

Respiratory Protection for Response to CBR Agents



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Respirator Leakage



- ◆ Primary determinant of respiratory protection
- ◆ Defines type of respirator used
- ◆ Determines respirator fit and performance

Respirator Leakage vs. Respirator Fit

Measure	Aerosol System	CNP System
Fit Factor	C_o / C_i	FR_{inh} / FR_{lk}
Leak	1 / Fit Factor	ml / min



Need for Feedback on Respirator Leakage



- ◆ Determination of respirator type
- ◆ Selection of specific model and size
- ◆ Certification of adequate “fit”
- ◆ Training on respirator wear and use

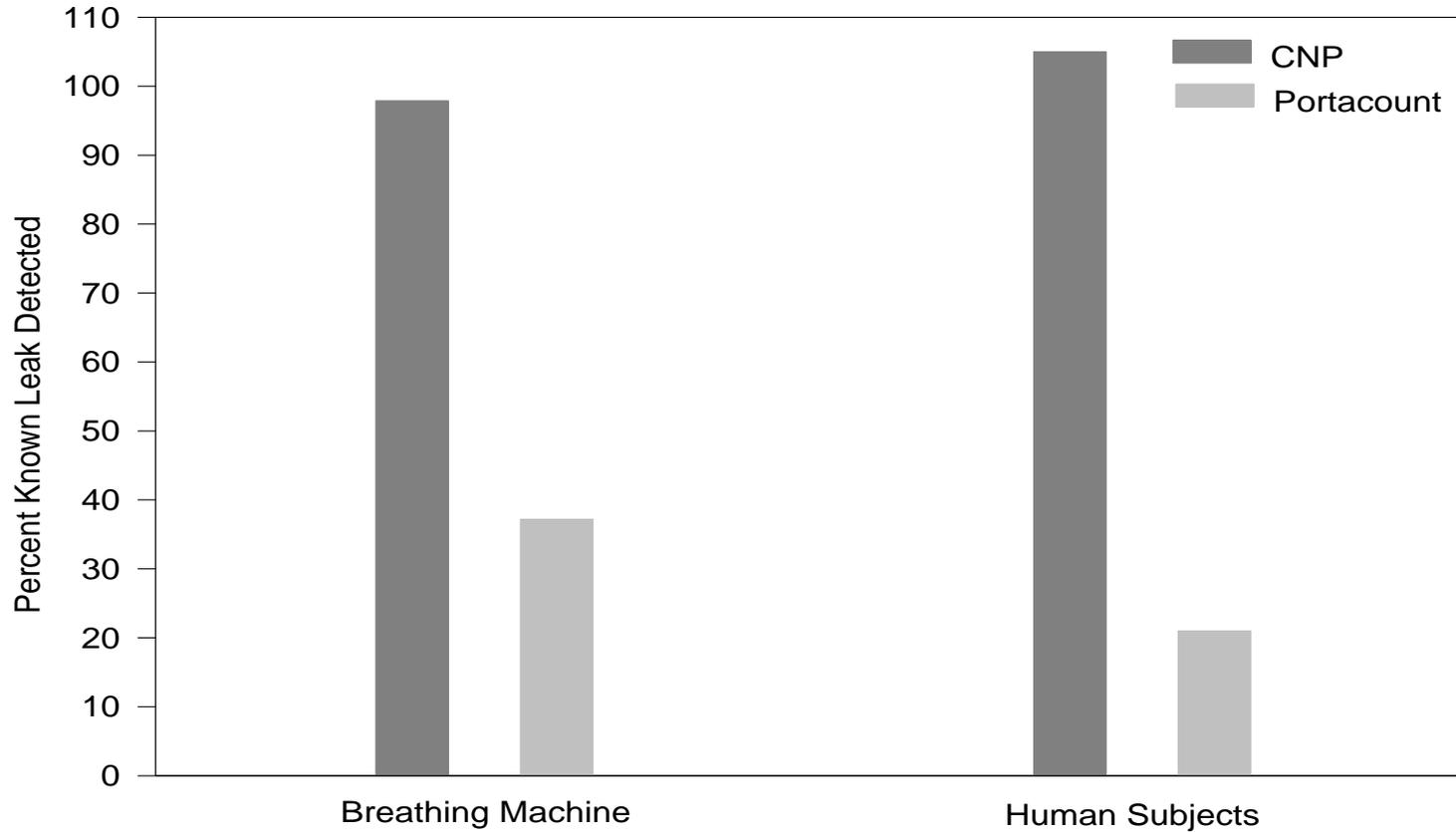
Measuring Respirator Leakage

- ◆ Aerosol based (generated, ambient) systems
 - TSI Portacount
 - TSI M-41
- ◆ Controlled Negative Pressure (CNP) system
 - OHD FitTester 3000

