

## **POF014: General platform presentation**

### **Work of Breathing, a proven and not-so-novel way to judge RPD**

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**Abstract:**

The level of breathing resistance in an RPD has to be determined to judge if it is easy enough to breathe on. Measurements of peak pressures have been used in some fields. However, peak pressures are very sensitive to the actual flow of gas, even a small change in flow can lead to a large change in peak pressures.

In other fields the measurement of work of breathing (WOB) has been used to determine the effort required to breathe. WOB measurements look at the entire breath, not just at two points. This method has been used in respiratory physiology since the 1950s and it has been used to judge the acceptability of a breathing apparatus for civilian and military diving since the 1980s. ISO recently published this method to judge acceptability of an RPD (ISO 16900-12). Levels of WOB that are acceptable by people have been adopted by ISO (16976-4).

A breathing machine is used to breathe an RPD under test. Measurements of pressure drop and either flow or volume are needed. It is convenient to plot pressure against volume. Such a PV-plot reveals many characteristics about an RPD and can make calculations of WOB easier. Developers and test houses can use PV-plots to get details of an RPD's performance.

Standardized orifices (ISO 16900-5) are used to verify that the entire system gives consistent and reproducible results, both day-to-day in a test house and between test houses on different continents.

Using WOB measurements as a way to judge RPDs is a proven and robust method. Human based limits for WOB are known. A standardized verification orifice allows consistent and reproducible results.