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Creating the future of transport

Follow up study to the heavy goods vehicle blind spot modelling and reconstruction trial

M Dodd

Transport Research Laboratory

PUBLISHED PROJECT REPORT PPR 403

Follow up study to the heavy goods vehicle blind spot modelling and reconstruction trial

by M Dodd (TRL)

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Follow up study to the HGV blind spot modelling and reconstruction trial

Client: **The Department for Transport, TTS Division**

(Brian Greenway)

This Published Report has been prepared for The Department for Transport.

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Executive Summary

Heavy Goods Vehicles (HGVs) manufactured since January 2006 must be fitted with rear-view mirrors that conform to the requirements of Directive 2003/97/EC. Until recently vehicles manufactured before 2006 have been required to meet the older and less stringent requirements of Directive 71/127/EEC.

However, since the 31st March 2009, Directive 2007/38/EC requires all N2 and N3 class vehicles* manufactured since 1st January 2000 to be equipped, on the passenger side, with wide-angle and close-proximity mirrors which fulfil the requirements for Directive 2003/97/EC.

By way of derogation from the above, compliance with Directive 2007/38/EC is deemed to be achieved where; *"vehicles are equipped, on the passenger side, with wide-angle and close-proximity mirrors, whose combination of fields of vision covers not less than 95% of the field of vision at ground level of a class IV mirror and not less that 85% of the field of vision at ground level of a class V mirror under Directive 2003/97/EC."*

If a vehicle cannot meet the above field of vision requirements using their existing mirrors, and it is not economically viable or technically feasible to replace these mirrors, then supplementary mirrors and/or other devices of indirect vision may be fitted to provide the extended field of vision. The combination of those devices must cover not less than 95% of the field of vision at ground level of a class IV mirror and not less than 85% of the field of vision at ground level of a class V mirror under Directive 2003/97/EC.

In 2006, a heavy goods vehicle blind spot modelling and reconstruction trial was carried out by TRL, on behalf of the Department for Transport and, in 2007, a Fresnel lens trial was also carried out by the Highways Agency, the Vehicle and Operator Services Agency (VOSA) and the UK Border and Immigration Agency. These studies have indicated that a Fresnel lens may give an HGV driver an improved view of vehicles or vulnerable road users that may be in a blind spot on the passenger side of the cab.

TRL has been commissioned by the Department for Transport to carry out this follow up study to the previous TRL trial. Three test vehicles were used (an Iveco, a Renault and a DAF) and the direct field of vision through the passenger side window of each vehicle was calculated from the ocular points of a 5th, 50th and 95th percentile driver for a range of different seat adjustments.

The mandatory external rear view mirrors were adjusted to provide the ground plane field of vision meeting the requirements of Directives 71/127/EEC and 2003/97/EC and measurements were taken to identify areas alongside the vehicle where a passenger car or a vulnerable road user could be hidden in a blind spot.

Three supplementary devices (a BDS mirror, a Dobli mirror and a Fresnel lens) were then added to the vehicles and measurements taken to identify the ground plane field of vision offered by each device, and to identify how effective each device was at eliminating the potential blind spots.

The results showed that the size and shape of the passenger side window, as well as, its relative position to the driver's ocular point had a noticeable effect on the ground plane visible to the driver of the HGV.

A subjective analysis of the visibility of passing road users showed that from the 1,584 measurements taken in this study, from the ocular points of a 5th and 95th percentile driver, there were a total of 471 potential blind spots identified when only the direct field

* As defined in Annex II of Directive 70/156/EEC
N_2: Vehicles designed and constructed for the carriage of goods and having a maximum mass exceeding 3.5 tonnes but not exceeding 12 tonnes.
N_3: Vehicles designed and constructed for the carriage of goods and having a maximum mass exceeding 12 tonnes.

of vision through the window and the indirect field of vision through the mandatory mirrors were considered.

As expected, the mandatory mirrors meeting the requirements of Directive 2003/97/EC did offer an improved field of vision over the mandatory mirrors which just met the requirements of Directive 71/127/EEC, and they eliminated about a third of the potential blind spots identified when the test vehicles were configured with the mirrors to the older standard.

All three supplementary devices tested (Fresnel lens, BDS mirror and Dobli mirror) offered additional benefit to the mandatory mirrors and eliminated some of the potential blind spots. It was estimated that, for the test vehicles and ocular points used in this study:

- The Fresnel lens could eliminate 78% to 90% of the blind spots;
- The BDS mirror, 37% to 75% of the blind spots; and
- The Dobli mirror, 43% to 76% of the blind spots.

In addition, the results of the tests carried out with a BDS mirror or a Dobli mirror showed:

- The field of vision they offered was very sensitive to the angle of adjustment;
- Without markings on the ground to define the required field of vision, it is possible that it could be quite difficult for a driver, on his own, to ensure that he has correctly adjusted the mirror;
- The field of vision offered by the devices could be obstructed by either the window frame or the external rear view mirrors, creating blind spots large enough to hide a vulnerable road user;

It is understood that both the BDS and Dobli mirrors are separately approved to Directive 2003/97/EC, indicating that they both have the correct radius of curvature. However, from the 5^{th} and 95^{th} percentile ocular points that were used in both the Iveco and Renault test vehicles, the BDS and Dobli mirrors were not able to achieve the full field of vision requirements of Directive 2007/38/EC.

The Fresnel lens was able to provide good coverage of the area to the passenger side of the vehicle and the test results showed that:

- The optimum position for the lens was at the lower edge of the window and towards the rear of the window;
- The vision through the lens could be obstructed by glare from the sun

Even with the supplementary devices in place, some potential blind spots still existed alongside the test vehicles which were large enough to hide a passenger car or vulnerable road user.

1 Introduction

Heavy Goods Vehicles (HGVs) manufactured since January 2006 must be fitted with rear-view mirrors that conform to the requirements of Directive 2003/97/EC. Until recently vehicles manufactured before 2006 have been required to meet the older and less stringent requirements of Directive 71/127/EEC.

However, from the 31st March 2009, Directive 2007/38/EC requires all N2 and N3 class vehicles[†] manufactured since 1st January 2000 to be equipped, on the passenger side, with wide-angle and close-proximity mirrors which fulfil the requirements for Directive 2003/97/EC.

By way of derogation from the above, compliance with Directive 2007/38/EC shall be deemed to be achieved where; *"vehicles are equipped, on the passenger side, with wide-angle and close-proximity mirrors, whose combination of fields of vision covers not less than 95% of the field of vision at ground level of a class IV mirror and not less that 85% of the field of vision at ground level of a class V mirror under Directive 2003/97/EC."*

If a vehicle cannot meet the above field of vision requirements using their existing mirrors, and it is not economically viable or technically feasible to replace these mirrors, then supplementary mirrors and/or other devices of indirect vision may be fitted to provide the extended field of vision. The combination of those devices must cover not less than 95% of the field of vision at ground level of a class IV mirror and not less than 85% of the field of vision at ground level of a class V mirror under Directive 2003/97/EC.

In 2006, a heavy goods vehicle blind spot modelling and reconstruction trial was carried out by TRL, on behalf of the Department for Transport and, in 2007, a Fresnel lens trial was carried out by the Highways Agency, the Vehicle and Operator Services Agency (VOSA) and the UK Border and Immigration Agency. These studies have indicated that a Fresnel lens may give an HGV driver an improved view of vehicles or vulnerable road users that may be in a blind spot on the passenger side of the cab.

TRL has been commissioned by the Department for Transport to carry out a follow up study to the previous TRL trial. The aims of this new study were to:

- Provide information relating to the ground plane field of vision provided by the requirements of Directives 71/127/EEC and 2003/97/EC;
- Provide information relating to the ground plane field of vision provided by the BDS mirror, Dobli mirror and Fresnel lens; and
- Identify blind spots in relation to passing road users and determine how well the BDS mirror, Dobli mirror and Fresnel lens may cover these blind-spots.

[†] As defined in Annex II of Directive 70/156/EEC
N_2: Vehicles designed and constructed for the carriage of goods and having a maximum mass exceeding 3.5 tonnes but not exceeding 12 tonnes.
N_3: Vehicles designed and constructed for the carriage of goods and having a maximum mass exceeding 12 tonnes.

2 Legislation

2.1 Directive 71/127/EEC

Directive 71/127/EEC originally defined three classes of rear-view mirror. An amendment in 1985 (85/205/EEC) stipulated a need for greater lateral vision to the side and rear of the vehicle, and also adjacent to the nearside of the cab structure. Therefore it became necessary to fit wide-angle and close proximity mirrors to category N_3 vehicles. Another amendment in 1988 (88/321/EEC) then made the same requirement for category N_2 vehicles having a mass of more than 7.5t, although in this later amendment it was not mandatory for close proximity mirrors to be fitted.

The Directive currently defines the five classes of rear-view mirror as:

- Class I – Interior rear-view mirror;
- Class II & III – Main exterior rear-view mirror;
- Class IV – Wide-angle exterior rear-view mirror; and
- Class V – Close proximity exterior rear-view mirror.

The Directive specifies several requirements concerning the fitting of rear-view mirrors to vehicles. It states the minimum number of mandatory rear-view mirrors as shown in Table 1.

Table 1: Minimum number of mandatory rear-view mirrors (71/127/EEC).

Vehicle category	Class I	Class II	Class III	Class IV	Class V
N_2 (3.5t – 7.5t)	-	2[*1]	-	-[*2]	-
N_2 (7.5t – 12t)	-	2[*1]	-	1	-
N_3 (>12t)	-	2[*1]	-	1	1

[*1] 1 on the left and 1 on the right

[*2] A Class IV mirror is mandatory on all category N_2 vehicles having a maximum mass not exceeding 7.5t if the mandatory Class II mirror, fitted to the same side is not convex.

The Directive also specifies the field of vision for the different class mirrors as shown in Figure 1 below.

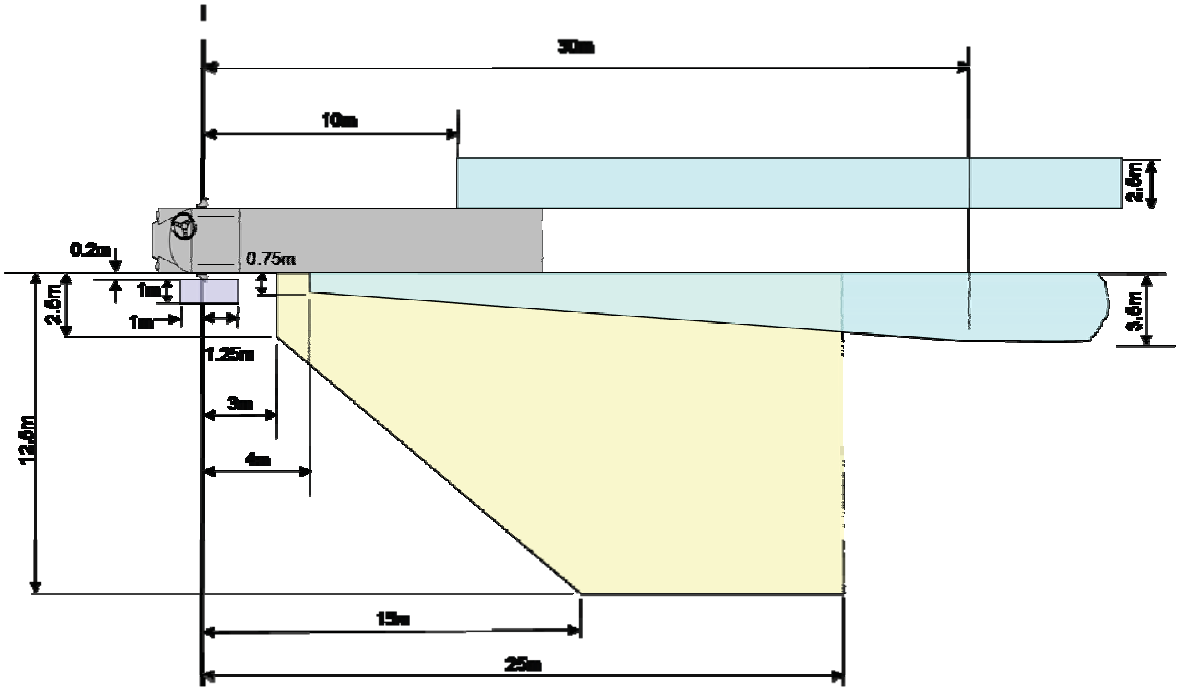

Figure 1: Field of vision requirements (71/127/EEC).

2.2 Directive 2003/97/EC

HGVs manufactured since 2006 must be fitted with rear-view mirrors that conform to the requirements of Directive 2003/97/EC. This Directive increased the field of vision of category N_2 and N_3 vehicles by extending the fields of vision and fitting an additional mirror, namely a Class VI (front) mirror designed to enable the area in front of the vehicle to be observed.

The specification for the radius of curvature was changed for Directive 2003/97/EC. In Directive 71/127/EEC the radius of curvature had to be greater than 1800mm for a Class II mirror and greater than 400mm for a Class IV and Class V mirror. For Directive 2003/97/EC, the minimum radius of curvature was reduced to 1200mm for a Class II mirror, and 300mm for a Class IV and a Class V mirror.

Table 2 shows the revised number of mandatory mirrors and Figure 2 shows the revised Field of Vision requirements.

Table 2: Minimum number of mandatory rear-view mirrors (2003/97/EC).

Vehicle category	Class I	Class II	Class III	Class IV	Class V	Class VI
N_2 (3.5t – 7.5t)	Optional	2^{*1}	Not permitted	2^{*1}	1^{*2}	1
N_2 (7.5t – 12t)	Optional	2^{*1}	Not permitted	2^{*1}	1^{*2}	1
N_3 (>12t)	Optional	2^{*1}	Not permitted	2^{*1}	1^{*2}	1

^{*1} 1 on the driver side and 1 on the passenger side

^{*2} Compulsory on passenger side, optional on driver side

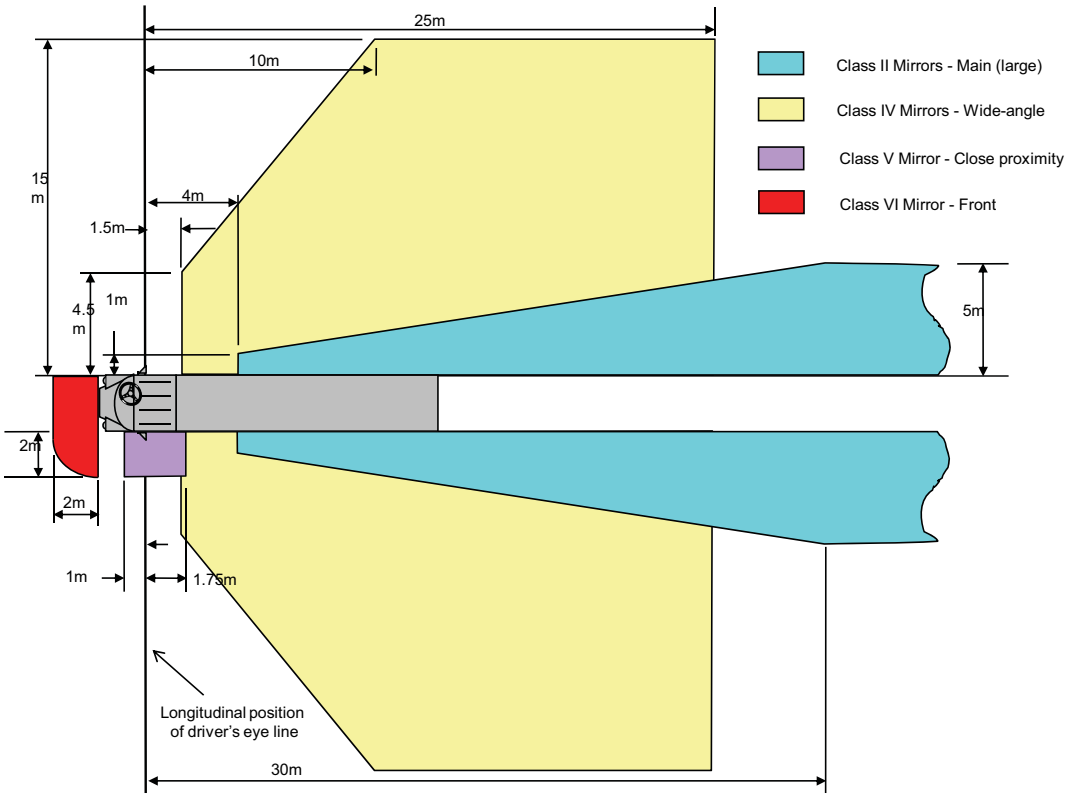

Figure 2: Field of vision requirements (2003/97/EC).

