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Full-face masks for diving applications: an overview

Giorgio Caramanna[1], Jouni Leinikki[2]

Introduction

The term “full-face” refers to a mask designed to cover a diver’s face – including eyes, nose and mouth – in a single volume, differing from the traditional “half-mask” which covers only the eyes and nose. The full-face mask therefore offers a higher degree of protection.

Using a full-face mask, a diver can breathe through the nose. Because a mouthpiece is not needed, it is possible to speak with other divers and the surface team when the full face is equipped with communicators.

Diving configurations

SCUBA diving

In this case, the full-face mask is added to the standard SCUBA configuration maintaining the freedom of movement that is typical of this diving technique.

Another independent air source, including at least a second stage (octopus), should be present.

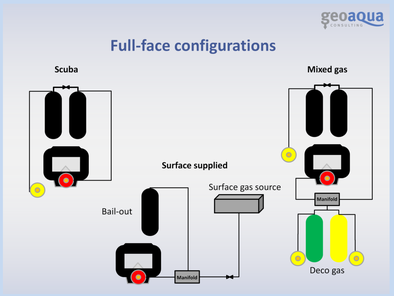
A spare half-mask should be carried and the diver should be proficient in removing the full-face and replacing it with the mask.

Mixed gas diving

The full-face may also be connected through a manifold to other breathing gas sources. The cylinders should have an independent regulator to be used in case of failure of the full-face mask.

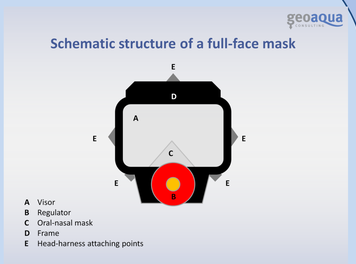
Surface-supplied diving

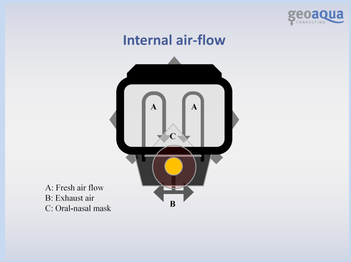
In surface-supplied diving, breathing gas is provided from the surface through an umbilical. In the unlikely event of a failure of surface-supplied, a bailout cylinder with enough breathing gas for safe surfacing is carried. The second stage of the full-face mask is connected to a manifold that accepts the main supply form the umbilical (this must have a non-return valve installed) and the bailout gas from the first stage on the bailout cylinder.



Main features

In general, full-face masks are equipped with an on-demand second stage regulator, which is activated when the pressure inside the mask drops after the inhalation phase. The air is then vented outside through the regulator exhaust valve or, in some models, through a dedicated valve usually placed on the bottom of the mask frame. A few models can be equipped with a positive-pressure regulator that is able to maintain an inner pressure above that of the surrounding environment with a controlled continuous flow of breathing gas inside the mask





Because the mask also includes a regulator, water should not enter and therefore the visor cannot be cleared by flooding the mask; instead, it must be defogged by another system such as a stream of fresh air circulating along appropriate paths. Usually, fresh air enters the mask from the visor base and flows along its surface before entering the oral-nasal mask. The exhaust air is then vented through the regulator baffles or a specific venting valve.

Comparative table of some key features of full-face masks

Model	Defogging	Diving mode	Regulator	Communicator
Divator MKII	Airflow	SCUBA Surface-supplied	Dedicated	Wireless Wired
Exo-26	n.a.	SCUBA Surface-supplied	Dedicated	Wireless Wired
M48-MOD-1	n.a.	SCUBA Surface-supplied Rebreather	Multiple choices	Wireless Wired
Atmosphere	Airflow	SCUBA	Dedicated	Wireless
Panorama Nova Dive	n.a.	SCUBA Rebreather	Multiple choices	Wireless
Guardian	Airflow	SCUBA	Dedicated	Wireless
Neptune G-Divers	Airflow	SCUBA	Dedicated	Wireless
Neptune “Pro”	Airflow	SCUBA Surface-supplied	Dedicated	Wireless Wired
Apollo Bio	Airflow	SCUBA	Dedicated	Wireless

Safety issues

Loss of communication

One of the main advantages in using a full-face is the possibility of talking with the diving team and the surface. If there is failure in the communication line, the dive should be terminated if no alternative communication methods are feasible.

Broken faceport

A full-face with a broken faceport will flood immediately. If this happens, the diver should replace the full-face with a spare mask and start breathing through an alternative air source, terminating the dive following a safe ascent to the surface.

Water ingression

In case of water ingression, the diver should assume a “chin up” position and press the second stage purge button. If the dive was in polluted water, the diver – having being exposed to contaminants – should go through an appropriate medical assessment.

Sharing breathing gas

The full-face can be equipped with a manifold and quick disconnection hoses so that one breathing gas source can be shared between two divers. A further alternative is the use of secondary regulators to be shared between the divers as in standard SCUBA configuration; in this case, the diver in need of breathing gas will replace the full face with the spare standard mask and breathe through the alternate regulator offered by the other diver.

Increased gas consumption

When using a full-face mask, an increase in breathing gas usage is quite common. The diver should therefore reassess the breathing rate when using the full-face in order to correctly plan the breathing gas management.

Fogging

In order to avoid fogging of the faceport, the inside of the mask should be maintained as dry as possible.

Equalization

Because of the shape of the full-face, it is not possible to pinch the nose to equalize; depending on the model, different devices allow nostrils to be closed.

Changes in buoyancy

The larger volume of a full-face affects the diver’s overall buoyancy; some models allow for small trimming ballasts to be added.

Contacts

[1]GeoAqua Consulting, PO Box 2805, Vineyard Haven, MA 02568, USA
giorgio.caramanna@gmail.com

[2]Alleco Oy, Veneentekijäntie 4, Helsinki, Finland
jouni.leinikki@alleco.fi

Conclusions

The main advantage is that by using a full-face equipped with a communication system, it is possible to talk among the members of a diving team and between divers and surface crew.

Full-face masks provide a higher degree of protection from the surrounding environment than a standard half-mask and regulator mostly in terms of thermal insulation.

Moreover, in case of loss of consciousness, the diver will still be able to breathe thereby increasing the chances of successful rescue.

As for other diving equipment, acquiring skills and experience about the use of the mask, and especially regarding the bailout and emergency procedures, is mandatory for its safe and enjoyable use.

Selected references

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