Face Velocity Requirement in the Event of a Credible Breach of a Glovebox.

The American Glovebox Society specifies that, in the event of a credible breach of a glovebox, the ventilation system for the glovebox needs to be designed to provide a face velocity of 125 ± 25 linear ft/min. Examples of a credible breach are the loss of a single glove and an open access port. The value of 125 ± 25 linear ft/min is listed as a recommendation (a "should" statement) in AGS-G001-2007, *Guideline for Gloveboxes*, and as a requirement (a "shall" statement) in AGS-G006-2005, *Standard of Practice for the Design and Fabrication of Nuclear Application Gloveboxes*. Users of the two documents have questioned this value, and requests have been directed to the AGS to extend the range of the specified face velocity to values less than 100 linear ft/min and to values greater than 150 linear ft/min. W. Dean Shipley, the former chair of the AGS Standards Development Committee (SDC), provided members of the SDC with the historical bases for the choice of the 125 ± 25 linear ft/min value by the AGS. The choice of the value was based on many years of experience by many glovebox operators; however. There is a paucity of hard technical data that support the choice of the value. To this end, Art Frigo, vice chair of the SDC, requested Argonne National Laboratory to model a glove-loss scenario to determine the efficacy of the choice of the 125 ± 25 linear ft/min value using a computational fluid dynamics computer program. Argonne consented to do this study and the results are provided in a paper entitled *Computational Fluid Dynamics (CFD) Analyses of a Globebox under Glove Loss Conditions*. J. L. Bailey, P. Strons, and A. A. Frigo authored it. A link to the paper is provided below. The paper concludes "that the AGS-specified face-velocity value of 125 ± 25 linear fpm [ft/min] should continue to be used as a requirement in the event of the loss of a glovebox glove." The paper also concludes that at face velocities of 90 ft/min and below, and at 175 fpm and above, there are back-flow containment issues. The Argonne paper also discusses the historical perspective of the choice of the 125 ± 25 linear fpm value.

http://www.osti.gov/scitech/servlets/purl/1160209