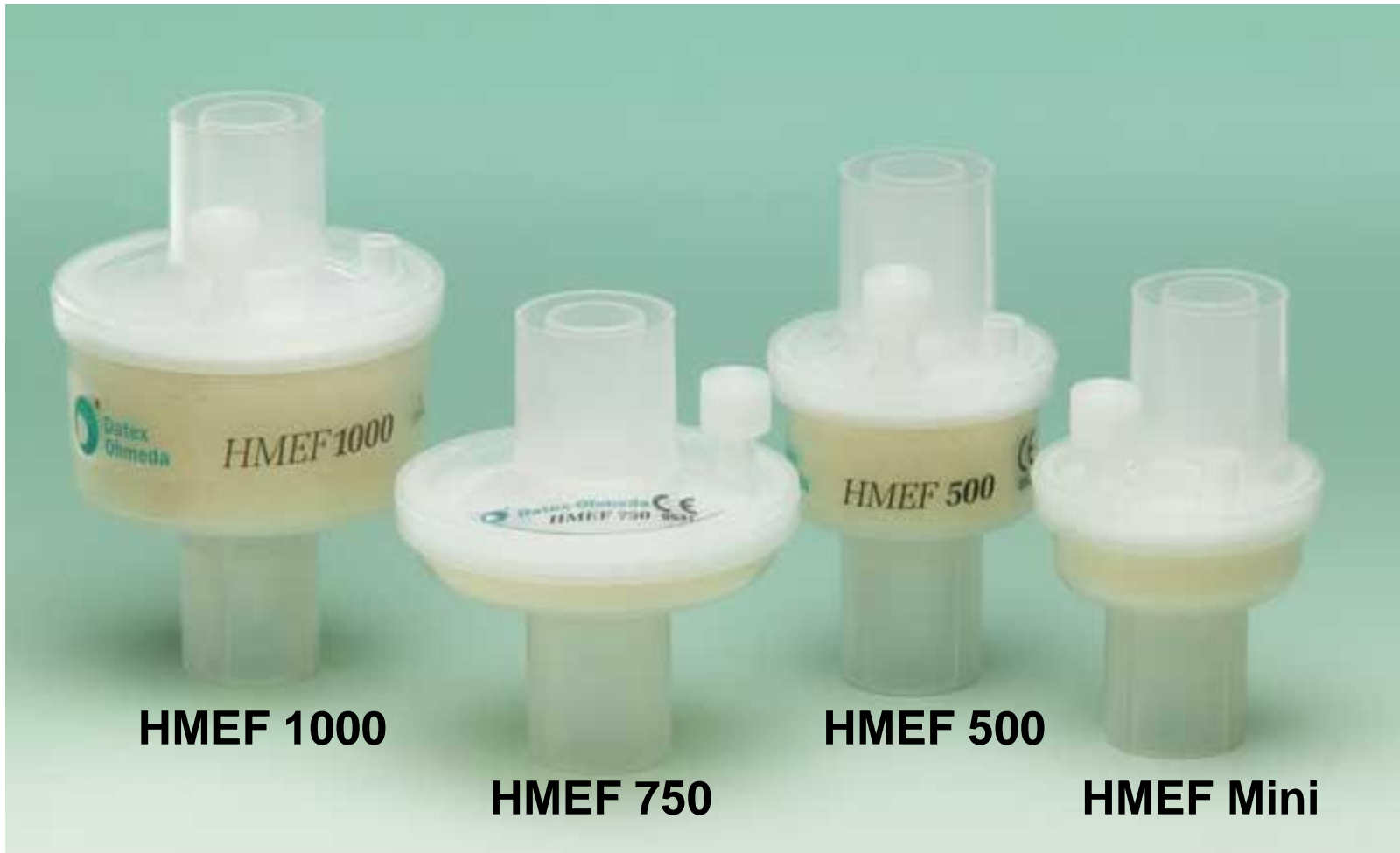
HMEF

Combined Humidification and Filtration

What is an HMEF?

- HME/Filter combination
- HME element made of cellular plastic (bulprene)
- CaCl_2 used as hygroscopic agent
- Electrostatic filter
- Used in both critical care and anesthesia

GEHC's HMEF Range



HMEF 1000 Kits



HMEF 1000 with Flexible Tube and Elbow Connector

- HMEF 1000 with Flexible tube and 15F/22M Elbow Connector
- Dead space 112 ml
- Weight 42 g
- Can be used throughout the anaesthesia delivery process:
 - During induction with the face mask
 - During maintenance while connected to ET tube
 - After extubation with the face mask
- Allows safe repositioning of the patient in the OR or ICU



Why cellular plastic & CaCl₂? - Edith has plastic Fibers & LiCl

Cellular plastic

- More consistent performance in production
- Better adjusted to automated manufacturing
- Cost

CaCl₂

- Simplified impregnation process
- Avoid future debate regarding the use of Lithium

Dead Space vs. Tidal Volume (TV) and Minute Ventilation(MV)

If the dead space of an HME(F) is 50 ml, tidal volume should be increased by 50 ml, compared to ventilation without an HME(F), to provide the same effective alveolar minute ventilation.

If end-tidal carbon dioxide ($E_t\text{CO}_2$) monitoring is available, it is essential to adjust the minute volume to provide a clinically relevant $E_t\text{CO}_2$ level with significantly increasing airway pressure (P_{peak}).

The clinician may also modify inspiratory time, inspiratory pause, respiration rate or tidal volume to achieve adequate alveolar ventilation.

Features & Benefits - HMEFs

Feature

- Excellent moisture output
- Low breathing resistance
- Low dead space
- Low weight
- Transparent housing
- Latex-free construction
- Wide range of products

Benefit

- Reduces need for active humid.
- Reduces work of breathing
- Helps ensure adequate ventilation
- Patient comfort and safety
- Easy to determine when to replace
- Safer use with all patients
- Meet various requirements

GEHC HMEF Advantages vs. Competition

HME element has plastic sponge structure

- Low breathing resistance = slight pressure drop
- Breathing resistance increases only slightly under humid conditions: from 0.64 to 0.69 cm H₂O
- HMEFs can be recommended for use in high humidity, low flow anesthesia
 - decreases humidity in the expiratory tube, because most of the humidity goes back to patient's airways

HMEF Product Concept

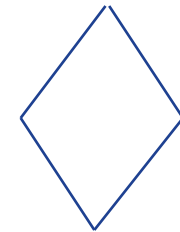
First priority for development:

Improved patient comfort!

- ➔ Light-weight
- ➔ Excellent moisture output
- ➔ Excellent filtration efficiency
- ➔ Low breathing resistance
- ➔ Low dead space
- ➔

Humidification/Filtration

**Breathing
resistance**



**Dead
space**

Weight