2.3 Directive 2007/38/EC

Until now, HGVs manufactured before 2006 have been required to meet the less stringent requirements of EU Directive 71/127/EEC.

From 31st March 2009 Directive 2007/38/EC requires that N2 and N3 class vehicles manufactured since 1st January 2000 must be equipped, on the passenger side, with wide-angle and close-proximity mirrors which fulfil the technical requirements of Directive 2003/97/EC.

By way of derogation from the above, compliance with Directive 2007/38/EC shall be deemed to be achieved where; *"vehicles are equipped, on the passenger side, with wide-angle and close-proximity mirrors, whose combination of fields of vision covers not less than 95% of the field of vision at ground level of a class IV mirror and not less that 85% of the field of vision at ground level of a class V mirror under Directive 2003/97/EC."*

If a vehicle cannot meet the above field of vision requirements using their existing mirrors, and it is not economically viable or technically feasible to replace these mirrors, then supplementary mirrors and/or other devices of indirect vision may be fitted to provide the extended field of vision. The combination of those devices must cover not less than 95% of the field of vision at ground level of a class IV mirror and not less than 85% of the field of vision at ground level of a class V mirror under Directive 2003/97/EC.

A Class IV (wide angle) mirror meeting the minimum requirements of Directive 71/127/EEC covers a ground plane measuring approximately 215m² in size. A Class IV mirror meeting the minimum requirements of Directive 2003/97/EC covers a ground plane measuring approximately 308m² in size, an increase of 93m² (Figure 3).

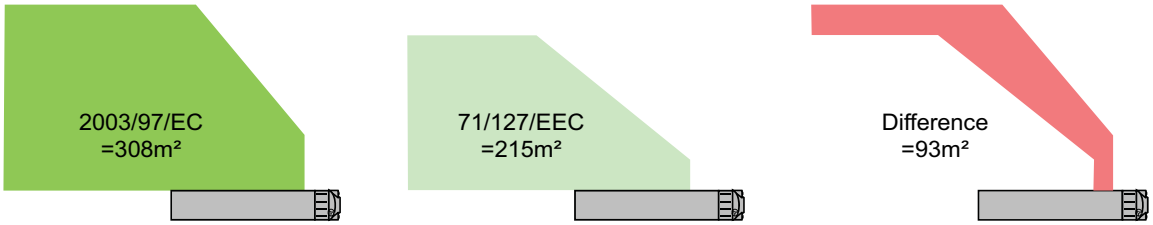

Figure 3: Comparison of field of vision requirements for Class IV mirrors.

To see not less than 95% of the 2003/97/EC Class IV ground plane, the combination of the mandatory and supplementary mirrors must be able to see a ground plane of at least 292m². Assuming that a Class IV mirror is capable of just meeting the minimum requirement of Directive 71/127/EEC then it would be able to see a ground plane measuring approximately 215m². Therefore the supplementary mirrors would need to see 77m² (292m² minus 215m²). This is equivalent to 83% of the red shaded area in Figure 3.

Similarly, a Class V (close proximity) mirror meeting the minimum requirements of Directive 71/127/EEC covers a ground plane measuring approximately 2.25m², and a Class V mirror meeting the minimum requirements of Directive 2003/97/EC covers a ground plane measuring approximately 5.5m², an increase of 3.25m² (Figure 4).

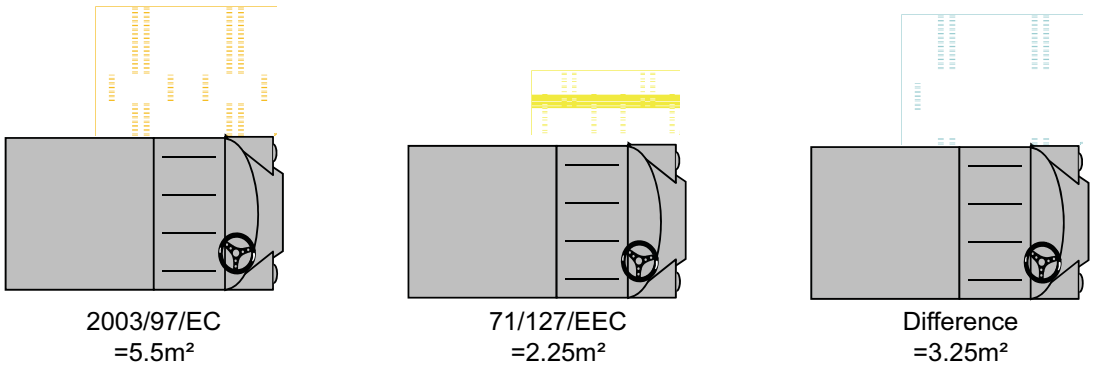

Figure 4: Comparison of field of vision requirements for Class V mirrors.

To see not less than 85% of the 2003/97/EC Class V ground plane, the combination of the mandatory and supplementary mirrors must be able to see a ground plane of at least 4.7m². Assuming that a Class IV mirror is capable of just meeting the minimum requirement of Directive 71/127/EEC then it would be able to see a ground plane measuring approximately 2.25m². Therefore the supplementary mirrors would need to see 2.45m² (4.7m² minus 2.25m²). This is equivalent to 75% of the blue shaded area in Figure 4.

Although Directive 2007/38/EC prescribes the field of vision that must be achieved, it does not specify how this is to be achieved.

3 Methodology

The tests described in this report were carried out on three different HGVs. Initially two vehicles were used for this study and the results were analysed before it was decided to extend the project to consider a third test vehicle. For the first two test vehicles, only the extreme ocular positions (5th and 95th percentile drivers) were used because it was expected that there would be a linear relationship between the two. Analysis of the results showed the relationship was not quite linear and so the ocular position for a 50th percentile driver was also considered for the third test vehicle.

This section describes the vehicles, test methods and supplementary devices used in this study. For some vehicles, the BDS mirror and Dobli mirrors are permanently attached to the vehicle by drilling holes in the A pillar or the front of the vehicle. The first two test vehicles were owned by TRL, therefore it was possible to make these modifications and fit the devices. However, the third test vehicle was not owned by TRL and so could not be modified in this way, thus prohibiting fitment of the BDS and Dobli mirrors.

3.1 Test vehicles

3.1.1 Vehicle 1 – Iveco Eurotrakker

The first vehicle was a 1998 registered Iveco Eurotrakker. The vehicle measured 2.3m wide. The bottom edge of the side windows was diagonal to the ground plane and varied between 2.04m above the ground at the front of the window to 2.17m above the ground at the rear of the window.

Figure 5: Test vehicle 1 - Iveco Eurotrakker.

In addition to its main side window, the passenger door on the Iveco Eurotrakker also had a small lower window, as shown below in Figure 6. This is quite an unusual feature which is not present on many types of vehicle. The view through such a window could easily be blocked by a passenger or by an object such as a bag placed in the passenger side footwell; therefore, for the purpose of this study the direct field of vision through this small lower window was excluded.

Figure 6: View through lower side window.

3.1.2 Vehicle 2 – Renault Magnum

The second test vehicle was a 1994 registered Renault Magnum. This is the same vehicle that was used in the previous study by TRL (Couper, 2006) and was chosen because it has a tall cab which was considered to represent one of the worst cases for blind spots. The vehicle measured 2.4m wide. For this vehicle the lower edge of the passenger window was 2.3m above the ground.

Figure 7: Test vehicle 2 - Renault Magnum.

3.1.3 Vehicle 3 – DAF-XF 105

The final test vehicle was a 2008 registered DAF XF. The vehicle measured 2.5m wide. The bottom edge of the side windows was diagonal to the ground plane and varied between 2.2m above the ground at the front of the window to 2.3m above the ground at the rear of the window.

This vehicle was newer than the other two vehicles and was the only test vehicle to be fitted with a Class VI (front) mirror.

Figure 8: Test vehicle 3 - DAF-XF.

3.2 Ocular point

The field of vision measurements and the photographs in this study were taken from ocular points for a 5th, 50th and 95th percentile driver. The standing height of a 5th percentile female is 1.51m (4'11"), and the standing height of a 95th percentile male is 1.87m (6'1") (Adultdata, 1998). The 5th percentile female and 95th percentile male were chosen to represent the upper and lower extremes of the likely driver eye height, and the height of the 50th percentile driver was calculated as the mean of these two extremes, specifically 169cm (5'6").

As described previously, measurements were taken from only the 5th and 95th percentile ocular points for the first two test vehicles. Measurements from the 50th percentile ocular point were added for the third test vehicle

The height of the ocular point above the surface of the driver's seat was calculated to be:

- 634mm for the 5th percentile driver
- 714mm for the 50th percentile driver, and
- 795mm 95th percentile driver.

The driver's seat in each test vehicle was set to its mid-height position with a seat back angle of 25°.

Further information on the calculation of the ocular points is provided in Appendix A.

As an additional check as to the suitability of using ocular points for 5th, 50th and 95th percentile drivers, a small selection of drivers at TRL were asked to adjust the seat in the Renault test vehicle to see if there was a common seat adjustment or eye height, regardless of their stature. For each person, the driver's seat position was reset to the lowest and rearmost position before they were asked to adjust it to give them what they considered to be a suitable and comfortable driving position.

Six drivers (five male and one female) with standing heights ranging from 1.72m to 1.89m were used for this assessment. After each of the six drivers had adjusted their seat the height of their ocular point, relative to the ground, was measured. The ocular points were found to be between 2.76m and 2.88m above the ground. Four of the six drivers had the same ocular point of 2.76m above the ground (despite having up to 11cm difference in standing height). For the other two drivers an ocular point of 2.84m and 2.88m above the ground were recorded respectively, as shown in Table 3.

Table 3: Comparison of driver stature and ocular point.

Driver	M/F	Standing height	Height of ocular point above the ground
1	M	1.83	2.76
2	M	1.89	2.88
3	M	1.74	2.76
4	M	1.72	2.76
5	F	1.78	2.84
6	M	1.77	2.76

For the Renault test vehicle, it was calculated that the sitting eye height of a driver in the cab (using a mid seat height) was 2.68m, 2.76m and 2.85m above the ground for 5th, 50th & 95th percentile drivers respectively. The results show that the majority of drivers adjusted the seat to achieve an ocular point which was equivalent to a 50th percentile driver.

3.3 Direct field of vision

Physical measurements were taken for each test vehicle to record the position and size of the passenger side window as well as the position of the driver's seat relative to a fixed reference point, as illustrated in the simplified diagram shown in Figure 9.

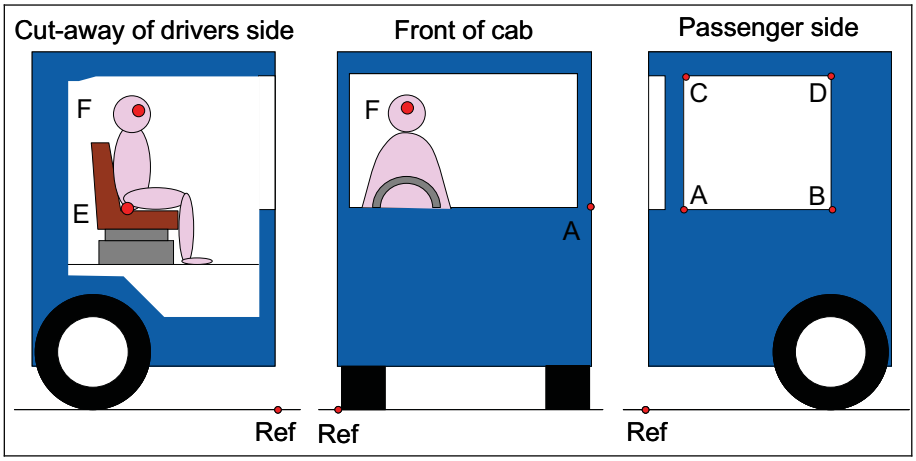

Figure 9: Vehicle measurements for direct field of vision.

The position of the driver's seat was recorded for 3 seat heights (highest, mid-point and lowest), and three fore/aft positions (rearmost, mid-point and foremost).

Using these measurements and the position of the ocular point (as calculated in Appendix A), trigonometric calculations were used to estimate the direct field of view from the eye height of different drivers, taking into account the height of the passenger window, as illustrated in Figure 10.

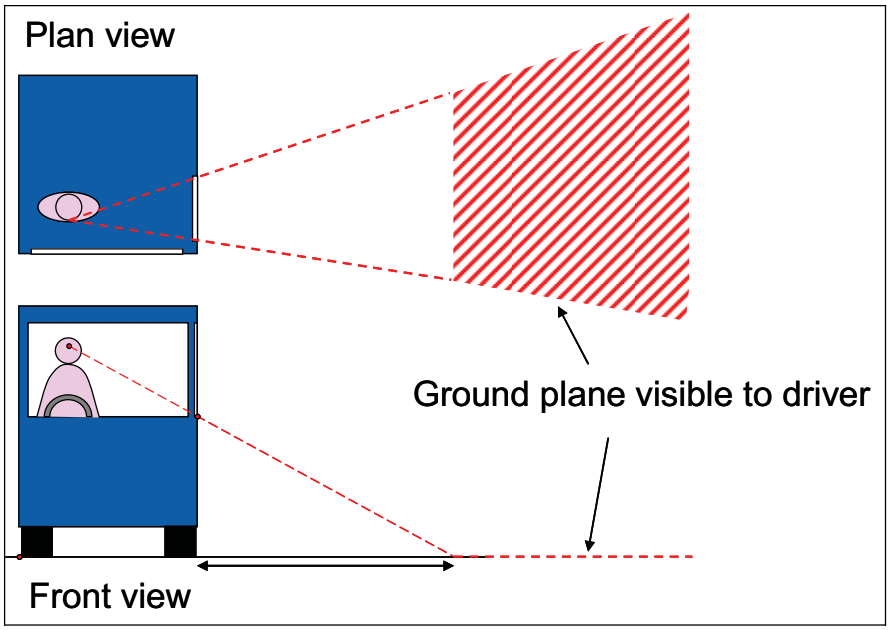

Figure 10: Field of vision through passenger side window.

3.4 Indirect field of vision

3.4.1 Mandatory mirrors

The indirect field of vision was measured for each test vehicle on the TRL Research Track. Firstly the ground plane field of vision for each of the mandatory mirrors, as defined in Figure 1 and Figure 2, was marked out on the road surface. Then each of the mandatory mirrors was adjusted to ensure they provided the correct view for each ocular point.

Where necessary, the view using the mirrors was limited by either adding masking tape to the mirror or by adjusting the angle of the mirror inwards so that they provided only the minimum field of vision for Directive 71/127/EEC.

For the tests where the mandatory mirrors were being assessed against the minimum requirements of Directive 2003/97/EC, the masking was removed and the mirrors readjusted to provide at least the minimum field of vision.

