

Performance of Breath-Synchronized PAPR (1)

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ABSTRACT

Compared to negative pressure particulate respirators, it is generally considered that PAPRs (Powered Air Purifying Respirators, equipped with motor fan), have the advantages in terms of its protection feature against contaminated air and lower breathing resistance. However, most of PAPRs in the market are designed only to keep continuously blowing filtered air. This carries such inconveniences as “Frequent filter replacement costs a lot.”, “Large size battery is required for full shift work” and “High exhalation resistance makes exhalation breathing considerably choking.” Due to these aspects, PAPRs have not been widely accepted by the market for the works with dusts except some applications. In 2002, we invented our very original technology for PAPRs, so called “Breath-Synchronized Air Flow System (BSFS)”, followed by the Breath-Synchronized Powered Air Purifying Respirator; model “Breath Link 10” that embodied the BSFS technology. We tested model BL-50 (brand new product developed from BL-10) to check its ability to synchronize with breath patterns and its cost performance. In this test, we used such factors as Sine-wave generated by breathing simulator, air flow comparison between actual breathing and BSFS airflow with treadmill work load and variation of internal air pressure of facepiece in comparison with several breathing patterns.