

characteristics between these respirators and airline respirators at the same flow rates, with the new class having an APF of 1,000 (loose-fitting facepiece SARs continued to receive an APF of 25). Accordingly, OSHA is proposing in this rulemaking to follow the procedure adopted by the 1992 ANSI standard and divide the two respirator types into separate classes, based principally on the WPF and SWPF performance of the continuous flow SARs with hoods or helmets.

*OSHA's proposed APF for loose-fitting facepiece SARs.* No WPF or SWPF studies involving this respirator class were available. Therefore, using analogous operational characteristics between these respirators and loose-fitting facepiece PAPRs, OSHA is proposing to assign loose-fitting facepiece SARs an APF of 25. In this regard, loose-fitting facepiece SARs, when evaluated under the NIOSH respirator-certification standards (42 CFR part 84), had the same minimum airflow rates found for loose-fitting facepiece PAPRs. Additional support for the proposed APF comes from the 1987 NIOSH RDL and the 1992 ANSI standard, both of which gave this respirator class an APF of 25.

#### 6. Self-Contained Breathing Apparatuses (SCBAs)

*Historical development of APFs for SCBAs.* As he did with full facepiece SARs used in the demand mode, Hyatt in 1976 assigned a protection factor of 50 to a full facepiece SCBA operated in this mode. Based on results from a panel of 31 respirator users tested at LANL, he gave full facepiece SCBAs used in the pressure demand mode an APF of 10,000+ (Ex. 2). The 1980 ANSI standard listed half-mask and full facepiece SCBAs operated in the demand mode as having APFs of 10 and 100, respectively, when qualitatively fit

tested; when quantitatively fit tested, the APFs for half-mask or full facepiece SCBAs functioning in the demand mode were the protection factors obtained during fit testing, with this APF limited to the sub-IDLH value. Full facepiece SCBAs used in the pressure demand mode received an APF of 10,000+. The 1987 NIOSH RDL recommended that half-mask and full facepiece SCBAs operated in the demand mode receive APFs of 10 and 50, respectively, and that the APF for full facepiece SCBAs operated in the pressure demand or other positive pressure mode be 10,000.

The committee responsible for the 1992 ANSI standard could not reach a consensus on an APF for full facepiece pressure demand SCBAs. As noted in footnote 4 of the APF table in this ANSI standard, available WPF and SWPF studies reported that, in some individual cases, the respirators did not achieve an APF of 10,000 (Ex. 1–50). Nevertheless, the committee found that a maximum APF of 10,000 was appropriate when employers used the respirators for emergency planning purposes and could estimate levels of hazardous substances in the workplace.

Two newly developed respirators equipped with hoods, Draeger's Air Boss Guardian and Survivair's Puma, have operational characteristics similar to SCBAs. The facepiece of the Draeger respirator consists of a hood with an inner nose cup and a seal at the neck; an air cylinder supplies air to the facepiece. NIOSH reviewed this respirator in accordance with its certification requirements specified at 42 CFR part 84, and in January 2001 certified the respirator as a tight-fitting full facepiece demand SCBA, with the cylinder having a 30-minute service life; NIOSH also approved the respirator for use in entering and escaping from hazardous atmospheres. In a May 16,

2001 letter to OSHA's Directorate of Compliance Programs (Ex. 7–1), Mr. Richard Metzler of NIOSH justified the classification of the Draeger respirator as an SCBA on the basis that the neck seal, which is integral to the facepiece, forms a gas-tight or dust-tight fit with the face, consistent with the definition of a tight-fitting facepiece specified by 42 CFR 84.2(k). This letter also noted that the fit testing procedures used for full facepiece demand SCBAs apply to the Draeger SCBA, and that, as a full facepiece demand SCBA, NIOSH recommended that the respirator receive an APF of 50 in accordance with its 1987 RDL.

NIOSH subsequently reviewed the Survivair Puma respirator, which has a tight-fitting hood supplied by an air cylinder; and certified the respirator as a pressure demand SCBA with a tight-fitting facepiece. As part of the certification process, NIOSH specified that fit testing required of SCBAs would apply to this respirator. However, Steve Weinstein of Survivair (Ex. 7–2) stated that the hood totally encapsulates the respirator user's hair, making quantitative fit testing (*e.g.*, with a Portacount) impossible; in such cases, the fit testing instrumentation treats dander and other material shed by the hair as particulates from outside the respirator, causing the fit factor to be artificially low. However, qualitative fit testing with the hood is possible because Survivair provides an adapter and P100 filters for this purpose; such fit testing meets the fit-testing requirements for tight-fitting SCBAs specified in paragraph (f)(8) of OSHA's Respiratory Protection Standard.

The table below provides a summary of APFs given to the half-mask and full facepiece SCBAs from Hyatt's 1976 studies at LLNL to the 1992 ANSI standard.

SCBAs	APFs			
	LANL (1976)	1980 ANSI standard	NIOSH RDL (1987)	1992 ANSI standard
Tight-fitting half-mask	10 (demand) .....	10 (demand; with QLFT) Same as QNFT factor (demand; sub-IDLH value max.).	10 (demand).	
Tight-fitting full facepiece.	50 (demand) .....	100 (demand; with QLFT) Same as QNFT factor (demand; sub-IDLH value max.).	50 (demand).	
Tight-fitting full facepiece.	10,000 (pressure demand) .....	10,000+ (pressure demand).	10,000 (pressure demand) .....	10,000 max. (emergency planning purposes only).

*OSHA's proposed APFs for SCBAs.* No WPF or SWPF studies for tight-

fitting half-mask SCBAs and tight-fitting full facepiece SCBAs operated in the

demand mode were available. In the only WPF study conducted on full