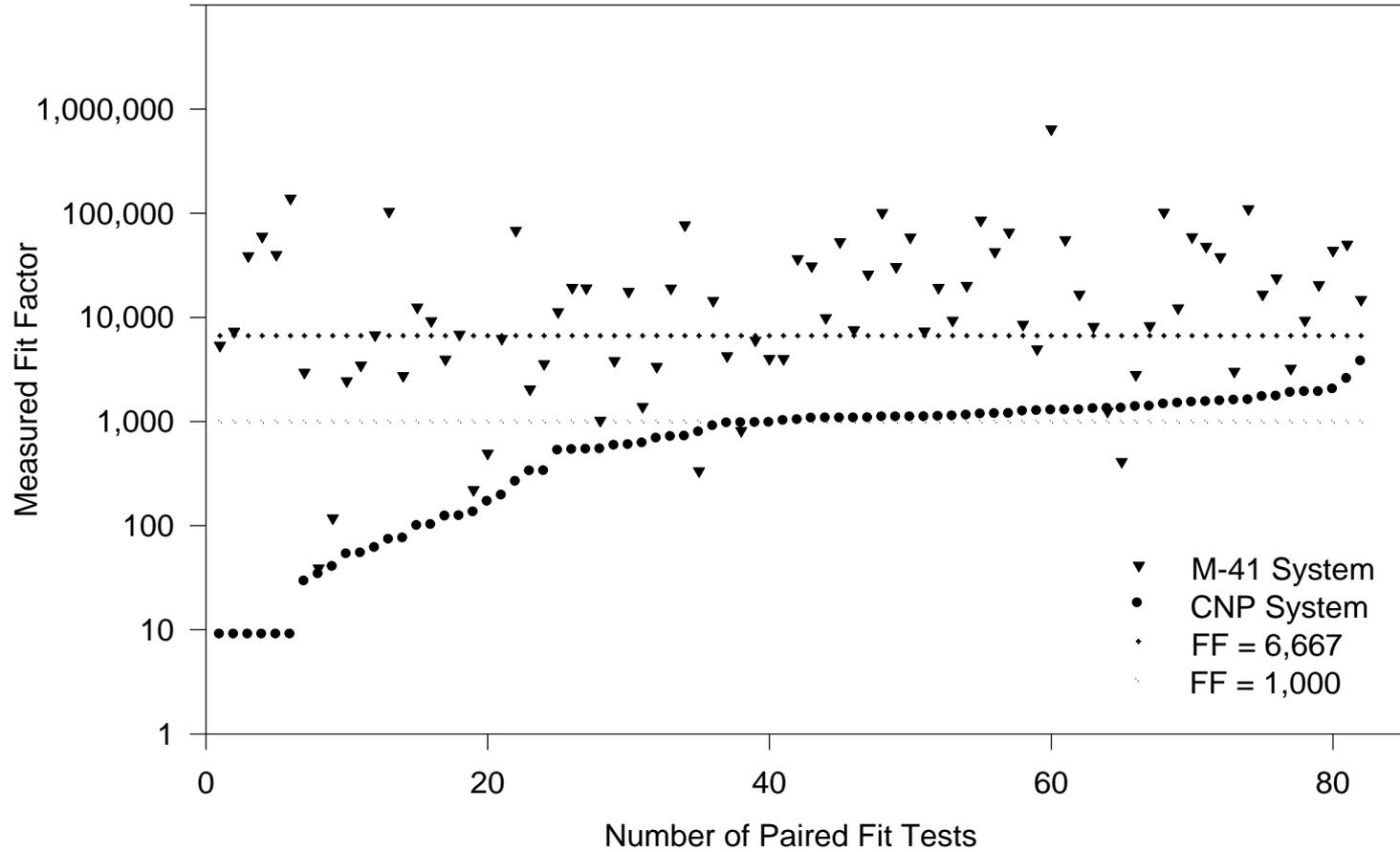
CNP vs. Aerosol Systems

- ◆ CNP detects >> leakage during paired tests
- ◆ CNP more accurate and less variable when measuring known leakage
- ◆ CNP substantially faster than aerosol
- ◆ Respirator donning has greater effect on leakage than fit test exercises

