

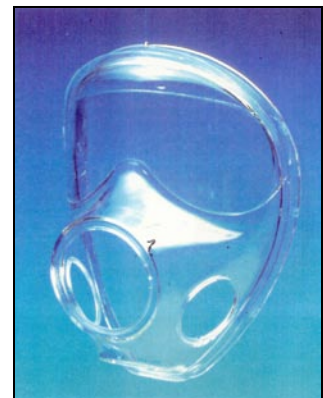
### Technical Mask Information



#### 1. INTEGRAL FACE-PIECE

##### General features

This stiff, transparent structure is the actual supporting body of the SGE 400 protective mask. Its task is to take place of the rubber bodies previously employed by traditional designs to bear the weight to which the mask is subjected. This unit supports the head harness, valves, filters, regulators, etc.



The advantages of this innovation are:

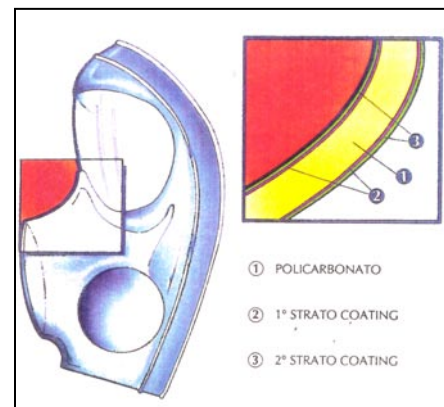
- a substantially reduced mask weight
- a better field of vision (practically the whole mask is transparent)
- the weight is held by a rigid structure, unlike the traditional rubber body which is flexible
- protection of the face is guaranteed by the impact and cut resistant structure
- for the above reasons and the consequent lack of discomfort due to limitation of field of vision, the mask fits comfortably which increases the amount of time a person can wear it
- the wearer can be easily identified due to the total transparency of the face-piece, helping to normalize conditions and maintain discipline

The main part of the face-piece, which consists of a large round surface in front of the eyes, is set back in the structure, thus keeping the overall dimensions to a minimum, reducing the risk of scratching and allowing the use of optical instruments so often used in today's armed forces. The material used is a specially coated polycarbonate (SGE 400; SGE 400/3; SGE 400/3 BB only), which transmits no less than 90% of available light while absorbing U.V. rays.

### **Mechanical features**

In the SGE masks, the entire bodies of the masks are made of a strong, rigid material (polycarbonate) and are therefore able to allow full protection for the face and eyes against extremely violent impacts.

Laboratory tests have been carried out proving that the polycarbonate body is left unharmed by a 6.35 caliber bullet hitting it at a speed of more than 150 m/seconds. This means that the whole face is given the same protection afforded by the protective helmet.



### **Resistance to chemical agents**

Treatment of the outer surfaces (SGE 400; SGE 400/3; SGE 400/3 BB only) makes the polycarbonate resistant to aggressive substances. Samples of the treated material have been subjected to mustard gas penetration tests. After over 50 hours, mustard

gas failed to penetrate through the tested specimens.

The treated face-piece may also be decontaminated an unlimited number of times without deterioration, using all the normal decontamination methods including immersion in boiling water.

### Material used

Face-piece: Transparent polycarbonate

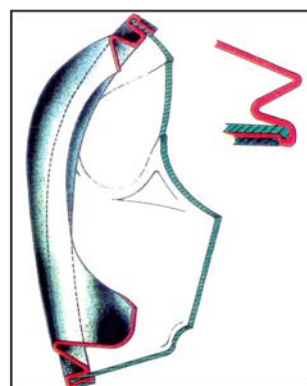
Treatment (SGE 400; SGE 400/3; SGE 400/3 BB only): Polysiloxane resin

## 2. FACE-SEAL

Due to the use of an integral load-bearing face-piece, it was possible to make the rubber face-seal much lighter, as its only function is to act as a seal. Traditional masks consist basically of a load-bearing rubber structure fitted with two sealed eye-pieces, and since the rubber body has to bear the weight of all the accessories attached to the mask it has to be made rigid and thick (heavy and uncomfortable) and will therefore not adhere comfortably to the wearer's face.



Our face-seal, on the other hand, is made of very soft rubber with a supple bellows type structure which allows perfect sealing and a very high degree of comfort even after very prolonged use. The bellows type structure also allows it to adjust easily to all face shapes, so that it is no longer necessary to stock large numbers of different sizes of masks, many of which will go unused.



The face-seal has a seat into which the edge of the load-bearing face-piece is inserted, and the coupling of these two parts is ensured by the fixing rim. As a whole, the straps, face-seal and stiff body of the mask together provide far more comfort than traditional masks.

In the case of traditional flexible rubber bodies, the tensile stresses exerted by the ends of the straps are discharged only on the points where these join the body. In order to obtain uniform sealing all around the edge of the mask, it is therefore necessary to pull the straps very tight.

Naturally, this situation is one of the greatest causes of discomfort when using traditional masks. The stiff body of the SGE means the effort applied by the straps is distributed evenly and perfectly all around the edges of the mask so it is not

necessary to tighten the straps excessively and uncomfortably.

## Materials

Platinum–catalyzed grade silicone rubber.

### 3. FILTER FITTINGS

The SGE masks have a threaded fitting for application of standard filters (DIN 3183, UNI 7246). The fitting is contained in a single unit which also comprises the exhalation valve.

