

A photograph of a miner in a dark tunnel. The miner is wearing a red helmet with a bright headlamp, a green jacket, and a harness. He is looking down and to the right. The background is dark with some wooden supports.

INTERNATIONAL MINES RESCUE CONFERENCE 2007

MASK WITH DRINKING DEVICE FOR PSS BG 4

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WE SEE YOU IN
THE UNITED STATES OF AMERICA
IN 2007!

2 YEARS AGO IN SYDNEY



STATEMENTS SYDNEY 2005

New full face mask

Three different sizes

Drinking device

New PSS (Personal Safety System) new components will be integrated

PSS BG 4 concept will be the mine rescue unit for the foreseeable future



TOPIC

Rescue teams around the world are trained to carry out risky tasks in order to save lives, rescue people, help maintain and restore infrastructure. Only the best are chosen to do the job and they deserve the best equipment.

Regardless of the best possible training and equipment, the physical and mental stress on the members of a mines rescue team is significant and dehydration will have a major impact on performance.

Water can help to reduce this negative impact.

DEHYDRATION

What is dehydration ?

Medically, it is a condition in which the body contains an insufficient volume of water for normal functioning.¹⁾

Signs of dehydration ?

- Thirst
- Headache^{1) 2)}
- Loss of performance
- Low endurance
- Rapid heart rate
- Elevated body temperatures
- Extreme sleepiness
- Fainting
- Vision may dim
- Delirium

1) www.wikipedia.org/wiki/dehydration

2) www.quickcare.org

DEHYDRATION

Consequences for Mines Rescue teams

The information provided is generally acknowledged and not in question, but what are the consequences, taking into account that mines rescue operations are usually paired with difficult environmental conditions: i.e. heat, fire, poor visibility, contaminated air, humidity, physical and mental stress ?

Miners do have the chance to adjust their behavior to the workplace conditions

- work-rest cycles
- mandatory water breaks

to name just a few, but mines rescue teams do not have this option. Presently they can not drink during their operation, only when they return to a fresh air base.

They have to rely on their physical fitness, intensive training, effective teamwork and the equipment they carry. Any sign of dehydration is dangerous for the individual and for all members of a team.

DEHYDRATION

Consequences for Mines Rescue teams

Dräger Safety is a global manufacturer of life supporting system, such as the PSS BG 4. It is our passion to continuously improve the understanding of our clients and their markets. Our responsibility is to provide maximum protection to life and health, optimising key product features like performance, comfort, handling and reliability.

A full face mask with a drinking device was the obvious contribution to support the members of mines rescue teams.

