

NEW RESPIRATOR FIT TEST PANELS REPRESENTING THE CURRENT CHINESE CIVILIAN WORKERS

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Respirator fit test panels provide an objective tool for selecting representative human test subjects based upon their facial characteristics for use in research product development testing and certification. Fit test panels are typically based upon anthropometric data such as the 2006 survey of 3000 Chinese civilian workers conducted by Tongji Medical College. In this study the objectives were to: (1) evaluate the applicability of the recently developed National Institute for Occupational Safety and Health (NIOSH) respirator fit test panels for Chinese workers; and (2) develop new respirator fit test panels using the Chinese survey data if needed. Overall 95% of the workers in the Chinese survey fall within the NIOSH bivariate and principal component analysis (PCA) panels suggesting that these panels are appropriate for international respirator standards. However only 6.3% fell into cells 1 3 6 9 and 10 of the bivariate panel and 7.2% are found within cells 1 5 and 6 of the PCA panel. Therefore new test panels with subject dimensions and distributions specific to Chinese workers are warranted. Two respirators fit test panels were developed with the same techniques used to create the NIOSH panels. The bivariate approach used face length and face width measurements weighted to match age and gender distributions of the Chinese population from the 2005 census. The PCA panel was developed using the first two principal components obtained from a set of 10 facial dimensions (age- and gender-adjusted). Respirators designed to fit these panels are likely to accommodate > 95% of Chinese Workers.