

**Fit testing of N95 filtering facepiece for anaesthetist and anaesthesia nurses managing endotracheal intubations in COVID19 patients**

**DEPARTMENT OF ANAESTHESIA  
PROTOCOL v1.12<sup>th</sup> May 2020**

**This activity is being undertaken by the Department of Anaesthesia as part of a quality improvement programme**

**Participants**

Anaesthetists and anaesthetic nurses on the COVID intubation team will be contacted by email as per normal department processes.

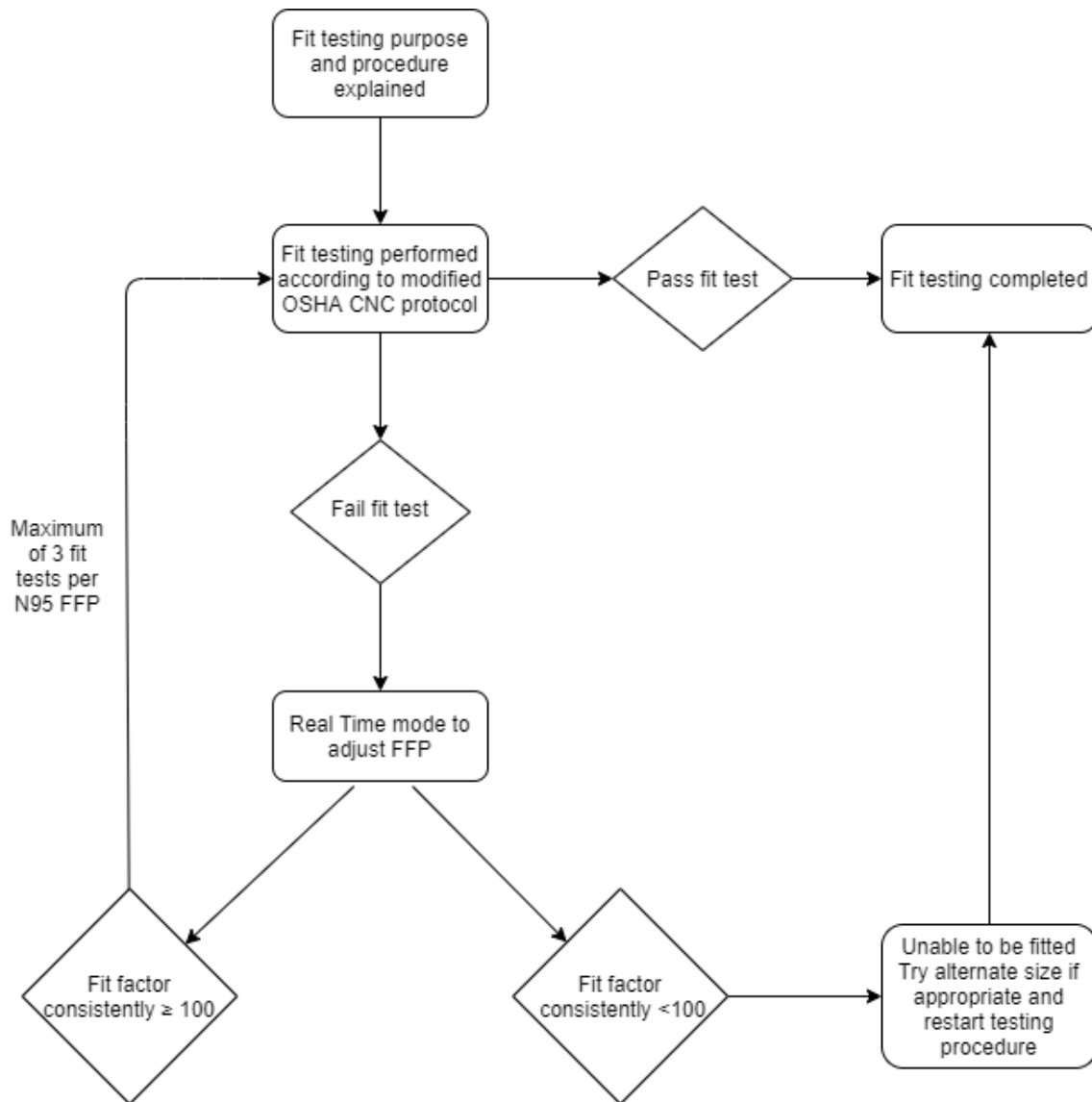
**Methods**

- The purpose and methods for fit testing will be explained to the participant.
- The participant will don the BSN ProShield® N95 FFP that they would usually use for clinical care.
- Using the TSI Portacount 8038/8048, fit testing will be conducted according to the modified OSHA (Occupational Safety and Health Administration, USA) CNC protocol.
- This includes 4 sets of dynamic movement performed while sampling particles in ambient air and within the N95 filtering facepiece. The movements are: bending over, talking, head side to side, head up and down.
- At the completion of the test (2:29 seconds), an overall fit factor will be presented. A fit factor of  $\geq 100$  is a pass and  $< 100$  is a fail.
- If the participant passes the fit test, the testing has completed and a questionnaire will be given to the participant to evaluate their experience.
- If the participant does not pass the fit test, the 'Real Time' mode on the PortaCount will be used to adjust the FFP to see if the seal can be improved.
- If the fit factor using the 'Real Time' mode is consistently  $\geq 100$ , the participant will be instructed to remove the FFP and re-don it for repeat fit testing.
- If the fit factor using the 'Real Time' mode is consistently  $< 100$ , the participant is unable to be fitted with this N95 FFP. If appropriate, an alternate sized BSN Medical ProShield® N95 FFP will be fit tested. The fit testing protocol will recommence using this alternate size FFP.
- After failing 3 fit tests, the FFP will be considered as unable to be fitted and the fit testing has completed.
- Participants who do not pass fit testing will be offered alternative respiratory protective equipment e.g. elastomeric respirator fitting
- The procedure will take approximately 30 minutes if repeated fit testing is required.

