

Chapter 6

INWARD RELIEF AND EXCESS PRESSURE VALVE, TYPE RV51/2

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ILLUSTRATION

Details of valve, Type RV51/2 *Fig.*
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Purpose

1. The Hymatic Valve, Type RV51/2 is provided to control the pressure of oxygen supplied from a continuous-flow type of emergency oxygen system for pressure breathing. It performs this function by providing for the outward relief of excess pressure, and inward venting when the system pressure drops. A non-return valve isolates the emergency system (when not in use) from the normal oxygen supply.

2. The circumstances in which the component would operate are as follows :—

- (1) Failure of the main oxygen supply at altitudes in excess of 10,000 ft. Emergency oxygen would then be used whilst descending to 10,000 ft.
- (2) Escape of a crew member (with or without ejection) from an altitude in excess of 10,000 ft.
- (3) Simultaneous failure of cabin pressure and main oxygen supply. In this instance the valve would maintain the required pressure in the crew member's clothing in addition to supplying emergency oxygen for breathing.

Supply data

3. The essential characteristics of the valve are as follows :—

- (1) It provides the user with up to 12.8 litres per min. of oxygen at a pressure of 3 in. to 6 in. water gauge *above ambient pressure* up to 40,000 ft. when 13 litres per min. of oxygen are supplied to the valve.
- (2) It provides the user with up to 12.8 litres per min. of oxygen at a pressure of between 2.7 and 3.3 lb/in² *absolute* when 13 litres per min. are supplied to the valve at heights above 40,000 ft.
- (3) It allows the user to breathe air from ambient atmosphere when the flow from the emergency oxygen supply has fallen below the respiratory demand (or if the emergency oxygen supply is not connected) so that a flow of 40 litres per min. of air will pass into the system under a suction

of 8 to 10 in. water gauge. This figure has been chosen deliberately to provide the user with a warning that his emergency oxygen supply is becoming exhausted (or that it is not available to him).

(4) To provide a means of isolating the emergency oxygen supply from the normal oxygen supply when the former is out of use.

Description

4. The valve (*fig. 1*) consists of four components within a light alloy casting as follows :—

- (1) Oxygen inlet valve
- (2) Excess pressure valve
- (3) Non-return valve
- (4) Inward relief valve.

Oxygen inlet valve

5. This is a mushroom-shaped, spring-loaded rubber valve which seals on a cupped seating and is automatically opened when the oxygen inlet is connected by a standard bayonet fitting to the emergency oxygen bottle. Its function is to ensure that when the emergency oxygen is disconnected from the valve, the crew member is made aware that he is not receiving his emergency oxygen at normal pressure because of the pressure drop through the inward relief valve, and also to exclude dirt from the Hymatic valve when it is not connected to the system.

Excess pressure valve

6. This consists of a disc-type valve sealing onto a raised seat. It is spring controlled with an ambient pressure reference at all altitudes up to 40,000 ft. Above this altitude the valve is controlled by a barometric capsule and has an absolute reference. Excess pressure within the system tends to open the valve and spill excess to atmosphere.

Non-return valve

7. The outlet of this valve is designed for use with anti-kink hose and contains a non-return valve,

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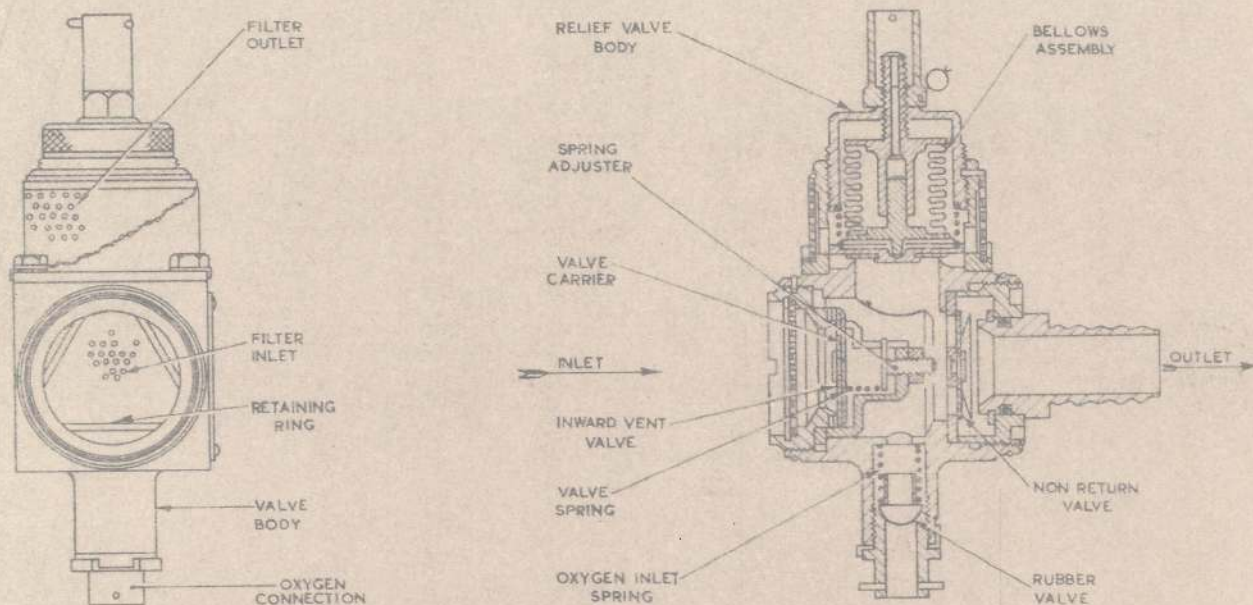


Fig. 1. Details of valve, Type RV51/2

This is a light, flap-type rubber valve covering a series of ports through which the emergency oxygen passes to the crew member. Any reversal of oxygen is prevented immediately by the valve closing. Hence the emergency oxygen system is isolated from the main oxygen system when the former is out of use and the crew member is breathing from his normal oxygen supply.

Inward relief valve

8. This is a simple disc type valve (spring-loaded

under normal conditions) which seals onto a raised seat. If the emergency oxygen system becomes exhausted, a suction greater than that needed for normal inspiration will open the inward relief valve and allow the ingress of ambient air. The increased suction which is then required for breathing serves as a warning to the user that *air* and not *oxygen* is being inhaled and that descent must be made immediately to an altitude at which anoxia (loss of consciousness due to lack of oxygen) would not occur.

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