The external rear view mirrors on both the 1998 Iveco (vehicle 1) and the 1994 Renault (vehicle 2) were capable of exceeding the minimum field of vision requirements of Directive 2003/97/EC, even though it was not a mandatory requirement for vehicles of these ages. However, neither of these vehicles was fitted with a Class VI (front) mirror and so it was not possible to measure the ground plane visible through such a mirror on these vehicles. The DAF (vehicle 3) was a new vehicle, and as required, was fitted with mirrors meeting the requirements of Directive 2003/97/EC.

3.4.2 Fresnel lens

A Fresnel lens is a thin plastic lens that is pressed against the passenger door window. A Fresnel lens replaces the curved surface of a conventional lens with a series of concentric grooves which act as individual refracting surfaces.

This is the type of lens issued, by VOSA, to foreign HGV drivers as part of a study to evaluate their effectiveness in reducing side-swipe incidents (Fitch, 2007).

Figure 11: Fresnel lens.

For the first two test vehicles, the lens was mounted in different positions to assess how the positioning of the Fresnel lens on the passenger window influenced its field of vision. The three positions considered were:

- The rearmost position at the bottom of the window;
- The foremost position at the bottom of the window; and
- The mid-point at the top of the window.

Small orange cones were positioned on the road surface to provide an outline of the field of vision. The longitudinal and lateral position of each cone was recorded and a photograph was then taken of the mirror/lens showing the cones on the ground.

For the third test vehicle, the Fresnel lens was only assessed at the rearmost position at the bottom of the window, because this was found to be the best position from measurements taken with the first two test vehicles.

3.4.3 BDS Mirror

This mirror is designed to be fitted to the passenger side A-pillar of a vehicle on the inside of the cab. Information on the manufacturers' website states that its advantages include no changes to the truck exterior; no vibration and good vision even with dirty windscreens.

Figure 12: BDS Dead Angle Mirror System.

The fitting instructions state to position the mirror in *"the correct spot against the A section window"*, although the instructions do not specify what the correct position is. For the purpose of this study the mirror was fitted close to the top of the A-pillar as this was similar to the position shown in Figure 12, and it minimised the obstruction to the view of the exterior rear-view mirrors.

Within the scope of this project, it was not possible consider all possible adjustments of the BDS mirror. Therefore, the influence of the adjustment of the BDS mirror was assessed by measuring the ground plane with the mirror in two different positions:

- The mirror angled down so the front edge of the Class V field of vision was visible in the mirror; and
- The mirror angled away so the rear edge of the Class IV field of vision was visible in the mirror.

Similarly to the Fresnel lens, for each adjustment a series of small orange cones were positioned on the road surface to provide an outline of the field of vision. The longitudinal and lateral position of each cone was recorded and a photograph was then taken of the mirror/lens showing the cones on the ground.

The field of vision using this device was only assessed using the Iveco (vehicle 1) and the Renault (vehicle 2).

3.4.4 Dobli Mirror

This mirror is mounted to the outside of the vehicle on the front nearside corner and is viewed through the windscreen. The mirror requires a specific mounting bracket for each vehicle to ensure it is correctly aligned to see alongside the vehicle.

Figure 13: Dobli blind spot mirror.

The manufacturer's instructions state to mount the mirror approximately 15cm in front of the windscreen with the centre of the mirror in line with the nearside edge of the vehicle. The instructions also state that the mirror is deemed to be correctly adjusted when then horizon is visible in the upper section of the mirror, when the cabin is not visible in the mirror, and when the area ABCD (shown in Figure 14) is visible in the mirror. The instructions do not define the dimensions of area ABCD.

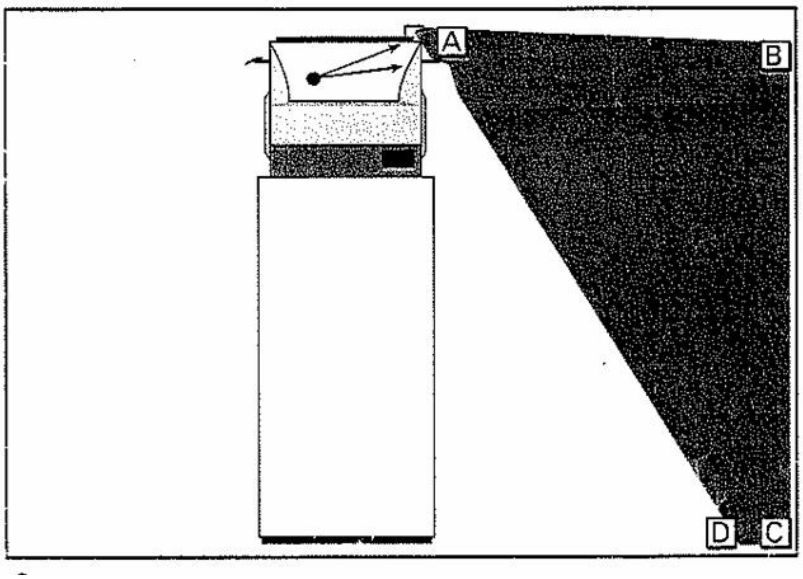

Figure 14: Image from Dobli mirror adjustment instructions.

Similarly to the BDS mirror, it was not possible to take measurements for all possible angles of adjustment and so the influence of the adjustment of the Dobli mirror was assessed by measuring the ground plane with the mirror in three different positions:

- The mirror angled down so the front edge of the Class V field of vision was visible in the mirror;

- The mirror angled away so the rear edge of the Class IV field of vision was visible in the mirror; and
- The mirror adjusted as per the manufacturer's instructions.

Once again, for each adjustment a series of small orange cones were positioned on the road surface to provide an outline of the field of vision. The longitudinal and lateral position of each cone was recorded and a photograph was then taken of the mirror/lens showing the cones on the ground.

The field of vision using this device was only assessed using the Iveco (vehicle 1) and the Renault (vehicle 2).

3.5 Visibility of passing road users

For each of the ocular points, the mandatory mirrors were adjusted to provide the correct field of vision in relation to either Directive 71/127/EEC or 2003/97/EC, as described in section 3.4.1.

The visibility of a passing road user was assessed using:

- A large passenger car;
- A small passenger car;
- A pedal cyclist; and
- A pedestrian.

3.5.1 Passing road users

3.5.1.1 Large passenger car

A 2008 Ford Mondeo was used to represent a large passenger car (Figure 15). The vehicle had an overall length of 4.8m, a width of 2.1m and a height of 1.5m.

Figure 15: Large passenger car – Ford Mondeo.

This vehicle was used for the Iveco and Renault test vehicles; however the same vehicle was not available during the test with the DAF so a 2005 Ford Mondeo was used instead. The dimensions of the 2005 vehicle are almost the same as the newer version with an overall length of 4.7m, a width of 1.9m and a height of 1.4m.

3.5.1.2 Small passenger car

A 1997 Vauxhall Corsa was used to represent a small passenger car alongside the Iveco and Renault test vehicles (Figure 16). This vehicle measured 3.7m in length, 1.6m in width and 1.4m in height.

Figure 16: Small passenger vehicle – Vauxhall Corsa.

For the DAF test vehicle, the Corsa was not available and so a 2000 Nissan Micra was used instead. This vehicle also measured 3.7m in length, 1.6m in width and 1.4m in height.

3.5.1.3 Pedal cyclist

When positioned as shown in Figure 17, the cyclist measured 1.7m in height and (including the bike) 1.4m in length.

Figure 17: Pedal cyclist alongside the Iveco (vehicle 1).

3.5.1.4 Pedestrian

The pedestrian used for these tests was 1.8m tall (Figure 18).

Figure 18: Example position of the passing pedestrian.

3.5.2 Assessment method

Each road user was assessed individually and was positioned at three lateral distances away from the side of the test vehicle, as shown in Figure 19:

- The first position was with the right side of the road user in line with the closest edge of the adjacent lane (a lateral distance of 0.5m from the side of the test vehicle);
- The second position was with the centreline of the road user in the middle of the adjacent lane (a lateral distance of 2.4m from the side of the test vehicle); and
- The third lateral position was with the left side of the road user in line with the far side of the adjacent lane (a lateral distance of 4.2m from the side of the test vehicle).

For each of these lateral positions eleven longitudinal positions, spanning an area from 5m behind to 5m in front of the driver's eye-line at 1m intervals, were considered. For the passenger cars, the front of the vehicle was used as the reference point and for the pedal cycle the middle of the front wheel was used.

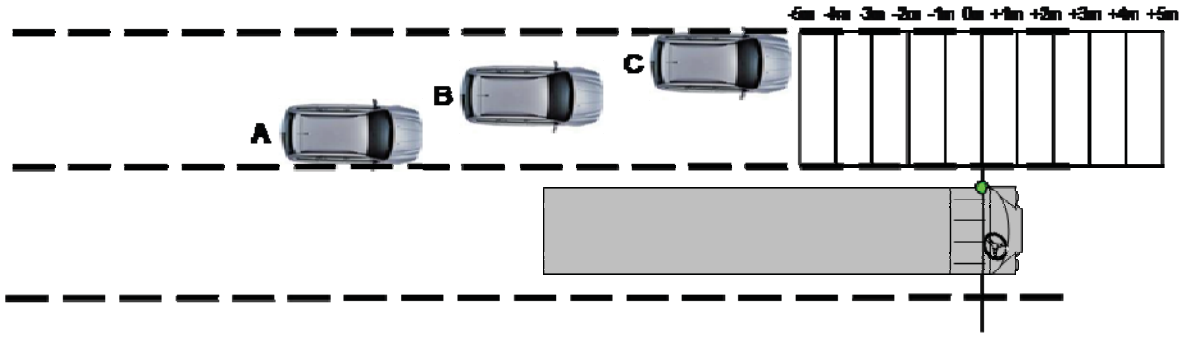

Figure 19: Longitudinal and lateral position of passing road users.

For each longitudinal and lateral position a photograph of the passenger window and the nearside mirrors was taken. The photographs were taken with both the test vehicle and the passing road user stationary on the TRL Research Track.

This provided a safe and consistent environment in which to assess the visibility of the passing road user. In reality, the HGV driver would only briefly scan his mirrors whilst

driving. It is also likely that the cab would be moving or shaking as a result of the natural disturbances from the road and/or the movement of the vehicle.

Therefore, to include these factors in the analysis, the subjective assessment involved quickly scanning each photograph individually to identify if the passing road user could be seen through the window and/or in one or more of the mandatory mirrors.

Two levels of visibility were considered:

- Road user was clearly visible in the mirror or through the window (as indicated by '✓' in Appendix D); and
- Road user was visible but might be missed with a quick glance (e.g. only part of the vehicle was visible at the very edge of the mirror) (as indicated by '?' in Appendix D).

If the passing road user was not visible at all through the direct and indirect field of vision, this was considered to be a *definite* blind spot on the vehicle. If the passing road user could be seen, but there was a chance that the driver might miss the road user with only a quick glance, then this was considered to be a *potential* blind spot.

If a blind spot was identified, the photograph was re-analysed to identify if the Fresnel lens, BDS mirror or Dobli mirror were capable of eliminating the blind spot by providing a view of the passing road user.

Figure 20 shows an example of where the passing road user is clearly visible in the Fresnel lens but it is considered to only be partly visible at the bottom of the passenger window and in the BDS and Dobli mirrors, and could therefore be easily missed with a quick scan.

Figure 20: Example photograph of a passenger car clearly visible in Fresnel lens but could be missed when looking through the BDS or Dobli mirrors.

Appendix D includes a series of tables which specify the test configuration and indicate if the road user was visible in each of the mirrors, the Fresnel lens and/or the window.

4 Test Results

4.1 Direct field of vision

The lower edge of the window in the Iveco (vehicle 1) slopes from rear to front and it also has a grab handle which partially blocks the view at the lower edge of the window, as illustrated in Figure 21. It was calculated that the window has a surface area of approximately 0.55m² and the distance between the rearmost point and the foremost point was 0.89m.

Figure 21: Passenger side window in the Iveco (vehicle 1).

The Renault has a rectangular window with a horizontal division close to the top of the window. It was calculated that the window has a total surface area of approximately 0.62m² and the distance between the rearmost point and the foremost point was measured to be 0.88m (Figure 22).

Figure 22: Passenger side window in the Renault (vehicle 2).

Figure 23 shows the passenger side window in the DAF (vehicle 3). It can be seen that the lower edge of this window runs at an angle from rear to front, although unlike the Iveco, the handle for this door was positioned below the height of the window and so did not obstruct the view. It was calculated that the window has an area of approximately 0.56m² and the distance between the rearmost point and the foremost point was measured to be 0.86m.

Figure 23: Passenger side window in the DAF (vehicle 3).

Using the method described in section 3.3, the ground plane field of vision through the passenger side window was calculated for each test vehicle using the three ocular points (5th, 50th & 95th percentile drivers) and using a mid height and mid for/aft seat position. The calculations did not take into account any obstruction caused by the external rear view mirrors.

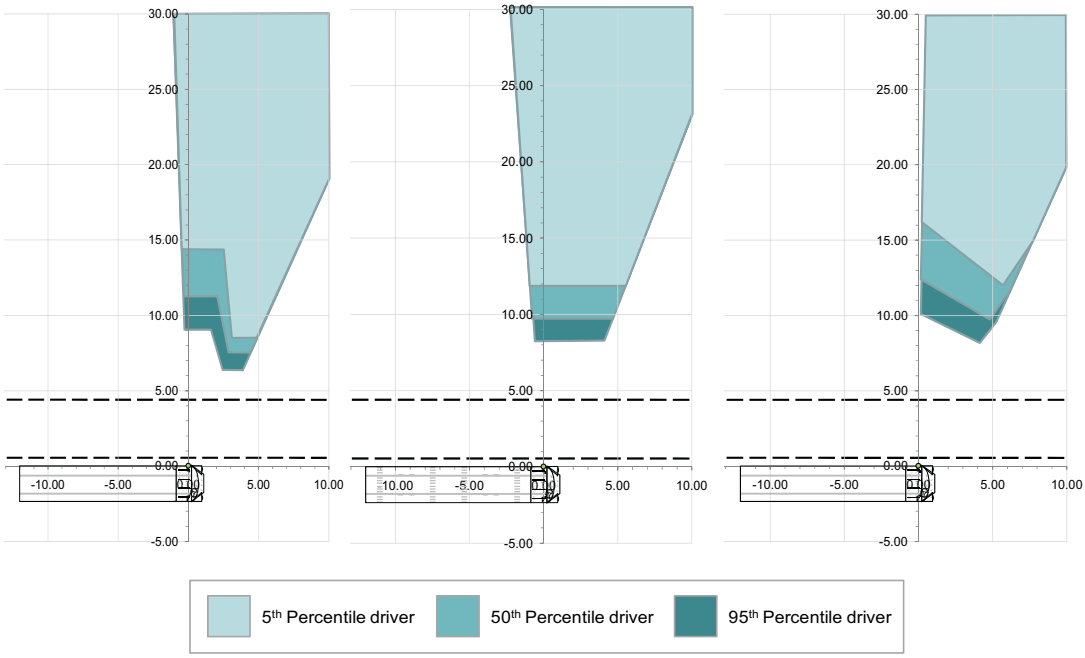

Figure 24: Direct field of vision – ground plane for different ocular points (Left: Iveco (vehicle 1); Centre: Renault (vehicle 2); Right: DAF (vehicle 3)).

Figure 24 shows that the shape of passenger side window can have an effect on the extent of the ground plane visible to the driver. For example, it can be seen how the grab handle in the Iveco and the slope of the lower edge of the window in the DAF, both reduce the field of vision.