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Flow chart of fit testing procedure



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**Ambient aerosol condensation nuclei counter (CNC) quantitative fit testing  
protocol. (OSHA, Fit Testing Procedures (Mandatory)**

**Standard Number 1910.134 App A)**

The ambient aerosol condensation nuclei counter (CNC) quantitative fit testing (PortaCount®) protocol quantitatively fit tests respirators with the use of a probe. The probed respirator is only used for quantitative fit tests. A probed respirator has a special sampling device, installed on the respirator, that allows the probe to sample the air from inside the mask. A probed respirator is required for each make, style, model, and size that the employer uses and can be obtained from the respirator manufacturer or distributor. The primary CNC instrument manufacturer, TSI Incorporated, also provides probe attachments (TSI mask sampling adapters) that permit fit testing in an employee's own respirator. A minimum fit factor pass level of at least 100 is necessary for a half-mask respirator (elastomeric or filtering facepiece), and a minimum fit factor pass level of at least 500 is required for a full-facepiece elastomeric respirator. The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

(a) PortaCount® Fit Test Requirements. (1) Check the respirator to make sure the sampling probe and line are properly attached to the facepiece and that the respirator is fitted with a particulate filter capable of preventing significant penetration by the ambient particles used for the fit test (e.g., NIOSH 42 CFR 84 series 100, series 99, or series 95 particulate filter) per manufacturer's instruction.

(2) Instruct the person to be tested to don the respirator for five minutes before the fit test starts. This purges the ambient particles trapped inside the respirator and permits the wearer to make certain the respirator is comfortable. This individual shall already have been trained on how to wear the respirator properly.

(3) Check the following conditions for the adequacy of the respirator fit: Chin properly placed; Adequate strap tension, not overly tightened; Fit across nose bridge; Respirator of proper size to span distance from nose to chin; Tendency of the respirator to slip; Self-observation in a mirror to evaluate fit and respirator position.

(4) Have the person wearing the respirator do a user seal check. If leakage is detected, determine the cause. If leakage is from a poorly fitting facepiece, try another size of the same model respirator, or another model of respirator.

(5) Follow the manufacturer's instructions for operating the PortaCount® and proceed with the test.

(6) The test subject shall be instructed to perform the exercises in section I. A. 14. of this appendix.

(7) After the test exercises, the test subject shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become unacceptable, another model of respirator shall be tried.

(b) PortaCount® Test Instrument.

(1) The PortaCount® will automatically stop and calculate the overall fit factor for the entire set of exercises. The overall fit factor is what counts. The Pass or Fail message will indicate whether or not the test was successful. If the test was a Pass, the fit test is over.

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(2) Since the pass or fail criterion of the PortaCount® is user programmable, the test operator shall ensure that the pass or fail criterion meet the requirements for minimum respirator performance in this Appendix.

(3) A record of the test needs to be kept on file, assuming the fit test was successful. The record must contain the test subject's name; overall fit factor; make, model, style, and size of respirator used; and date tested.

**4. Modified ambient aerosol condensation nuclei counter (CNC) quantitative fit testing protocol for full-facepiece and half-mask elastomeric respirators.**

(a) When administering this protocol to test subjects, employers shall comply with the requirements specified in Part I.C.3 of this appendix (ambient aerosol condensation nuclei counter (CNC) quantitative fit testing protocol), except they shall use the test exercises described below in paragraph (b) of this protocol instead of the test exercises specified in section I.C.3(a)(6) of this appendix.

(b) Employers shall ensure that each test subject being fit tested using this protocol follows the exercise and duration procedures, including the order of administration, described in Table A-1 of this appendix.

**5. Modified ambient aerosol condensation nuclei counter (CNC) quantitative fit testing protocol for filtering facepiece respirators.**

(a) When administering this protocol to test subjects, employers shall comply with the requirements specified in Part I.C.3 of this appendix (ambient aerosol condensation nuclei counter (CNC) quantitative fit testing protocol), except they shall use the test exercises described below in paragraph (b) of this protocol instead of the test exercises specified in section I.C.3(a)(6) of this appendix.

(b) Employers shall ensure that each test subject being fit tested using this protocol follows the exercise and duration procedures, including the order of administration, described in Table A-2 of this appendix

**TABLE A-2— MODIFIED AMBIENT AEROSAL CNC QUANTITATIVE FIT TESTING PROTOCOL FOR FILTERING FACEPIECE RESPIRATORS**

Exercises <sup>1</sup>	Exercise procedure	Measurement procedure
Bending Over .....	The test subject shall bend at the waist, as if going to touch his/her toes for 50 seconds and inhale 2 times at the bottom <sup>2</sup> .	A 20 second ambient sample, followed by a 30 second mask sample.
Talking .....	The test subject shall talk out loud slowly and loud enough so as to be heard clearly by the test conductor for 30 seconds. He/she will either read	A 30 second mask sample.

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	from a prepared text such as the Rainbow Passage, count backward from 100, or recite a memorized poem or song.	
Head Side-to-Side ....	The test subject shall stand in place, slowly turning his/her head from side to side for 30 seconds and inhale 2 times at each extreme <sup>2</sup> .	A 30 second mask sample.
Head Up-and-Down	The test subject shall stand in place, slowly moving his/her head up and down for 39 seconds and inhale 2 times at each extreme <sup>2</sup> .	A 30 second mask sample followed by a 9 second ambient sample.

<sup>1</sup>Exercises are listed in the order in which they are to be administered.

<sup>2</sup>It is optional for test subjects to take additional breaths at other times during this exercise.