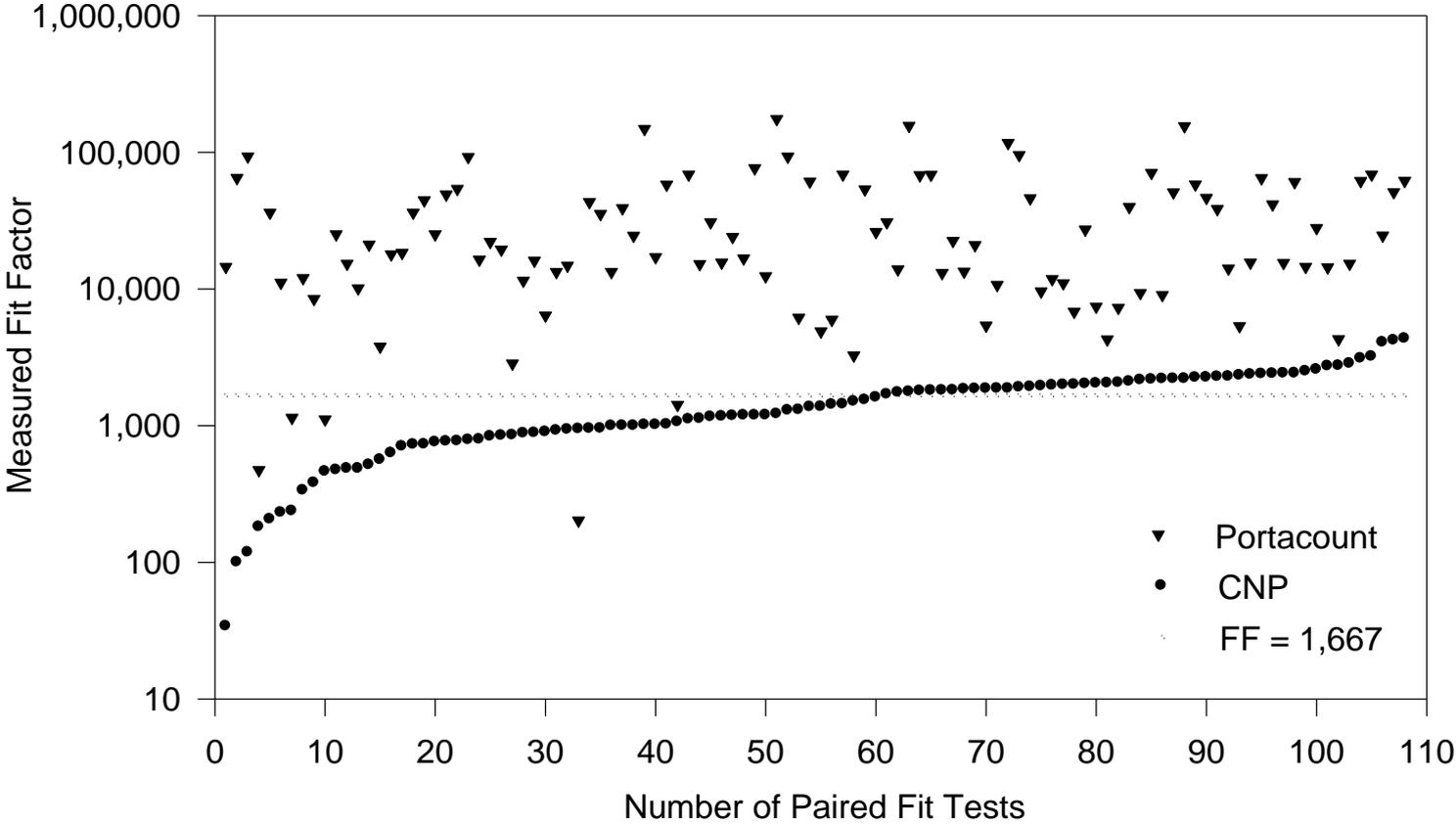
Detection of Known Leakage



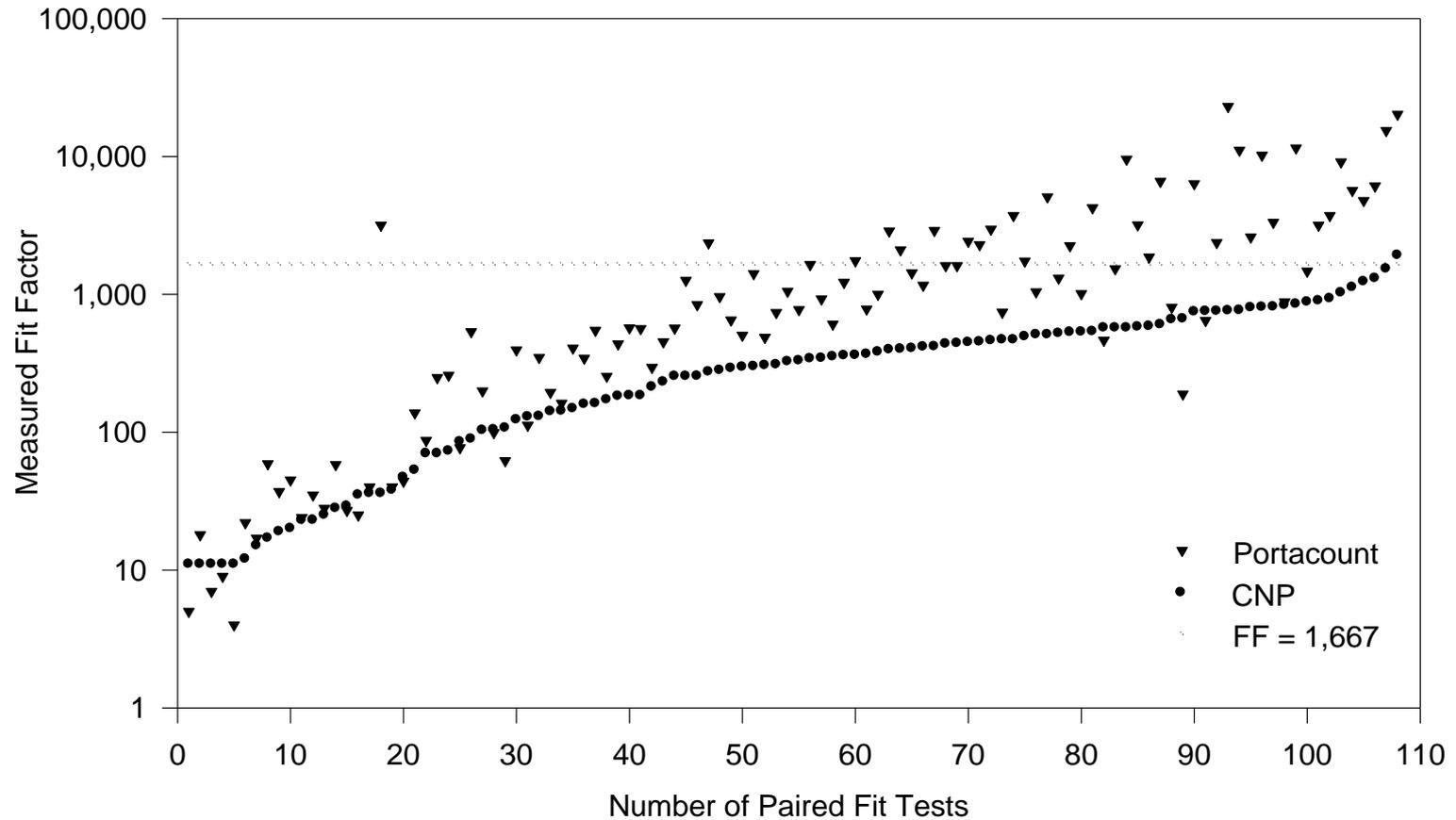
Marine-2 Fit Factors



MCU-2P Fit Factors w/o Eyewear Inserts



MCU-2P Fit Factors with Eyewear Inserts



Fit Test Exercise Effect?

Sub #	NB1	DB	SS	UD	TK	GM	BO	JOG	NB2	OA
Fit Factor										
1	111,000	102,000	110,000	112,000	35,700	72,500	94,600	86,800	84,300	79,900
2	64,700	106,000	75,200	79,800	21,700	116,000	242,000	59,000	89,200	65,300
4	17,400	27,200	21,000	18,100	7,650	24,500	8,830	8,050	16,500	13,400
Equivalent Leak Rate, ml/min										
1	0.48	0.53	0.49	0.48	1.51	0.74	0.57	0.62	0.64	0.67
2	0.83	0.51	0.72	0.67	2.48	0.46	0.22	0.91	0.60	0.82
4	3.09	1.98	2.56	2.97	7.03	2.20	6.09	6.68	3.26	4.01

From OSHA Docket No. H-049, Exhibit No. 54-114

CNP OSHA vs. REDON Protocols