Figure 24 also shows how the height of the ocular point, in relation to the lower edge of the passenger side window, affects the extent of the ground plane that can be seen. As expected the diagram shows that a taller driver (95th percentile) can see the ground closer to the side of the vehicle than a shorter driver (5th or 50th percentile).

4.2 Indirect field of vision

4.2.1 Mandatory mirrors

Figure 25, Figure 26 and Figure 27, show the ground plane field of vision requirements, for the mandatory mirrors as defined in Directive 71/127/EEC and 2003/97/EC. The calculated direct field of vision has been added to these diagrams to show the overall field of vision to the driver.

For all three vehicles it can be seen that there is an area within the adjacent lane where the driver is unable to see the ground either directly through the side window or indirectly through the external mirrors. This blind spot also extends beyond the far side of the adjacent lane.

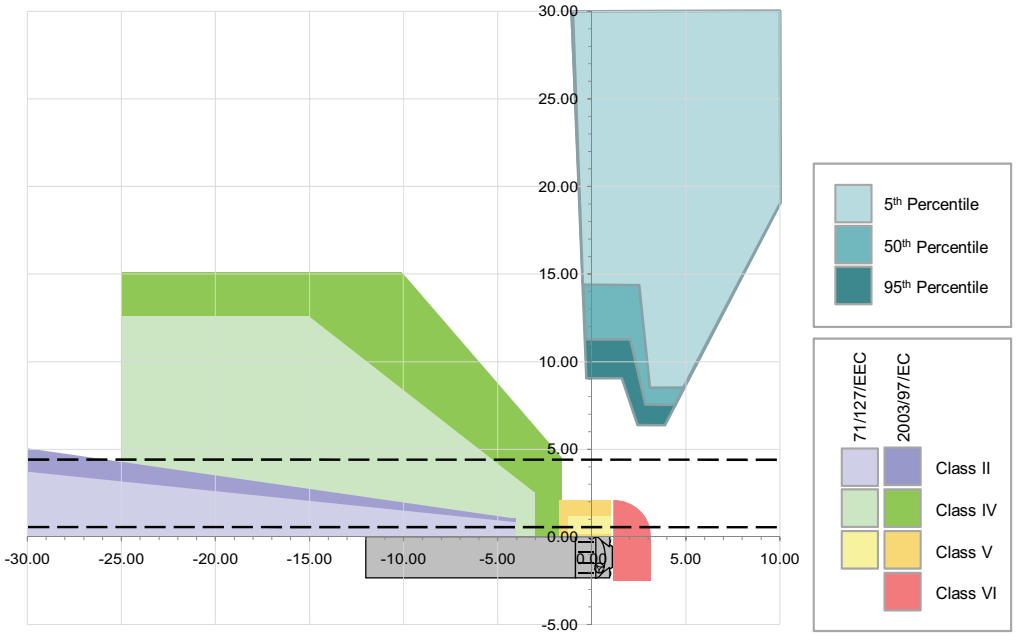

Figure 25: Direct and indirect field of vision through the passenger side window and mandatory mirrors - Iveco (vehicle 1).

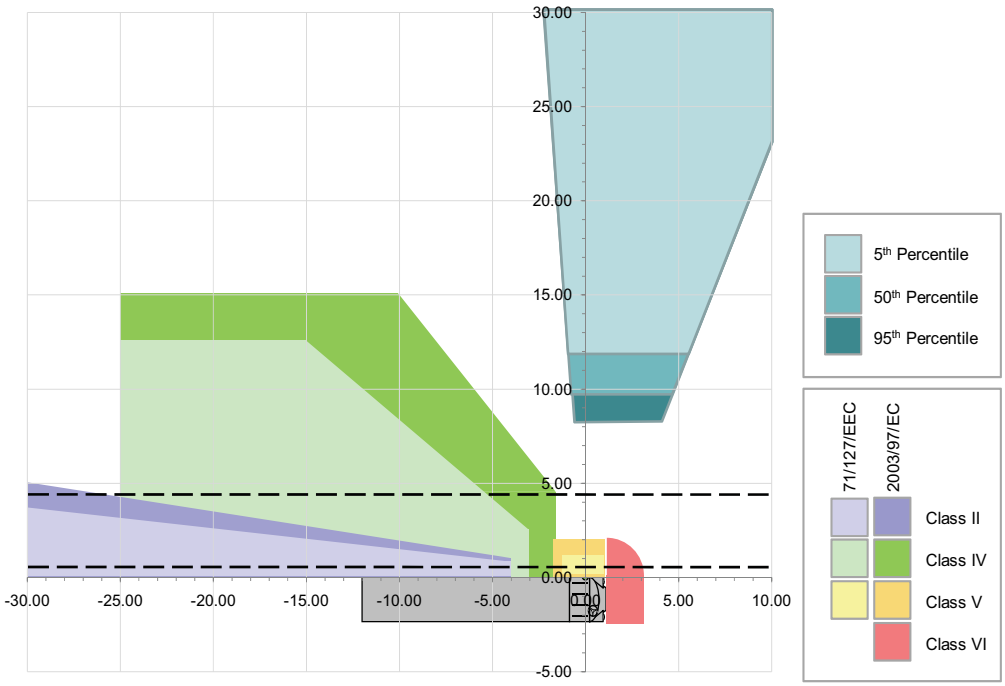

Figure 26: Direct and indirect field of vision through the passenger side window and mandatory mirrors - Renault (vehicle 2).

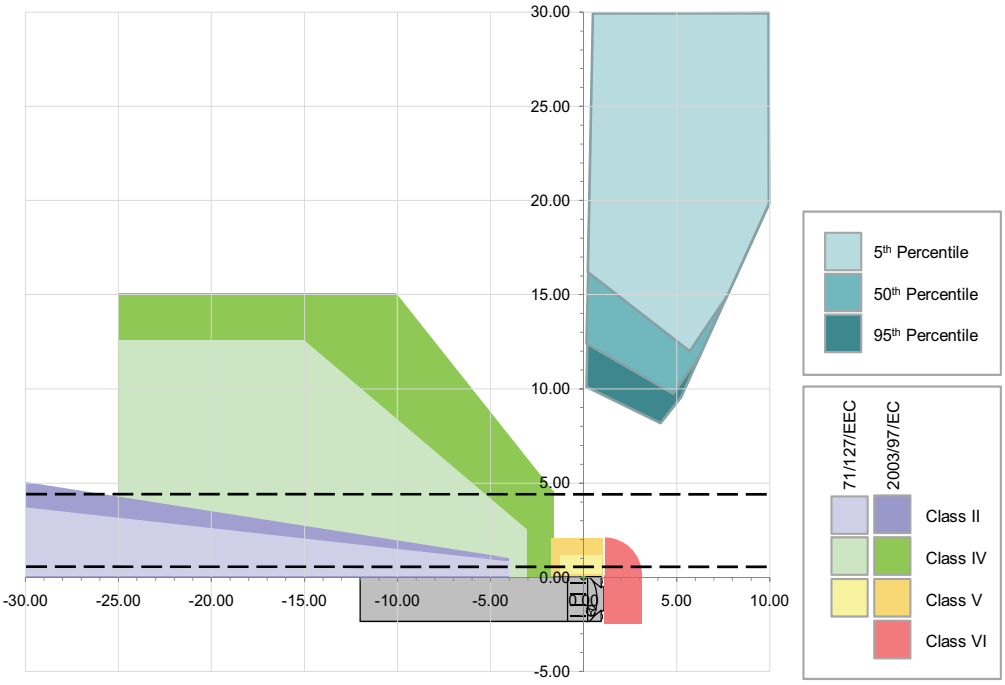

Figure 27: Direct and indirect field of vision through the passenger side window and mandatory mirrors - DAF (vehicle 3).

4.2.2 Fresnel lens

For the first two test vehicles, the Fresnel lens was assessed in three different positions on the passenger window using the ocular pints for 5th and 95th percentile drivers, by measuring the position of marker cones as described in section 3.4.2.

The ground plane measurements in Table 4 show that when the lens was positioned at the top of the window the ground was not visible until a distance of 1.9m and 2.6m away from the side of the vehicle for the 5th and 95th percentile drivers respectively.

In comparison, when the lens was positioned at the bottom of the window the ground could be seen at a distance of 1.0m and 1.9m away from the side of the vehicle, for 95th and 5th percentile drivers respectively.

Table 4: Lateral distance when ground plane first visible – Fresnel lens.

Test vehicle	Position of lens	Driver	Min lateral distance for ground plane FoV
Iveco Eurotrakker	Mid-point at the top of the window	5th	2.6m
		95th	2.3m
	Rearmost position at the bottom of the window	5th	1.9m
		95th	1.5m
	Foremost position at the bottom of the window	5th	1.9m
		95th	1.3m
Renault Magnum	Mid-point at the top of the window	5th	2.2m
		95th	1.9m
	Rearmost position at the bottom of the window	5th	1.5m
		95th	1.3m
	Foremost position at the bottom of the window	5th	1.5m
		95th	1.0m

The upper limit of the field of vision through the Fresnel lens is defined as the furthest lateral distance away from the vehicle that could be seen through the top of the lens. This distance was greater when the lens was positioned at the top of the window, because it was possible, in some cases, for the shorter driver (5th percentile) to see the far side of the test area (~150m away).

For the 95th percentile driver, the upper limit of the field of vision through the Fresnel lens was reduced when the lens was positioned at the bottom of the window. In this condition, it was still possible for the driver of the HGV to see the ground at a distance of 8.2m away from the vehicle. At this distance, the ground was also just visible by direct vision through the passenger window.

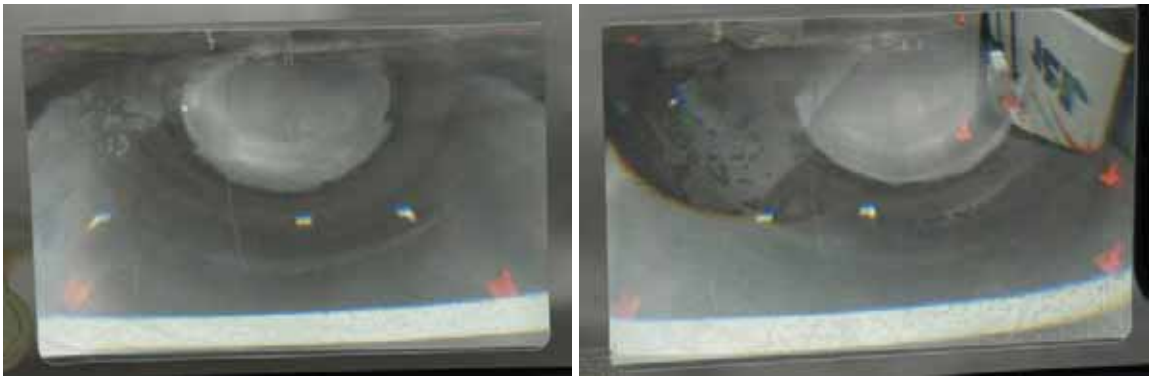

Figure 28: Field of vision of Fresnel lens partly impaired by external rear view mirror on Renault test vehicle (right).

The above results suggest that positioning the Fresnel lens at the bottom of the window would offer a field of vision closer to the side of the vehicle. There was minimal difference between positioning the lens towards the front or rear of the window, although as shown in Figure 28, the field of vision was partly impaired by the external rear view mirror when positioned further forward.

As also indicated in Figure 28, some photographs of the Fresnel lens show reflections of the vehicle and sky in the image. These images are accurate representations of what was seen with the naked eye. The level of reflections changed throughout the tests suggesting that the level of ambient light and the angle of the sun were having an effect on the visibility through the lens.

Diagrams showing the ground plane field of vision through the Fresnel lens for each of the ocular points and positions considered are provided in Appendices B-D. Figure 29 and Figure 30 shows examples of these diagrams for the Renault (vehicle 2).

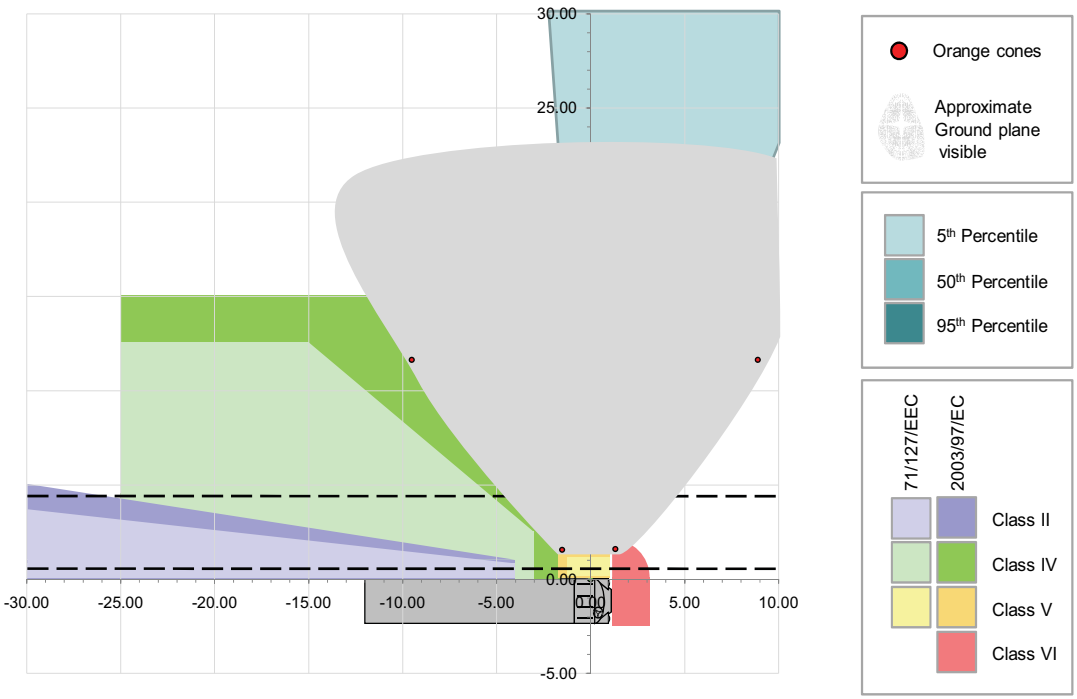

Figure 29: Ground plane field of vision through Fresnel lens from 5th percentile driver's ocular point – Renault (vehicle 2).

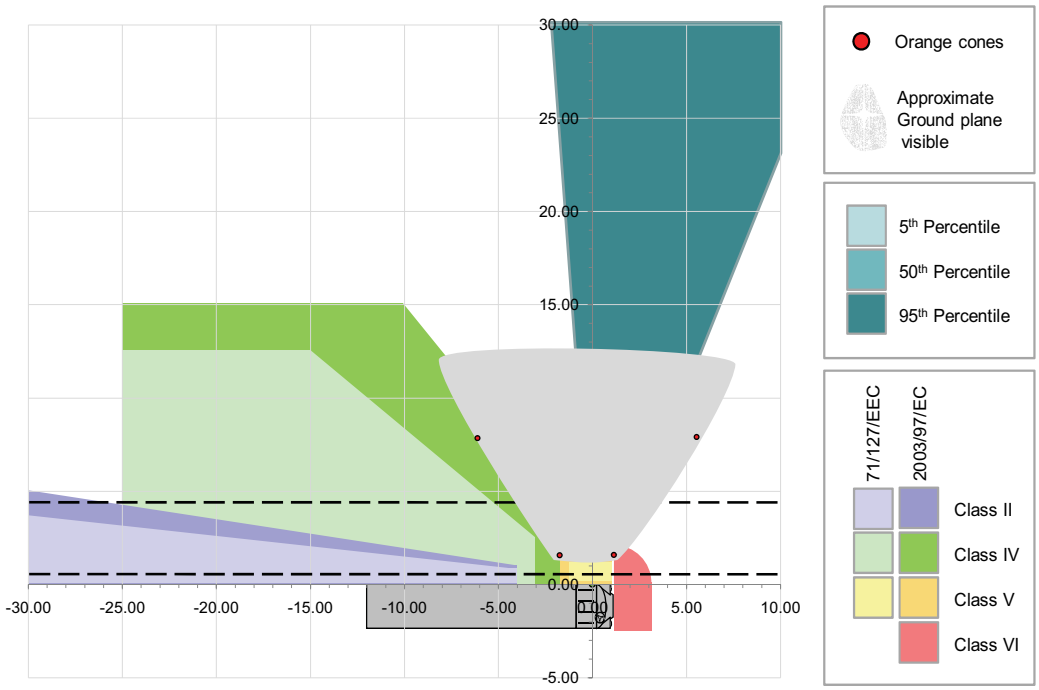

Figure 30: Ground plane field of vision through Fresnel lens from 95th percentile driver's ocular point – Renault (vehicle 2).