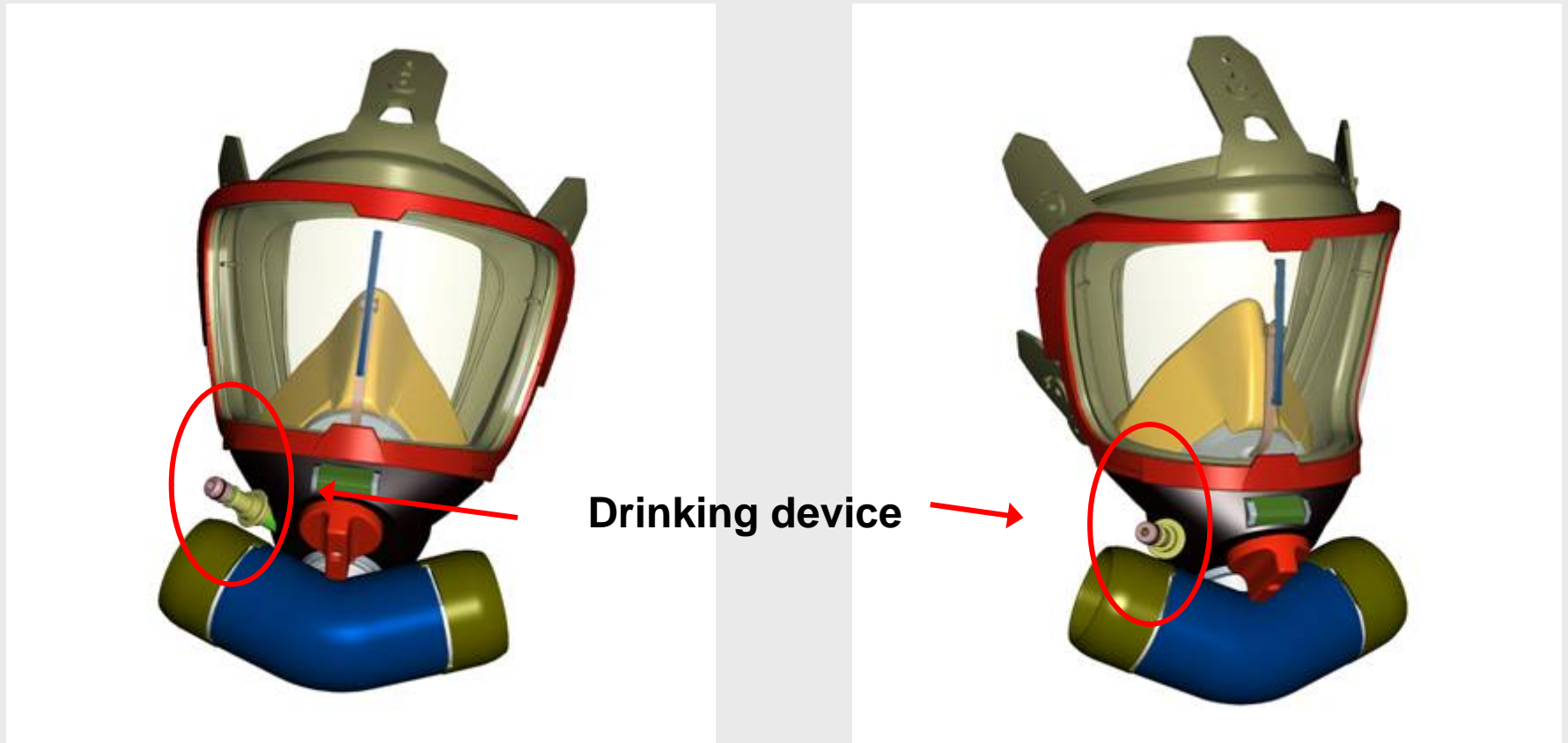
As water is considered to be the best liquid for fluid replacement ¹⁾, we are looking at a hydration system with the following features:

- easy to use
- safe to use
- easy to maintain
- easy to clean

1) Kielblock and Schutte (1993) „Human Heat Stress: Basic Principles, Consequences and ist Management“

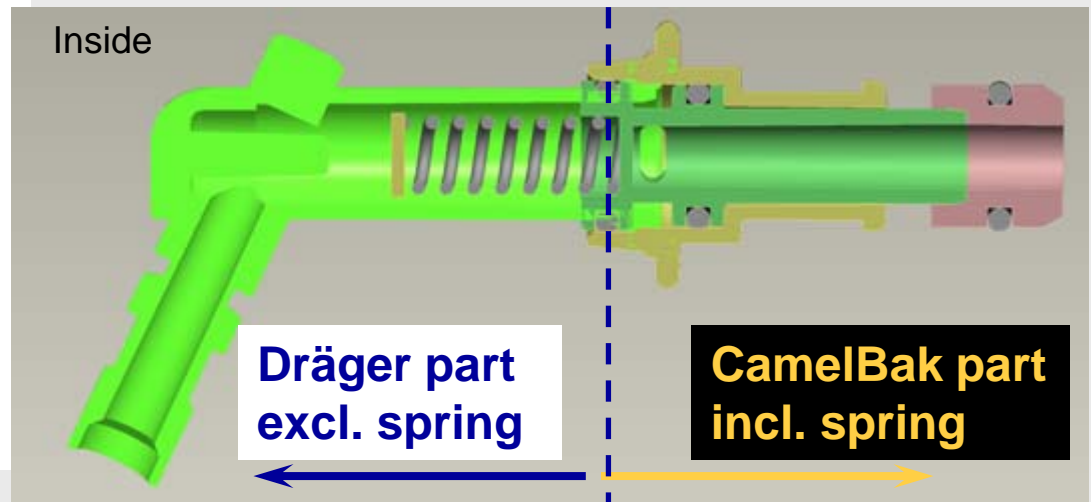
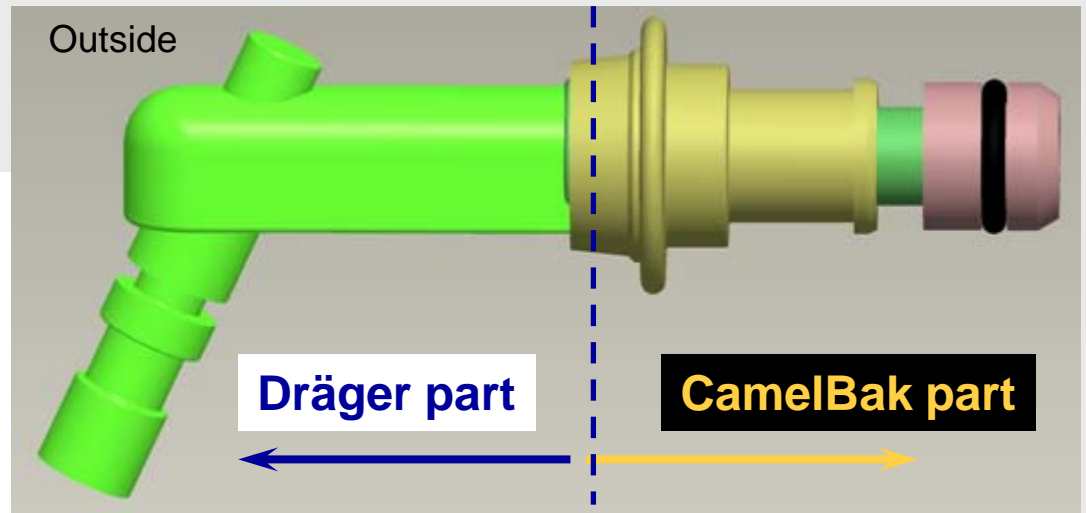
TECHNICAL CONCEPT