The shape of the internal ring nut allows perfect ventilation of the whole face-piece, preventing misting even at low temperatures.



### Mechanical characteristics

The material used is black polyarilamide, created for aeronautical and aerospace requirements. In addition to a very high impact resistance, it is not affected by aging or atmospheric factors. Its abrasion resistance is such that after testing with over 3000 assembly/disassembly operations, the filter had sustained no wear.

### Material used

Technopolymer parts: Polyarilamide reinforced with mineral charges

Membrane: Polyisoprene mixture

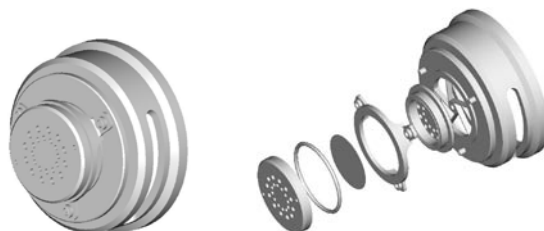
### 4. EXHALATION VALVE

As already seen, the exhalation valve is fitted onto the same unit containing the filter fitting. Externally the valve has a structure which, although it covers the whole membrane, still allows easy discharging of the exhaled air. The purpose of this covering structure is to keep a sufficient volume of uncontaminated air in continuous contact with the membrane.



### 5. SPEECH DIAPHRAGM (Optional)

The speech diaphragm coincides with the exhalation membrane.



## 6. MEMBRANES

The exhalation membrane has been made to require minimum effort even at very high flow rates. The excellent memory of the membranes has been achieved by a combination of good design and high grade material. Using blends containing butyl rubbers instead of the traditional natural rubber used by other manufacturers, causing a considerable increase in resistance to chemical agents, has been achieved.



## 7. ORAL-NASAL UNIT

The design of this component is critical to the effectiveness and comfort of the mask. Because it comes in direct contact with particularly sensitive areas of the face, the correct choice of shape and material was vital. The oral-nasal area of our mask is made of soft medical grade silicone rubber, designed specifically for use in contact with the human body for indefinite periods of time without causing irritation or allergic reactions of any kind.



The shape is designed to provide optimum comfort and efficiency; the U shaped peripheral lip performs the following important functions:

- it adheres softly and evenly to the face, following its contours perfectly
- it has a sufficiently rigid structure to ensure effective sealing during inhalation
- it is sufficiently soft to open and swells under the slight pressure caused by exhalation, isolating the nose and mouth area perfectly from the rest of the mask

### **Breathing valve system**

Two very light inhalation valves are attached laterally to the oral-nasal unit, the lower part of which is connected to the auxiliary drainage valve. The front part of the oral-nasal unit is attached into the exhalation/speech/feeding valve unit. This union is obtained by using the rubber's elasticity, guaranteeing perfect sealing, and in addition allows for the easy removal of the oral-nasal unit (for replacement or

cleaning purposes) by hand without the need for any tools.

## Materials

Membrane: Polysoprene

Oral-nasal unit: Platinum-catalyzed medical grade silicone rubber

## 8. FIXING RIM AND STRAP

The fixing rim has the role of connecting the straps to the frame of the mask and at the same time fixing and locking the face-seal and the incorporated hood, if used. Once the rim is tightened in place by means of the special screw, it fits into a special seat in the frame of the mask. In this way, the pull exerted on the fixing points of the head harness is transferred and distributed evenly around the whole circumference of the mask, allowing perfect adjustment of its tightness for maximum comfort and optimum sealing on the face of the wearer. It should be pointed out that this is not possible with the traditional mask, as the pull exerted by the strap itself is secured, thus requiring the wearer to over-tighten the mask, drastically reducing the level of comfort.

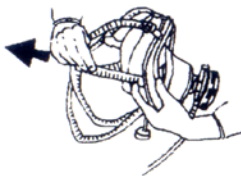


## Materials:

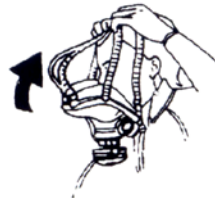
Rim: Polyamide 11

Head-strap: Nitril

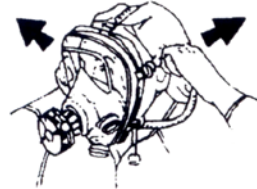
- (1) Loosen all the straps  
(1) Allungare tutti i cinghiaggi



- (2) Wear the mask  
(2) Indossare la maschera



- (3) Adjust the side straps  
(3) Regolare i cinghiaggi laterali



- (4) Correct position of the spider  
(4) Posizione corretta del cinturino



- (5) Adjust the lower straps  
(5) Regolare i cinghiaggi inferiori



- (6) Adjust the top straps  
(6) Regolare i cinghiaggi superiori



## **9. CLEANING AND DECONTAMINATION**

The mask design makes decontamination and cleaning easier. In fact, even when rubber is made of mixtures capable of providing a chemical shield, its structure does absorb and is penetrated by the contaminants. The SGE masks are made of two main parts: face shield and face seal. So the majority of the mask is made of plastic materials which are not permeable to aggressive agents, and are not penetrated by them in the least even after very long exposure times. It is advisable to clean the mask each time after use. This is easily accomplished by washing with soap and water. Hot water can also be used. The mask can be disinfected using non-aggressive disinfectants or by immersing it briefly in boiling water. At least once a year the inhalation and exhalation membranes must be checked, as well as the sealing gasket of the fitting on the mask.