4.2.2.1 Feasibility of permanently etching a Fresnel design into a window pane

A Fresnel lens is made from plastic and is attached to the inner surface of the passenger window. One alternative to this might be to etch a Fresnel lens design into the window pane itself. To make an initial assessment as to the feasibility of such an idea TRL contacted Pilkington Automotive who were able to provide some background on the manufacturing process of different automotive glass and were able to offer some initial thoughts about the feasibility of this idea.

The majority of side windows on heavy goods vehicles are made from toughened glass. Such glass is manufactured on a float line which is a continuous process whereby molten glass is poured onto one end of a molten tin bath. The glass floats on the tin, and levels out as it spreads along the bath, giving a smooth face to both sides. After the glass cools it is cut to shape and given an edge finish. The glass is then re-heated to a plastic state where it is shaped and then toughened by rapidly air cooling it.

This process leaves the glass very strong but under permanent stress. Figure 31 shows a schematic of the stress profile in toughened glass. It can be seen that from the surface of the glass approximately 20% of the thickness is under compression. This level of compression falls to zero at approximately 20% of the glass thickness when it begins to come under tension up to a peak at the centre of the glass.

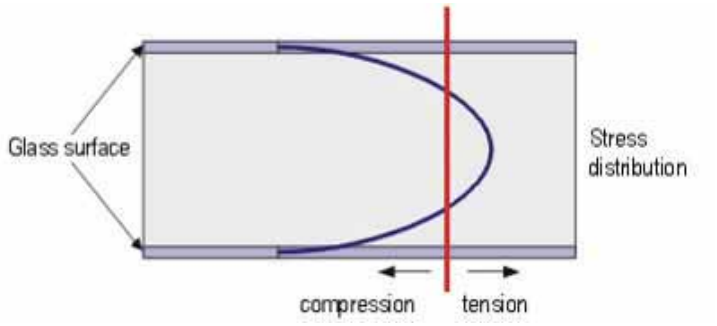

Figure 31: Schematic representation of the stress profile in toughened glass (source: AZoM, 2008).

To etch a Fresnel design into the surface of toughened glass would erode the surface of the glass and Pilkington Automotive suggested that, as a result, this would lower the surface compression and the strength of the glass. A typical automotive window is 3mm to 5mm thick and so it would only be necessary to erode 0.6mm to 1.0mm of glass before the surface compression is removed completely.

In automotive applications laminated glass is typically used for front windscreens; however Pilkington Automotive suggested that this type of glass may be more suitable than toughened glass for including a Fresnel design.

Laminated glass is made up of two pieces of glass with a thin interlayer, typically of polyvinyl butyral (PVB), sandwiched between them. The interlayer keeps the glass bonded even when broken. For an automotive application, the thicknesses of the two pieces of glass are approximately 2mm each and the interlayer is typically 0.8mm thick.

Pilkington Automotive said that the thickness of the glass is likely to be too small to incorporate a Fresnel design. However, they considered that there may be potential for the interlayer to be made thicker, and this layer could incorporate a Fresnel design. Pilkington Automotive explained that for adhesion purposes the interlayer must be in contact with the glass so it would be necessary to sandwich a Fresnel design in between two interlayers.

Clearly this would add complexity to the manufacturing process and would also be likely to increase the overall material costs of a window. Pilkington Automotive suggested that a standard laminated window would typically cost three to four times as much as a standard toughened glass window and, incorporating a Fresnel design into a laminated window, could push the price up such that the laminated glass might cost five to six times as much as a standard toughened glass window.

This initial investigation into the feasibility of permanently including a Fresnel design into a window pane suggests that it might be possible although there are a number of technical issues to resolve to ensure the strength of the glass is not compromised. It also appears likely that such a design would add significant cost to the glass which, given the relatively low cost of the current plastic Fresnel lens may not prove to be cost beneficial.

4.2.3 BDS Mirror system

The field of vision provided by the BDS mirror was assessed for vehicle 1 and vehicle 2 only. Firstly the mirror was angled downwards to try and include the ground at the front of the Class V field of vision at the bottom of the mirror. Secondly, the mirror was re-adjusted so that the rear of the Class IV field of vision was just visible at the top of the mirror.

The fitting instructions for the mirror did not specify a particular location on the A-pillar where the mirror should be mounted. However, a photograph in the instructions showed the mirror positioned towards the top of the A-pillar. Therefore the mirror was mounted in a similar position in both test vehicles (1 & 2) in which this device was used.

The Renault has a vertical grab handle that runs the entire height of the passenger window. During installation of the BDS mirror it was found that the grab handle prevented the BDS mirror from being angled down enough to see in front of the driver's ocular point. For the purpose of this study it was decided to remove the grab handle so that a full range of adjustment was possible.

4.2.3.1 Test vehicle 1 - Iveco

In the Iveco it was not possible to see the front edge of the Class V (close proximity) field of vision with the BDS mirror from the 5th percentile ocular-point. The front edge of the Class V ground plane was one metre ahead of the driver's ocular point. For the 5th percentile driver it was only possible to see the ground 0.5m ahead of the driver's ocular point (Figure 32 left).

For the 95th percentile driver it was possible to see closer to the front edge of the ground plane, but again it was not possible to view the entire width of the required field of vision (Figure 32 right).

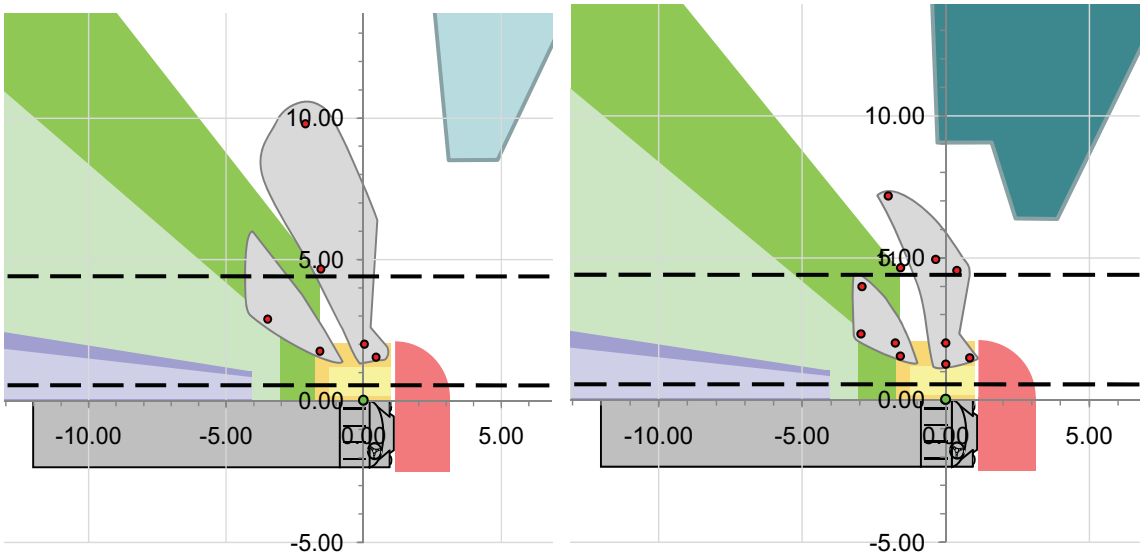

Figure 32: Estimated ground plane field of vision for BDS mirror (grey shaded area) in Iveco for 5th (left) and 95th (right) drivers, with the mirror angled down as far as possible.

Figure 32 shows that the estimated ground plane field of vision is split into two areas. This division was caused by the vertical window frame, separating the two panes of glass in the passenger window.

The ground plane field of vision through each mirror was defined by using a series of small orange cones as markers on the road surface to provide an outline of the field of

vision. Appendix B defines the position of the markers (shown in Figure 32) and shows a photograph of the field of view though the mirror.

By adjusting the angle of the mirror downwards to try and see the front edge of the Class V ground plane, the overall size of the area covered by the mirror was compromised. In fact the rearmost position that could be seen was only about 5m behind the driver's ocular point, whereas the rearmost position of the Class IV field of vision is 25m behind the driver's ocular point and 15m to the side.

The second mirror position that was tested was with the mirror angled such that the rearmost edge of the Class IV field of vision was just visible at the top edge of the mirror. This position gave a much larger field of vision. However, the vertical window frame, separating the two panes of glass in the passenger window, was again visible in the mirror and this resulted in a large blind-spot covering a substantial proportion of the Class IV field of vision, which the mirror was designed to see (Figure 33).

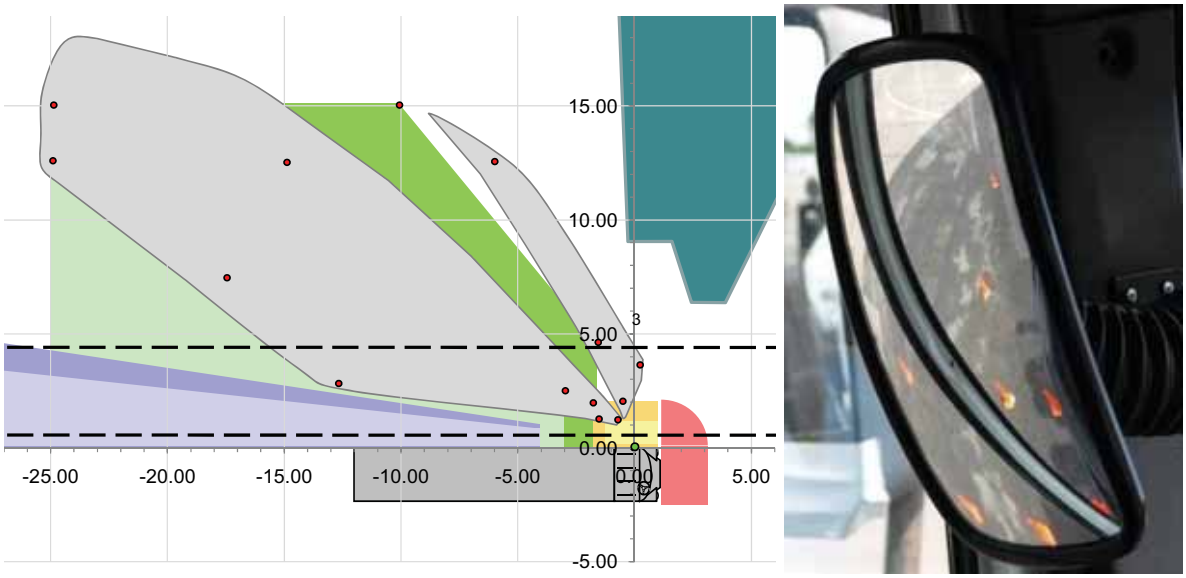

Figure 33: Estimated ground plane field of vision and photograph for BDS mirror (grey shaded area) in Iveco for 95th percentile driver.

4.2.3.2 Test vehicle 2 - Renault

With the BDS mirror angled downwards as far as possible the ground plane was only visible up to a distance of 0.3m in front of the driver's ocular point, and similarly to the Iveco, the field of vision only extended to a distance of approximately 5m behind the driver's ocular point (Figure 34).

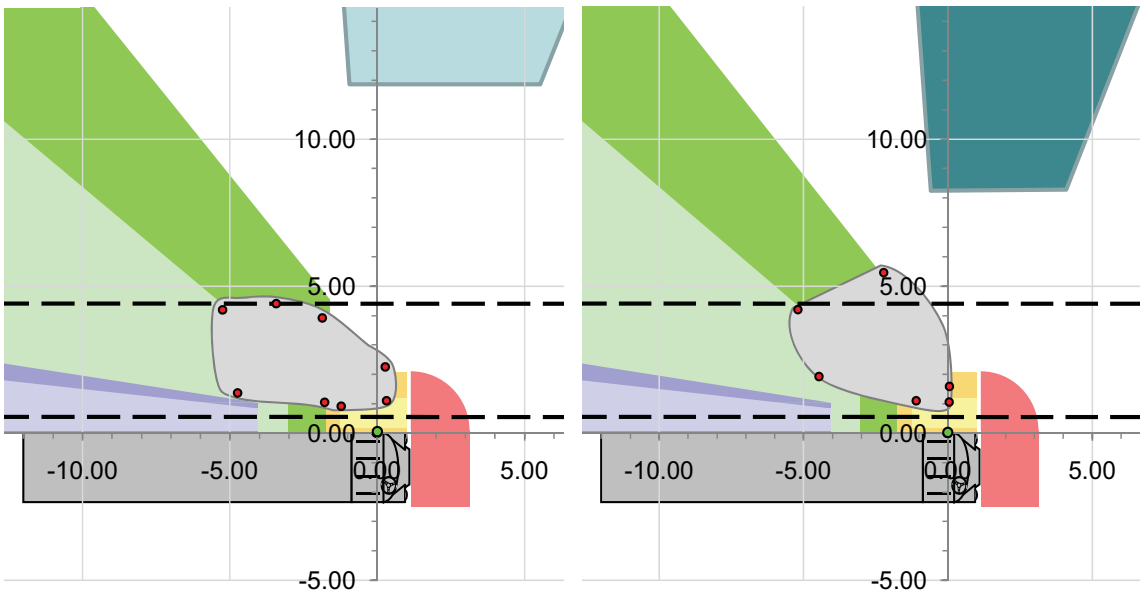

Figure 34: Estimated ground plane field of vision for BDS mirror (grey shaded area) in Renault for 5th (left) and 95th (right) drivers, with the mirror angled down as far as possible.

When the mirror was adjusted so the rear edge of the Class IV field of vision was just visible at the top edge of the mirror, then this again provided a much larger field of view.

In the Renault the passenger window was also made up of two panes of glass separated by a horizontal window frame close to the top of the window. The BDS mirror was positioned close to the top of the window to ensure that it did not impair the view through the mandatory mirrors. However, this meant that the horizontal window frame, separating the two panes of glass in the passenger window, was visible in the mirror and this resulted in a blind spot approximately 8m to 10m to the side of the vehicle. Figure 35 shows an example of this from the ocular point of the 5th percentile driver.