Dräger FPS 7000 RP with drinking device



TECHNICAL CONCEPT

Dräger FPS 7000 RP with drinking device



HYDRATION

How much water is sufficient ?

This is difficult to answer, because one needs to find the balance between water and weight.

Water loss (examples):

1 gallon = 3.785 liters

- 2.5 liters / day

Normal day (England) ¹⁾

- 3 gallons (11.4 liters)

Hot weather ²⁾

- 1.5 liters / hour

Military operation in hot environment ³⁾

- 1 – 2.2 liters / hour

Heavy physical exertion in heat ⁴⁾

Counter measures:

Drink water before, during and after your tasks. Up to 2 gallons (7.6 liters) / day or for example 4 cups (1 to 1.2 liters) an hour.⁵⁾

1) www.wikipedia.org/wiki/dehydration

2) Occupational & Environmental Health College of Agriculture & Life Science

3) British Army / Defense Science and Technology Laboratory

4) Sue Leveritt / Heat Stress in Mining

5) Bach / Occupational Health and Safety, published by MSHA in Metal and Nonmetal Quarterly Volume 1, # 2

HYDRATION

Would 2 liters be acceptable ?

4 cups (1 to 1.2 liters) per hour are recommended. That would be between 2 to 2.5 liters for a 2 hour operation.

We can not give the answer, but we can offer options on where to place water containers; that can be bottles or bladders/tubes. CamelBak offers a large variety of solutions, adaptable to our connection.

On the following pictures you will see a 3 liter bladder worn on the chest. This is only used as an example.

MASK WITH DRINKING DEVICE



Drinking port covered



Drinking hose connected

3 | CamelBak bladder

MASK WITH DRINKING DEVICE

Project Schedule

Many of the components of the mask are finalized.

Still open are the wiper, the connecting piece with standard RP connection and the drinking device adaption.

Towards the end of this year, we plan to carry out a field trial to let you confirm, if this is the solution that fits your needs.

Provided the trial does not require a major re-design, we plan to have the mask with drinking device available around middle of next year. That does include the necessary approvals (EN and NIOSH) to start with.

MASK WITH DRINKING DEVICE

Future

Experience and time will tell us in what way such a feature can improve the performance of mines rescue.

Already today the teams are performing at the highest level, but we are certain that even this level can be exceeded by „just“ adding water at a time when it is mostly needed.

We hope that we have the chance to discuss your experiences in 2 years time at the next, the 4th International Mines Rescue Conference.



Thank you for your attention