

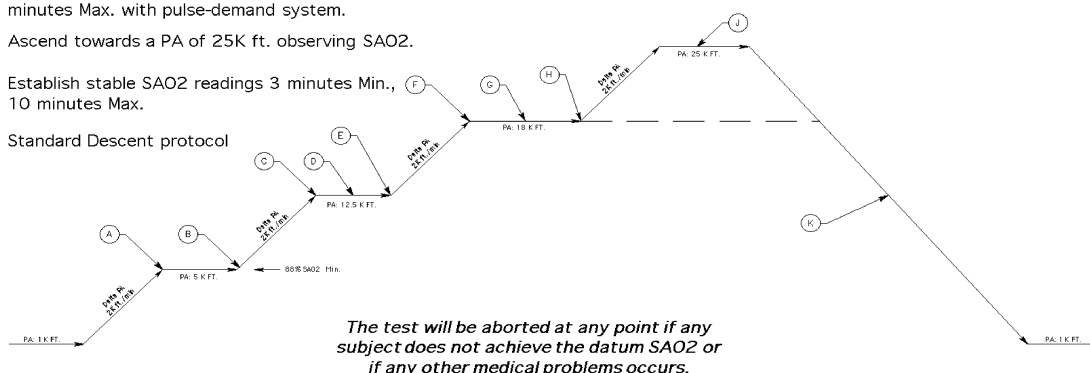
## ALPS Face mask TSO applicability

The Alps series of nasal oral facemask system are, for the most part, unique to a new testing protocol established in part by MH Oxygen and FAA CAMI. FAA/TSO C64a, C89a and C103 are the base line requirements for a CAMI testing protocol that resulted in a test report titled 'Performance Evaluation of Pulse Oxygen Designs Designated for General Aviation Use at Altitudes up to 25,000 Feet Above Sea Level' Report No. DOT/FAA/AM-06X. During the testing at CAMI, the Alps mask was expected to pass the physiological aspects outlined in the afore mentioned list of TSOs. Once this was established the Alps mask was subjected to several altitude chamber runs with several persons in both pulse demand and constant flow mode up to pressure altitudes of 25,000 ft.

- A: Establish SAO2 datum in 3 minutes min., 10 minutes Max.
- B: Don cannula with pulse-demand system and ascend towards a PA of 12.5K ft. observing SAO2.
- C: Establish stable SAO2 readings 3 minutes Min., 10 minutes Max. with pulse-demand system.
- D: Establish stable SAO2 readings in 3 minutes Min., 10 minutes Max. with pulse demand system. Change to constant-flow with cannula with flow meter @ 800 ml/minute and reestablish SAO2 readings in 3 minutes Min., 10 minutes Max.
- E: ReDon cannula with pulse-demand system and ascend towards a PA of 18K Ft. observing SAO2.
- F: Establish stable SAO2 readings 3 minutes Min., 10 minutes Max. with pulse-demand system.
- G: Change to face-mask and reestablish SAO2 readings in 3 minutes Min., 10 minutes Max. with pulse-demand system.
- H: Ascend towards a PA of 25K ft. observing SAO2.
- J: Establish stable SAO2 readings 3 minutes Min., 10 minutes Max.
- K: Standard Descent protocol

### Notes & Cautions

SAO2 readings will be incorrect because of disturbances to the pulse oxymeter during movements of the test subject. Therefore it is most advised that someone be available to assist if any equipment changes are made during testing.



The accumulator bag on many facemasks was primarily intended to provide a means to detect that oxygen is flowing and have also acted as a rebreather for medical applications requiring the mitigation of CO<sub>2</sub> depletion. Many masks have check valve assemblies to reduce back flowing during exhalations. Almost all of the oxygen masks used in aviation are in part a hand-me-down from the medical oxygen therapy arena. In some instances, the accumulator bag has demonstrated a modest ability to provide a beneficial bolus of oxygen at the start of the inhalation phase. This has yielded the SBA class of passive phase dilution masks. A good example of this is the so-called 'dixie-cup' drop mask commonly used in passenger airlines. Many other types of SBA class nasal oral face mask designs came into existence designed specifically for aviation using the accumulator bag.

The accumulator bag was not included in the Alps series because the EDS electronic Pulse Demand System provided the indication for positive oxygen flow from an in-line flow indicator and annunciation indicators on the system, thus eliminating the immediate need of the bag. In addition, because of the immediate active response of the pulse demand system to inhalation efforts balancing the O<sub>2</sub> and CO<sub>2</sub> levels more actively, the accumulator bag was not needed and became the final configuration tested. It has been discussed that yet another TSO may be established as a result of this testing.