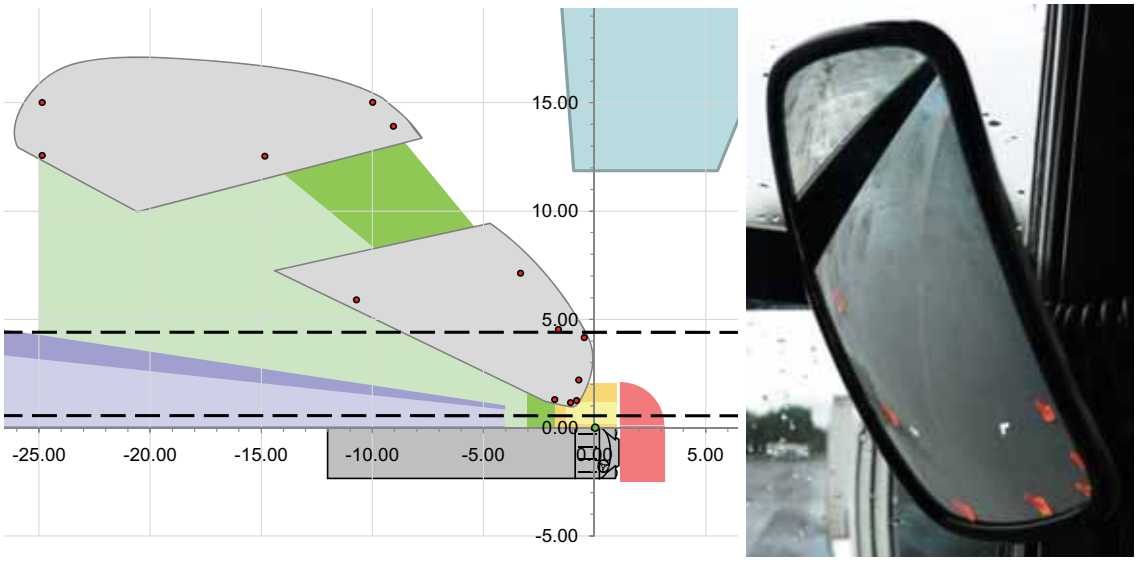

Figure 35: Estimated ground plane field of vision (grey shaded area) and photograph for BDS mirror in Renault for 5th percentile driver.

4.2.4 Dobli mirror

In addition to the two adjustments assessed with the BDS mirror, the Dobli was also assessed in a third position with the mirror adjusted as per the manufacturers' instructions described in section 3.4.4. The field of vision provided by the Dobli mirror was assessed for vehicle 1 and vehicle 2 only.

The Dobli mirror is mounted on the outside of the vehicle; it is positioned at the base of the windscreen on the passenger side and is viewed through the windscreen. For the tests with the Renault it was necessary to move the tax disc holder from the bottom corner of the windscreen because this was obstructing the view of the mirror. Figure 36 shows that the windscreen wiper also partly obstructed the view of the mirror, although this was not sufficient to cause a large blind spot in this vehicle.

Figure 36: Windscreen wiper partly obstructing Dobli mirror on Renault test vehicle.

4.2.4.1 *Test vehicle 1 - Iveco*

A similar field of vision was achievable for both the 5th and 95th percentile drivers. With the mirror angled downwards, it was possible to see the ground at the front edge of the Class V ground plane, however similarly to the BDS mirror; the rearmost field of vision was limited to approximately three metres behind the driver's ocular point.

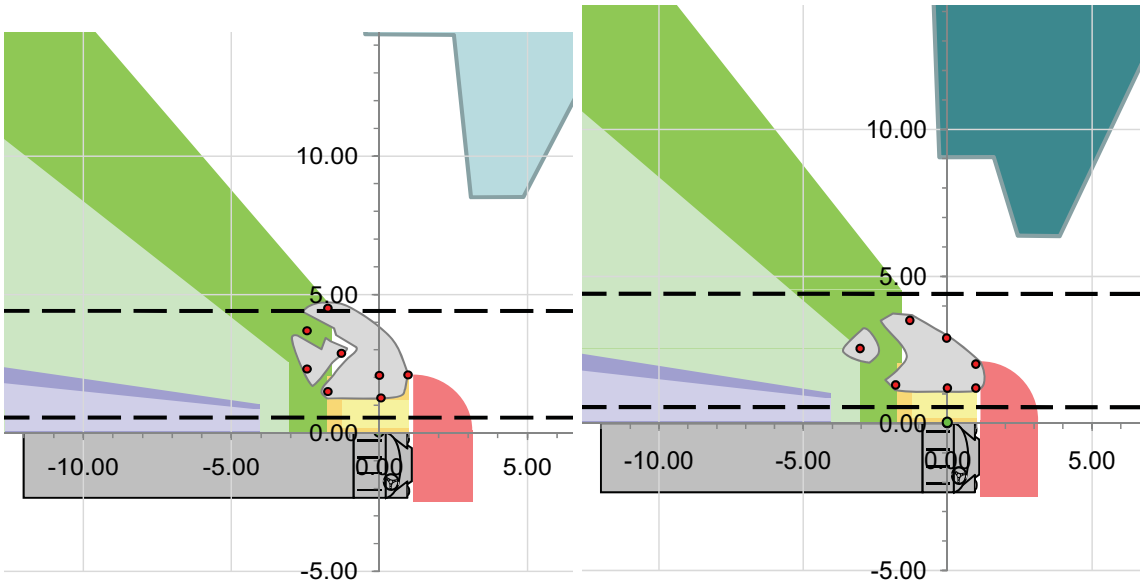

Figure 37: Estimated ground plane field of vision for Dobli mirror (grey shaded area) fitted to the Iveco for 5th (left) and 95th (right) drivers, with the mirror angled down as far as possible.

Figure 37 shows that the estimated ground plane field of vision is separated into two areas. This is because the Class II external rear view mirror was visible in the Dobli mirror, resulting in a blind spot.

The Dobli mirror, when angled towards the rear edge of the Class IV ground plane, covered a similar amount of the required field of vision to when the mirror was adjusted to have the horizon just visible (as per the manufacturers' instructions). However, the Class II external rear-view mirror on the vehicle did cause a large blind spot, as shown in Figure 38.

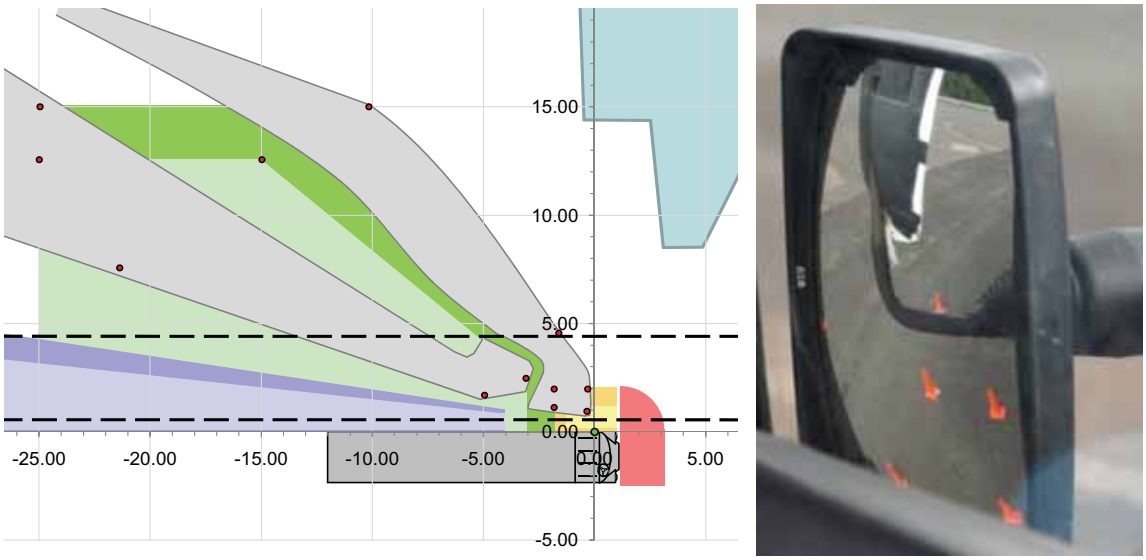

Figure 38: Estimated ground plane field of vision and photograph for Dobli mirror (grey shaded area) fitted to the Iveco for 5th percentile driver.

4.2.4.2 Test vehicle 2 - Renault

Adjusting the angle of the mirror downwards once again produced a small field of vision, extending from 1m in front to 3.5m behind the driver's ocular point.

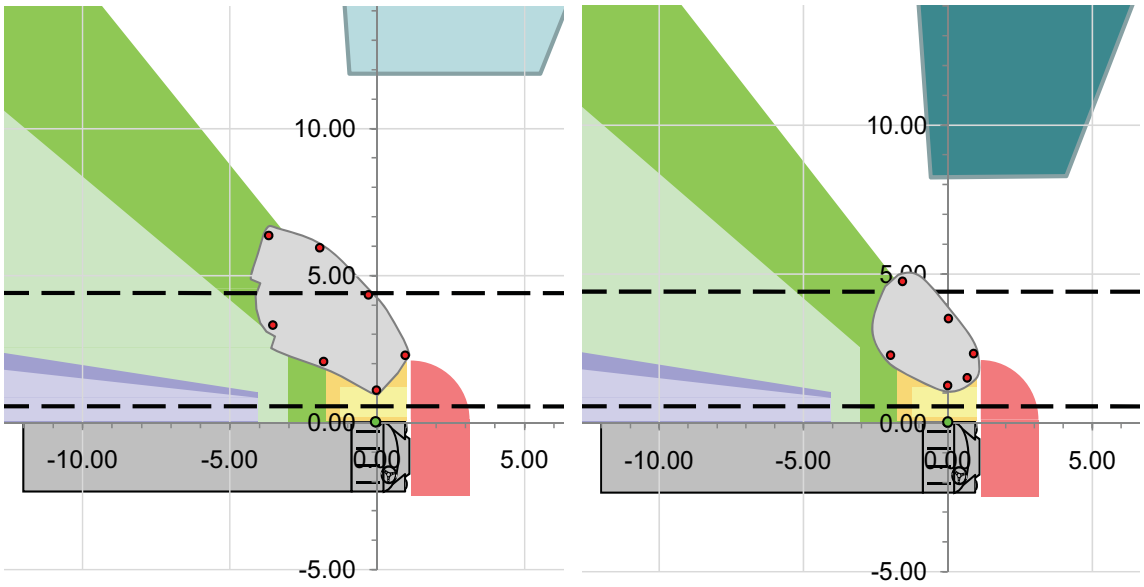

Figure 39: Estimated ground plane field of vision for Dobli mirror (grey shaded area) fitted to the Renault for 5th (left) and 95th (right) drivers, with the mirror angled down as far as possible.

With the mirror angled rearwards the Class II external rear-view mirror of the Renault partly obstructed the field of vision of the Dobli mirror. In fact for the 95th percentile driver it was not possible to see the rearmost edge of the Class IV ground plane, as shown in Figure 40.

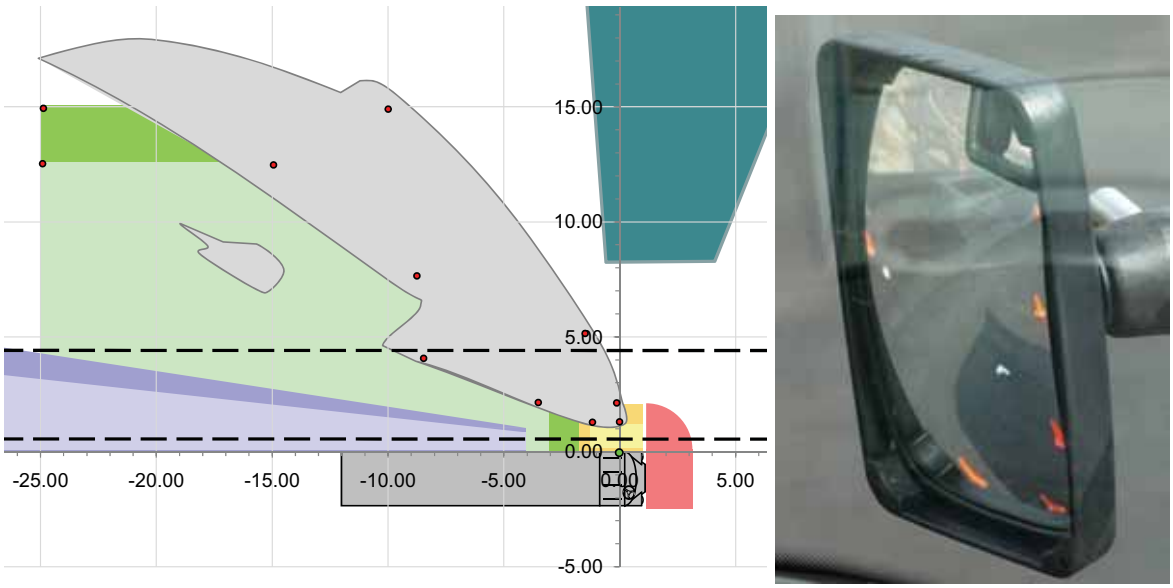

Figure 40: Estimated ground plane field of vision (grey shaded area) and photograph for Dobli mirror fitted to the Renault for 95th percentile driver.

4.3 Visibility of passing road users

For each of the ocular points, the mandatory mirrors were adjusted to provide the correct field of vision in relation to either Directive 71/127/EEC or 2003/97/EC, depending on the test configuration. The view using the mirrors was limited by either adding masking tape to the mirror or by angling the mirror inwards so that they provided only the minimum field of vision for Directive 71/127/EEC.

For the tests where the mandatory mirrors met the minimum requirements of Directive 2003/97/EC, the masking was removed and the mirrors readjusted to provide at least the minimum field of vision.

The Fresnel lens was positioned towards the rear edge at the bottom of the passenger window. The Renault Magnum and DAF were tested with the Fresnel in place for all of the test configurations and the results showed a consistent pattern of visibility for the different ocular points and positions of the road users. For the Iveco, some configurations were assessed without the Fresnel lens in place. However, by using the available results, it was possible to estimate the coverage of the Fresnel lens for the configurations where it was not tested.

4.3.1 Direct field of vision and mandatory mirrors

Individual photographs were analysed to identify if the passing road user could be seen either directly through the passenger window and/or indirectly through one of the mandatory mirrors. If the passing road user was visible in the mirror but could potentially be missed if the driver only quickly scanned his mirrors this was considered to be a 'potential' blind spot.

As described in section 3, measurements were taken from the ocular points of the 5th, 50th and 95th percentile drivers in the DAF (vehicle 3). Similar measurements were only taken from the ocular points of the 5th and 95th percentile drivers for the other two test vehicles. Also, the DAF was the only test vehicle to be fitted with a Class VI (front) mirror and the visibility from this mirror was noted and recorded in the spreadsheets (Appendix E). To provide a like-for-like comparison, the following analysis only considers the number of potential blind spots observed from the ocular points of the 5th and 95th percentile drivers in each vehicle excluding the view from the Class VI (front) mirror.

Figure 24 showed that from the DAF (vehicle 3) the driver could not see the ground as close to the vehicle compared with the other two test vehicles. This is further illustrated in Figure 41 below, where the roof of the passing Mondeo can only just be seen at the bottom of the passenger side window. Figure 42 shows a photo in the same configuration but taken from the Renault test vehicle. This shows that a greater proportion of the passing car can be seen directly in the window.

Figure 41: Direct visibility through passenger side window of DAF just shows roof of Mondeo which is clearly visible in Fresnel lens (Photo ref: P2119081).

Figure 42: Direct visibility through passenger side window of Renault clearly shows Mondeo (Photo ref: P8147639).

Overall, though, the subjective analysis of the photographs revealed that the Renault had the most potential blind spots (182), followed by the Iveco (153) and the DAF (153).

Table 5 shows the number of potential blind spots from each test vehicle, broken down by the type of passing road user and the set-up of the mandatory external rear view mirrors.

The field of vision using mandatory mirrors just meeting the requirements of Directive 71/127/EEC was substantially less than the field of vision provided by mandatory mirrors meeting the requirements of Directive 2003/97/EC. Unsurprisingly, Table 5 shows that on average, 62% of the potential blind spots were recorded when the external rear view

mirrors of each test vehicle were set up to just meet Directive 71/127/EEC, compared with the same vehicle using mirrors meeting the requirements of Directive 2003/97/EC.

