

3M™ Eyewear Fit System – Spectacle Evaluation Method

Supplies

- ▶ A selection of safety eyewear appropriate for the job hazards and tasks
- ▶ Fit Evaluation Forms
- ▶ Pen or pencil
- ▶ 2 Coverage and Gap Gauges (Gauge 1: sphere sizes approx. 6 mm and 8 mm (~ 0.24 and 0.31 in); Gauge 2: sphere sizes approx. 10 mm and 12 mm (~0.39 and 0.47 in))

Method

Before beginning the fit evaluation process, inform the wearer that you will be asking a series of questions to help assess eyewear comfort, view, and security. The Coverage and Gap Gauge will be used to measure coverage and gaps. The wearer may experience a slight “tickling” or pressure on the face as the gauge is moved around the perimeter of the eyewear to measure gaps.

- Step 1) Select a Style of Eyewear to Test
- Step 2) Ergonomic Check
- Step 3) Assessment – View, Security, Coverage, and Gaps
- Step 4) Worker Education
- Step 5) Ergonomic Recheck
- Step 6) Record Results

Step 1) Select a Style of Eyewear to Test

Instruct the wearer to try on the available eyewear models and select a style from those pre-determined by the work site to be appropriate for the hazards and tasks. The choices may vary depending on the job classification. It is suggested that only clear or lightly tinted lenses that allow a clear view of the wearer’s pupil be used for fitting. Most tinted lens models are also available in a clear version that could be used for the purpose of fitting the wearer. If the chosen style has adjustable features the wearer should adjust for best wearing comfort and perceived fit before proceeding with the fit evaluation.

Step 2) Ergonomic Check

It is recommended to check the ergonomics and wearing comfort of the selected eyewear model prior to assessing fit. If a particular eyewear model is not comfortable the wearer may not keep them on during all times they are exposed to eye hazards. Verify the following:

- A. Temple tips should not pinch in the area around the wearer’s ear.
- B. Pressure on the head from the temples or side arms should be acceptable (not too loose or too tight)
- C. Nosepiece shouldn’t pinch or slide.
- D. If the nose pads are adjustable, check fit and adjust as needed, the full surface of the nosepiece or nose-pads should touch the wearer’s nose.
- E. The weight of the eyewear should be comfortable on the face.

If unacceptable discomfort is noted by the wearer and the eyewear has adjustable features, then have the wearer try adjusting for a more comfortable fit. If a more comfortable adjustment setting cannot be achieved or the eyewear is not adjustable it is suggested the wearer select another style of eyewear.



Figure 1A: Coverage and Gap Gauges front side.

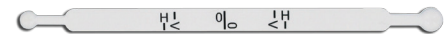


Figure 1B: Coverage and Gap Gauges back side

Step 3) Assessment – View, Security, Coverage, and Gaps

View: Verify the wearer can see in all directions of eye rotation without major obstruction to the field of view that would interfere with visibility to perform work tasks. If the selected pair limits the field of view, the wearer should select another style or model and start a new fit evaluation.

Security: Ask the wearer to do gentle head and body movements including shaking the head, turning the head from side to side, and moving the head up and down. Verify that the eyewear stays in place on the wearer's head and the frame does not fall off with head movement. If the selected pair is not secure, the wearer may want to try a lanyard for added stability. If a secure fit cannot be obtained, select another style or model and start a new fit evaluation.

Coverage: Check how well the safety eyewear covers the soft tissue area around the eyes. Use the ruler on one of the Coverage and Gap Gauges to check the brow to cheek bone and lateral coverage of the eyewear. It is recommended that only clear or lightly tinted lenses that allow a clear view of the wearer's pupil be used when evaluating coverage. Most tinted lens models are also available in a clear version that could be used for the purpose of fitting the wearer.

- I. Select one of the Coverage and Gap Gauges and hold it vertically. Instruct the wearer to look straight ahead and keep their face relaxed (i.e. do not smile, frown, raise eyebrows, etc). Centre the "0" line approximately in the middle of the wearer's pupil. Using the ruler on the Coverage and Gap Gauge, evaluate the distance from the centre of the pupil to the upper and lower edge of the eyewear. This distance should meet or exceed the lines on the gauge marked with a "V" (Figure 2). Include the frame in the evaluation. Record the result on the Fit Evaluation Form under the "vertical measurement" column. Repeat with the other eye.
- II. Rotate the Coverage and Gap Gauge to the horizontal position and again centre the "0" line approximately in the middle of the wearer's pupil. Check the distance between the pupil and the inner edge (near the nose bridge) and the outer edge of the eyewear. The distance from the centre of the pupil to the inner and outer edge of the eyewear should meet or exceed the lines on the gauge marked with an "H" (Figure 3). Include the frame in the evaluation. Record the result on the Fit Evaluation Form under the "horizontal measurement" column. Repeat with the other eye.
- III. Adequate coverage from brow to cheek bone as well as lateral side to side coverage is important to help protect the soft tissues of the eye from projectiles and debris. From the centre of the pupil, the vertical and horizontal lines on the ruler on the Coverage and Gap Gauge are set to measure a distance of approximately 17 mm and 20 mm respectively. These values are derived from the performance testing of safety eyewear standard "American National Standard Practice for Occupational and Educational Personal Eye and Face Protective Devices", ANSI Z87.13. The 2010 edition of this standard defines a minimum design coverage area for eyewear of 40 mm in width by 33 mm in height measured through the geometric centre of the lens. Due to the uniqueness of each individual's face and head this level of coverage may not be achieved for an individual. If the selected pair of eyewear doesn't meet or exceed the coverage area vertically and horizontally the wearer should select another style or model and start a new fit evaluation.