For the large passenger car there were approximately twice as many potential blind spots from the Renault compared with the Iveco and the DAF. This suggests that the visibility from the Renault is poor in comparison to the other vehicles. However, the number of potential blind spots for the other passing road users was reasonably similar for each of the test vehicles and so it is unclear why there was such a large difference for the large passenger car.

Table 5: Number of potential blind spots for each test vehicle from 5th, 50th & 95th percentile ocular points.

Passing Road User	Iveco		Renault		DAF*	
	71/127/EEC	2003/97/EC	71/127/EEC	2003/97/EC	71/127/EEC	2003/97/EC
Large car	14	8	29	15	19	11
Small car	24	19	27	14	22	16
Cyclist	26	21	28	20	25	19
Pedestrian	22	19	29	20	26	15
Total	**86 (56%)**	**67 (44%)**	**113 (62%)**	**69 (38%)**	**92 (60%)**	**61 (40%)**

Note: *- excludes visibility from Class VI (front) mirror

Table 6 shows the potential blind spots for the different ocular positions in each test vehicle. The eye height for the 5th percentile driver was 161mm below the eye height for the 95th percentile driver.

Table 6: Number of potential blind spots by driver ocular point.

Passing Road User	Iveco		Renault		DAF*	
	5th	95th	5th	95th	5th	95th
Large car	15	7	26	18	19	11
Small car	26	17	25	16	22	16
Cyclist	26	21	25	23	27	17
Pedestrian	22	19	26	23	24	17
Total	**89 (58%)**	**64 (42%)**	**102 (56%)**	**80 (44%)**	**92 (60%)**	**61 (40%)**

Note: *- excludes visibility from Class VI (front) mirror

Although the mirrors were adjusted for the two drivers to give a similar indirect field of vision, the direct field of vision could not be changed and so this is likely to be the reason that there were slightly more potential blind spots for the 5th percentile driver eye point compared with the 95th percentile driver. For example, Figure 43 and Figure 44 show a comparison between the visibility from the 5th percentile eye height and the 95th percentile eye height in the Renault. Figure 43 shows that, although the passing car is clearly visible in the Fresnel lens, it is not directly visible through the passenger window from the 5th percentile eye height. The extra height of the 95th percentile driver (Figure 44) does allow the vehicle to be visible through the window.

Figure 43: Small passenger car not visible through direct field of vision from the 5th percentile driver of the Renault although it was clearly visible in the Fresnel lens (Photo ref: P8147890).

Figure 44: Small passenger car directly visible through side window as viewed from the 95th percentile driver of the Renault (Photo ref: P8147852).

Table 7 shows that there were more potential blind spots when the passing road user was positioned in the centre or far side of the adjacent lane. The figures shown in Table 7 are the total number of potential blind spots for all three ocular points and both configurations of mandatory mirrors.

Specifically, it was found that about 14% of all potential blind spots were recorded when the passing road user was at the near side of the adjacent lane, compared to 37% and

49% of all potential blind spots when the passing road user was in the centre and far side of the adjacent lane respectively.

Table 7: Number of potential blind spots by the lateral position of passing road user.

Passing Road User	Iveco			Renault			DAF*		
Lateral Position**	**A**	**B**	**C**	**A**	**B**	**C**	**A**	**B**	**C**
Large car	1	10	11	10	17	17	2	13	15
Small car	10	17	16	5	16	20	5	14	19
Cyclist	6	16	25	5	21	22	6	17	21
Pedestrian	7	13	21	6	19	24	9	13	19
Total	**24 (15%)**	**56 (37%)**	**73 (48%)**	**26 (14%)**	**73 (40%)**	**83 (46%)**	**22 (14%)**	**57 (37%)**	**74 (49%)**

* Excludes visibility from Class VI (front) mirror

** As defined in Figure 19

Figure 45 shows the distribution of potential blind spots by the longitudinal position of the passing road user. The graph includes data from all three test vehicles and shows that that 72% of blind spots were recorded from one metre behind the driver's eye-line to three metres in front of it.

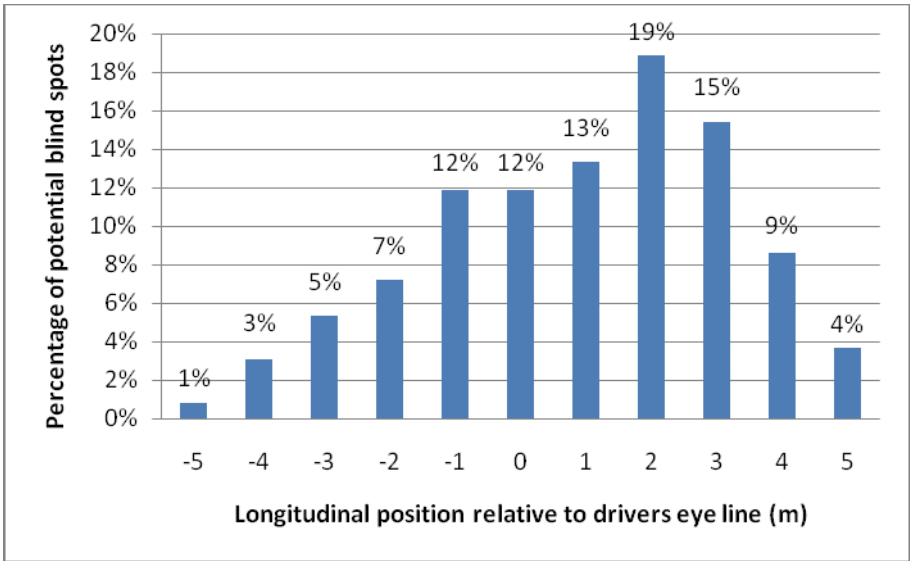

Figure 45: Percentage of all potential blind spots by longitudinal position of the passing road user.

The position of two metres in front of the driver's eye-line had the largest number of potential blind spots. In this position the passing road user was often hidden by the A-pillar on the passenger side of the vehicle and, because the road user was ahead of the front of the test vehicle, it was not visible in any of the rearward facing mirrors.

For example, in this position a cyclist at the closest edge of the adjacent lane could not be seen from the Renault either directly through the window or by any of the mandatory or supplementary mirrors (Figure 46).

Figure 46: Pedal cyclist in blind spot of Renault test vehicle (Photo ref: P8147725).

The Renault used for this project was not required to be fitted with a Class VI (front) mirror. However, if it was possible to equip the vehicle with a (correctly adjusted) Class VI mirror, then the pedal cyclist would have been visible to the driver of the Renault and so the blind spot would not have existed.

This is illustrated by the photograph in Figure 47, which was taken from the DAF test vehicle from the 5th percentile ocular point, and with the cyclist in the same position as the above photo. It shows that the cyclist was clearly visible in the Class VI (front) mirror.

Figure 47: Pedal cyclist visible in Class VI (front) mirror fitted to DAF test vehicle (Photo ref: P2129721).

Another example was when the pedestrian was standing at the closest edge of the adjacent lane and one metre ahead of the driver's ocular point. The position he was in

was a potential blind spot for both the Iveco and the Renault because he was below the lower edge of the passenger side window.

Also, for the DAF, when the pedestrian was standing at the closest edge of the adjacent lane and two metres ahead of the driver's ocular point, it was only possible to see the pedestrian using the Class VI (front) mirror (Figure 48).

Figure 48: Pedestrian only visible in Class VI (front) mirror on the DAF vehicle when standing at the closest edge of the adjacent lane and two metres ahead of the driver's ocular point (Photo ref: P2129754).

As the pedestrian moved from the near edge of the adjacent lane to the centre of the adjacent lane the Class VI mirror became less able to provide a clear view of the pedestrian. Figure 49 shows a pedestrian standing at the centre of the adjacent lane and two metres ahead of the drivers eye line (the same longitudinal position as the previous photo). In this case, the pedestrian was only just visible in the Class VI mirror and it is unlikely he would be easily seen by the driver if he wasn't wearing the high-visibility jacket. Although the pedestrian was less visible in the Class VI mirror, he did become visible in the Fresnel lens.

Figure 49: Pedestrian standing in the centre of the adjacent lane and two metres ahead of the driver's ocular point (Photo ref: P2129698).

Additionally for the Iveco, when the pedestrian was in the middle of the adjacent lane and positioned two metres in front of the driver's ocular point, there was a potential blind spot caused by the nearside A-pillar and the Dobli mirror (Figure 50). None of the supplementary mirrors were able to cover this area because it was ahead of their mounting positions.

Figure 50: Example of potential blind spot behind nearside A-pillar on Iveco (Photo ref: P8017334).

4.3.1.1 Poorly adjusted close proximity mirror

Figure 51 shows that when the nearest edge of the passing vehicle is on the closest edge of the adjacent lane (0.5m from the side of the HGV) it is just visible in a close proximity mirror that just meets the minimum requirements of Directive 71/127/EEC.

Figure 51: Passing car positioned the closest edge of adjacent lane is just visible in correctly adjusted close proximity mirror meeting Directive 71/127/EEC.

If this mirror were to be angled too far inwards then the vehicle would no longer be visible, as shown in Figure 52. This could mean that even if the car was on the closest edge of the adjacent lane it might not be visible to the driver.

Figure 52: Passing car positioned the closest edge of adjacent lane is not visible in poorly adjusted close proximity mirror meeting Directive 71/127/EEC.

A close proximity mirror meeting the requirement of 2003/97/EC has a larger field of vision, so with the correct adjustment to this mirror a vehicle at the closest edge of the adjacent lane would not be hidden from view (Figure 53).

Figure 53: Passing car visible in correctly adjusted close proximity mirror meeting Directive 2003/97/EC.

However, when positioned in the centre of the adjacent lane, a passing vehicle is just visible in the close proximity mirror (Figure 54), and so poorly adjusting a mirror just meeting the requirements of Directive 2003/97/EC could mean that a vehicle in the centre of the adjacent lane might not be visible to the driver of the HGV.

Figure 54: Passing car positioned in the centre of adjacent lane is just visible in correctly adjusted close proximity mirror meeting Directive 2003/97/EC.

4.3.2 Supplementary devices

For the cases where a potential blind spot was identified, the photographs were re - assessed to see if a Fresnel lens, BDS mirror or Dobli mirror could eliminate the blind spot by providing the driver with a view of the passing road user.

If the passing road user was clearly visible through either the Fresnel lens or in the BDS or Dobli mirror then it was assumed that the device could *definitely* eliminate the blind spot. This has been used to represent the lower limit of the estimated range.

However, if the passing road user was visible through either the Fresnel lens or in the BDS or Dobli mirror, but there was chance that the driver of the HGV might miss the other road user with just a quick glance, it was assumed that the device could *possibly* eliminate the blind spot. The number of blind spots that could definitely have been eliminated was added to the number of blind spots that could possibly have been eliminated to give the upper limit of the estimated range.

4.3.2.1 Fresnel lens

The Fresnel lens was assessed on each of the three test vehicles. Table 8 shows the estimated range of effectiveness of the Fresnel lens in eliminating the potential blind spots identified alongside the vehicles. It can be seen that similar results were achieved on all three test vehicles and the Fresnel lens was able to eliminate between 78% and 90% of potential blind spots.

Table 8: Effectiveness of the Fresnel lens in eliminating potential blind spots.

Passing road user	Large car	Small car	Pedal cyclist	Pedestrian	Average
Blind spot eliminated?	**Iveco**				
Definitely	22 (100%)	38 (88%)	37 (79%)	34 (83%)	86%
Possibly**	0 (100%)	0 (88%)	1 (81%)	1 (85%)	87%
No	0 (0%)	5 (12%)	9 (19%)	6 (15%)	
	Renault				
Definitely	44 (100%)	38 (93%)	25 (56%)	32 (65%)	78%
Possibly**	0 (100%)	2 (98%)	7 (71%)	4 (73%)	85%
No	0 (0%)	1 (2%)	13 (29%)	13 (27%)	
	DAF*				
Definitely	30 (100%)	38 (100%)	34 (77%)	28 (69%)	85%
Possibly**	0 (100%)	0 (100%)	6 (91%)	2 (73%)	90%
No	0 (0%)	0 (0%)	4 (9%)	11 (27%)	

* Excludes visibility from Class VI (front) mirror
** Percentages on this row represent total of definitely + possibly eliminated

For the large passenger car, the subjective analysis determined that the Fresnel lens could eliminate all of the potential blind spots identified when only the direct and indirect field of vision using the mandatory mirrors were considered. For the small passenger car the estimated effectiveness of the Fresnel lens was still high, but slightly lower than the large passenger car. This might be because the position of the vehicles was taken in reference to the font of the vehicle and so the smaller (and shorter) vehicle was not visible in cases where the rear of the large car was only just visible in the lens, as illustrated in Figure 55.

Figure 55: Example of large passenger car just visible in Fresnel lens (left), whilst the small passenger is not visible in the Fresnel lens (right)

4.3.2.2 BDS Mirror

The BDS mirror was assessed only on the Iveco and Renault test vehicles. This device did not prove to be as effective as the Fresnel lens in covering the areas where there were potential blind spots. Overall, the BDS mirror was able to cover between 37% and 75% of potential blind spots.

Table 9: Effectiveness of the BDS mirror in eliminating potential blind spots.

Passing road user	Large car	Small car	Pedal cyclist	Pedestrian	Average
Blind spot eliminated?	**Iveco**				
Definitely	16 (73%)	22 (55%)	11 (23%)	6 (15%)	37%
Possibly*	4 (91%)	8 (75%)	19 (64%)	15 (51%)	67%
No	2 (9%)	10 (25%)	17 (36%)	20 (49%)	
	Renault				
Definitely	35 (80%)	26 (63%)	11 (23%)	10 (20%)	45%
Possibly*	9 (100%)	8 (83%)	22 (69%)	16 (53%)	75%
No	0 (0%)	7 (17%)	15 (31%)	23 (47%)	

* Percentages on this row represent total of definitely + possibly eliminated

This device was most effective for the larger passing road users (e.g. a car) but was less effective for a pedestrian or cyclist. This might be because a cyclist or pedestrian is much smaller than either of the passenger cars and so it is easier for them to be missed with a quick glance, especially if the window frame was partly/fully obstructing the view, or if only part of the bicycle frame was in view, as shown in Figure 56.

Figure 56: Cyclist and pedestrian partly hidden by the window frame visible in the BDS mirror.

4.3.2.3 Dobli Mirror

The Dobli mirror was also assessed only on the Iveco and Renault test vehicles. It showed a similar level of performance to the BDS mirror and was able to provide coverage for 43% to 76% of the potential blind spots identified.

Table 10: Effectiveness of the Dobli mirror in eliminating potential blind spots.

Passing road user	Large car	Small car	Pedal cyclist	Pedestrian	Average
Blind spot eliminated?	**Iveco**				
Definitely	16 (73%)	22 (55%)	16 (34%)	11 (27%)	43%
Possibly*	4 (91%)	10 (80%)	13 (62%)	13 (59%)	70%
No	2 (9%)	8 (20%)	18 (38%)	17 (41%)	
	Renault				
Definitely	38 (86%)	26 (63%)	23 (48%)	20 (41%)	59%
Possibly*	6 (100%)	7 (80%)	11 (71%)	7 (55%)	76%
No	0 (0%)	8 (20%)	14 (29%)	22 (45%)	

* Percentages on this row represent total of definitely + possibly eliminated

Like the BDS mirror there were also occasions when the visibility of a cyclist of pedestrian was partly obstructed. Unlike the BDS mirror (which was mounted inside the cab), the Dobli mirror was mounted ahead of the vehicle and viewed through the windscreen. Therefore, for this device, the obstruction was caused by the external rear view mirrors, as shown in Figure 57.