Gaps: For spectacles, the smaller the gap between the eyewear and the face, the less likely it is that debris and projectiles will pass through to the soft tissues of the eye. Use the spheres on the Coverage and Gap Gauge to check for excessive gaps between the eyewear and the face. Review the check points in figure 4. Pay close attention to the location of positions 1 and 6 on the top of the eyewear and 7 and 12 on the bottom of the eyewear.

- I. Starting with the Coverage and Gap Gauge with sphere sizes of 10 mm and 12 mm, hold the gauge vertically. Instruct the wearer to ensure the eyewear is still securely in place and hasn't slipped out of position and to look straight ahead.
- II. Gently probe the gap clearance around the perimeter of the eyewear, checking the top and the bottom of the frame as well as the nose bridge area in the locations marked in Figure 4. For each location, mark one gap measurement value on the Fit Evaluation Form by checking the appropriate box. The gap measurement is the sphere size that best matches the space between the face and the eyewear at the check points. It is important to have a good line of sight to the gap locations in order to be able to judge the fit of the sphere into the gap. It may be helpful to stand while measuring the top locations and to sit down while measuring the bottom locations. Starting with the 12 mm sphere, if the middle of the 12 mm sphere is able to pass between the eyewear and the face, check the "12 mm" box on the Fit Evaluation Form. If the 12 mm sphere fits loosely into the gap, try the other sphere sizes, working down from largest to smallest. Continue this process using both Coverage and Gap Gauges as needed to check all 12 locations recording a single gap measurement value for each location. Figures 5A and 5B show examples of two different gap sizes. Figure 5A illustrates an example of a 6 mm gap while Figure 5B shows a 10 mm gap.
- III. While there is no maximum gap size currently specified in standards and regulations, the smaller the gap between the eyewear and the face the less likely it is for debris and projectiles to pass through to the soft tissues of the eye. A gap size of less than 6, 6 or 8 mm is preferred. If there are gaps of 10 mm or 12 mm it is recommended to evaluate another style or model of eyewear.

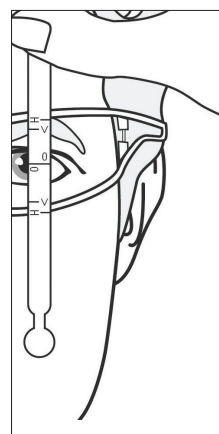


Figure 2: Vertical Coverage

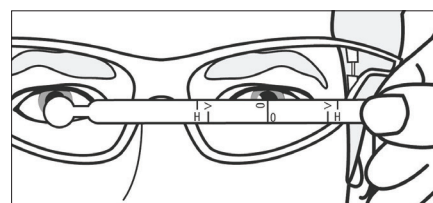


Figure 3: Horizontal Coverage

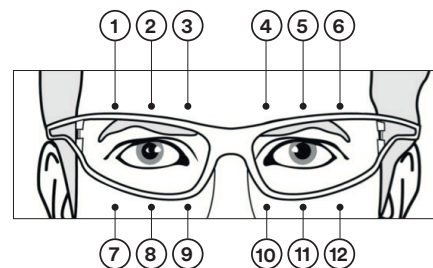


Figure 4: Gap check locations



Figure 5A: Checking Gap



Figure 5B: Checking Gap

Step 4) Worker Education

Verify the wearer has been trained on the proper use, maintenance, and limitations of safety eyewear. The worker should wear their safety eyewear in the manner it was designed to be worn during all required functions and tasks. Also ensure the worker is trained on site specific procedures such as cleaning and storage of eyewear. Consult the User Instructions supplied by the manufacturer of the eyewear for use information.

Step 5) Ergonomic Recheck

Now that the wearer has had the eyewear on for a short period of time, verify it is still comfortable and doesn't slip, slide, pinch, etc. If unacceptable discomfort is noted by the wearer and the eyewear has adjustable features, then have the wearer try adjusting for a more comfortable fit. If a more comfortable adjustment setting cannot be achieved or the eyewear is not adjustable it is suggested the wearer select another style of eyewear. If adjustments are made or another style of eyewear is selected, repeat the fit evaluation.

Step 6) Record Results

Record the brand (manufacturer), model number, and other applicable information for the selected style in the space provided in the Fit Evaluation Form. Retain fit records in compliance with applicable regulations, standards, and company policies.

Further reading

Eyewear Fit System – Background

Eyewear Fit System – Spectacle Evaluation Method

Fit Evaluation Form – Spectacles

3M Spectacle User Instruction

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Note: This document has been supplied for reference purposes only. Please see individual product packs for applicable User Instructions.

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