Figure 57: Cyclist and pedestrian partly hidden by the external rear view mirror visible in the Dobli mirror.

Appendix D includes a series of tables which specify all the test configurations and indicate if the road user was visible in each of the mirrors, the Fresnel lens and/or the window. The spreadsheet also provides references to individual photographs.

5 Discussion

5.1 Direct field of vision

The comparison of the direct field of vision from each of the three test vehicles (Figure 24) showed that from the DAF (vehicle 3) the driver could not see the ground as close to the vehicle compared with the other two test vehicles. In the DAF the driver sits lower down, in relation to the window, compared with the Renault. This allows the driver of the Renault to look through the passenger side window at a steeper angle (Figure 58) thus seeing the ground closer to the side of the vehicle.

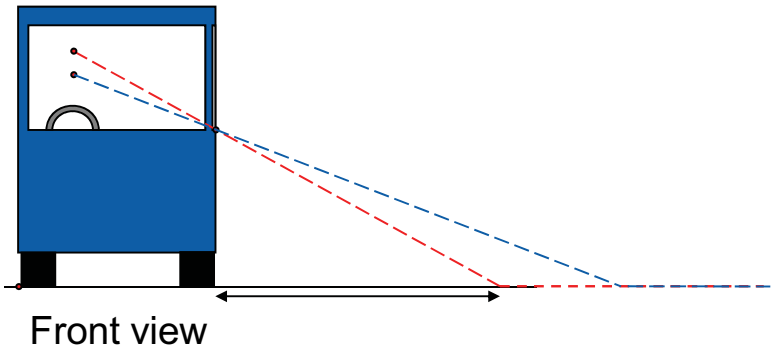

Figure 58: Effect of relative height of ocular point and window height on ground plane field of vision.

The height of the ocular points, relative to the lower edge of the passenger side window, was similar in the Iveco and the DAF. However, the Iveco was not as wide as the DAF which again meant that the driver could look through the side window at a steeper angle. The shorter distance to the passenger side of the vehicle has been represented in Figure 59 by moving the eye-point to the right.

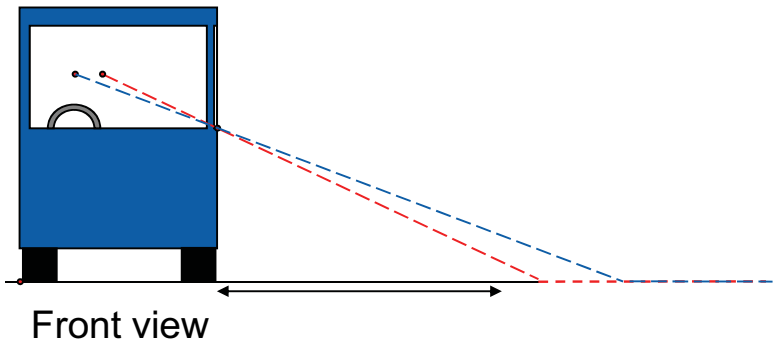

Figure 59: Effect of height and width of vehicle on ground plane field of vision.

The comparison of the three test vehicles also showed a difference in how far rearwards the driver could see using the direct field of vision in each vehicle. For both the Iveco and the Renault it was possible to see the ground plane a short distance behind the driver's eye line, whereas in the DAF the ground could only be seen from just in front of the driver's eye line. This is caused by the relative longitudinal position of the driver's ocular point and the rear edge of the passenger side window.

The effect of the for/aft position of the driver is further illustrated when the longitudinal position of the seat is adjusted. Figure 60 shows the calculated ground plane field of vision for a 50th percentile driver in the Iveco (vehicle 1) with the seat adjusted to the, foremost, middle and rearmost longitudinal position.

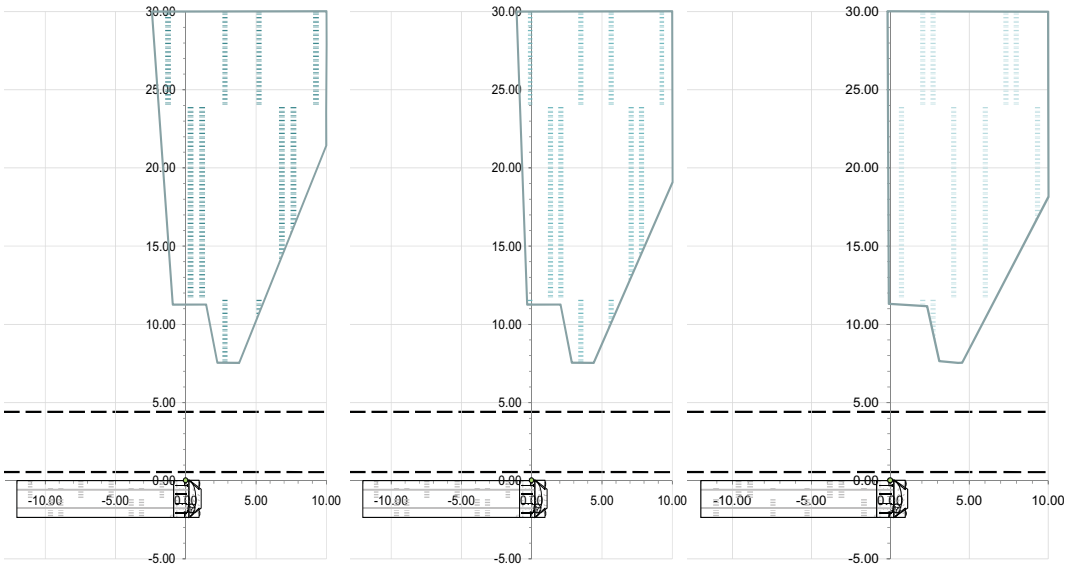

Figure 60: Direct field of vision – ground plane for different seat positions in the Iveco (vehicle 1). (foremost (left), middle (centre), rearmost (right))

The direct field of vision calculated earlier in the report, was in relation to the ground plane that was visible to the driver of the HGV. However, as shown by the photographs of the passing road users, objects can be seen directly when they are much closer to the vehicle. For example, an object 1.2m[‡] tall could be seen about 2.94m away from the side of the Iveco, 4.67m away from the Renault and 4.89m from the DAF (Figure 61).

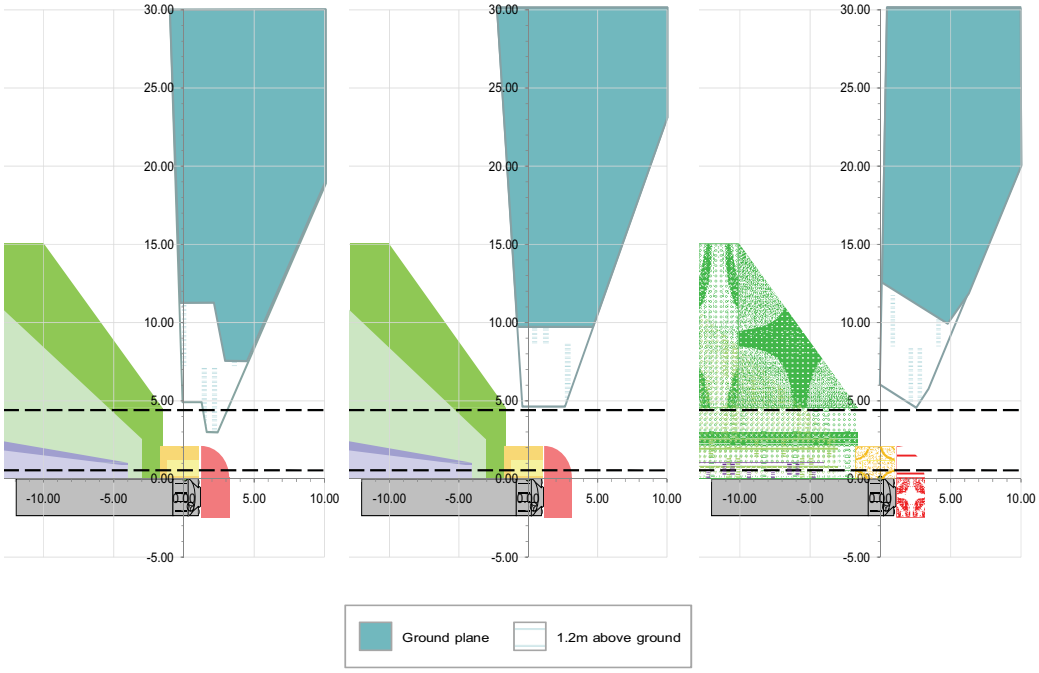

Figure 61: Comparison of direct field of vision at ground plane and 1.2m above ground plane for Iveco (left), Renault (centre) and DAF (right) test vehicles.

[‡] As per Annex III, para.5.6.2 of Directive 2003/97/EC

5.2 Indirect field of vision

5.2.1 Mandatory mirrors

The analysis of the field of vision though the mandatory mirrors showed there was the same number of potential blind spots around the Renault and DAF, both of which had slightly fewer potential blind spots compared with the Iveco. Because the DAF was the only test vehicle fitted with a class VI mirror and to provide a like-for-like comparison, the visibility of the passing road users in the Class VI mirror was not considered in the analysis described in section 4.3.1.

If the Class VI mirror had been included in the analysis then the number of potential blind posts would have been reduced for the DAF, as shown in Table 11. This shows that the reduction is potential blind spots was greater for the passenger cars, with little difference for either of the vulnerable road users.

Table 11: Effect of including Class VI (front) mirror from estimation of potential blind spots alongside the DAF test vehicle in 2003/97/EC configuration.

Passing Road User	DAF	
	Excluding Class VI	Including Class VI
Large car	11	5
Small car	16	9
Cyclist	19	17
Pedestrian	15	13

5.2.2 Supplementary devices

Both the BDS and Dobli mirrors are approved to 2003/97/EC as separate technical units. This indicates that they have a lens with a radius of curvature which is capable of providing the field of view required by that Directive for a Class IV or Class V mirror. However, the test results showed that having the correct adjustment of these mirrors was critical in maximising the field of vision they could provide. For example, adjusting the angle of the BDS or Dobli mirror downwards to see the front edge of the ground plane for the Class V mirror meant that the overall field of vision was quite small. However, a larger field of vision could be achieved when the BDS and Dobli mirrors were angled upwards such that the rear edge of the Class IV field of vision was visible in the top part of the mirror.

In between taking measurements on the Iveco with the mandatory mirrors meeting the requirements of Directive 71/127/EEC and taking similar measurements with the mandatory mirrors meeting the requirements of Directive 2003/97/EC, some adjustments were made to the BDS and Dobli mirrors to try and maximise the field of vision they provided. As a result, the spreadsheets in Appendix D show some differences between the areas in which the passing road users can be seen from the Iveco. These are genuine differences and are further evidence to show how small changes to the alignment of the BDS and Dobli mirrors can affect the field of vision they provide.

Also, without markings on the ground to define the required field of vision, it is possible that it could be quite difficult for a driver, on his own, to ensure that he has correctly adjusted the mirror.

The ground planes were measured with the BDS and Dobli mirrors in the following positions:

- The mirror angled down so the front edge of the Class V field of vision was visible in the mirror;
- The mirror angled away so the rear edge of the Class IV field of vision was visible in the mirror; and
- The mirror adjusted as per the manufacturer's instructions (Dobli mirror only)

From the 5th and 95th percentile ocular points the BDS and Dobli mirrors were not able to achieve the reduced field of vision requirements of Directive 2007/38/EC; namely 95% of the ground plane field of vision for a Class IV mirror and 85% of the ground plane field of vision for a Class V mirror.

In some cases the Class IV field of vision from the BDS and Dobli mirrors was obstructed by the window frame and/or the external rear-view mirrors on the vehicle which reduced the size of the ground plane visible through the mirrors. The level of such obstructions will vary from vehicle to vehicle and so the performance of the additional mirrors is also dependent upon the features of the vehicle to which they are fitted and where on the vehicle they are fixed. No attempt was made to change the mounting position of the devices, or to consider different adjustments to the face of the mirror to improve the field of view they offered. It is possible that such changes could improve the field of vision, but it is equally possible that different blind spots could be created by the features of the vehicle (e.g. window frames and/or external mirrors).

The ground plane field of vision for a Class V mirror meeting the requirements of Directive 2003/97/EC extends one metre ahead of the driver's ocular point. With the Dobli mirror angled to see the Class IV ground plane (25m back and 15m to the side of the vehicle), it was often not possible to see the foremost edge of the Class V ground plane illustrating that it could not meet the requirements of Directive 2007/38/EC for either test vehicle.

Whereas the Dobli mirror is mounted in front of the vehicle, the BDS mirror was mounted on the A pillar inside the cab. Therefore, with the mirror facing rearwards, it was impossible for the mirror to provide coverage of the front edge of the Class V ground plane which was ahead of its mounting position.

The Fresnel lens was able to provide good coverage of the area to the passenger side of the vehicle. The ground plane visible through the lens was measured with the lens in three different positions on the window. These tests showed that it was preferable to position the lens at the bottom of the passenger window because it was possible to see the ground closer to the vehicle than if the lens was positioned at the top of the window.

The fore/aft positioning of the Fresnel lens was also considered and the results showed minimal difference between placing the lens at the front of the window compared with placing it at the rear of the window. It was noted that, when the lens was positioned towards the front of the passenger window, the external rear-view mirrors of the vehicle partly obstructed the view. As before, the magnitude of such an obstruction is dependent upon the vehicle to which the lens is fitted.

An initial investigation regarding the feasibility of etching the Fresnel lens design into the passenger window pane revealed that the strength of the toughened glass used in side windows would be compromised by adding this feature. It was identified that it would be easier to include the Fresnel lens design into a window using laminated glass, although it was estimated that this could raise the cost of the window by up to six times that of a current toughened glass window.

5.3 Visibility of passing road users

An area from five metres behind the driver's eye-line to five metres in front of the driver's eye-line was assessed for the adjacent lane using the following road users:

- A large passenger car;
- A small passenger car;
- A pedal cyclist; and
- A pedestrian.

For each of the three test vehicles, the visibility of each passing road user was measured for 11 longitudinal positions and three lateral positions using 5th and 95th percentile ocular points and with the external rear view mirrors meeting the requirements of either Directive 71/127/EEC or Directive 2003/97/EC. This gave a total of 1056 measurements.

For each longitudinal and lateral position a photograph of the passenger window and the nearside mirrors was taken. The photographs were taken with both the test vehicle and the passing road user stationary on the TRL research Track. This provided a safe and consistent environment in which to assess the visibility of the passing road user.

It is recognised that in reality an HGV driver would only briefly scan their mirrors whilst also concentrating on the other actions of driving. It is also likely that the cab would be moving or shaking as a result of the natural disturbances from the road and the movement of the vehicle. Therefore the subjective assessment procedure involved quickly scanning each photograph individually to identify if the passing road user could be seen through the window and/or in one or more of the mandatory mirrors.

A total of 471 potential blind spots were identified when only the direct field of vision through the window and the indirect field of vision through the mandatory mirrors were considered for the three test vehicles. For all three test vehicles there were more potential blind spots identified when looking from the ocular point of the 5th percentile driver. Although the mirrors were adjusted for the different ocular points to give a similar indirect field of vision, the positions of the windows are fixed and so the direct field of vision cannot be changed. This could explain why there were slightly more potential blind spots from the 5th percentile driver. This also supports the earlier suggestion that the relative height of the driver's eye to the lower edge of the side window is an important factor in the visibility of a passing vehicle.

The mandatory mirrors meeting the requirements of Directive 2003/97/EC did offer an improved field of vision over the mirrors that just met the requirements of Directive 71/127/EEC, eliminating about a third of the potential blind spots identified when the test vehicles were configured to the older Directive.

Where a potential blind spot was identified, the individual photographs were re-analysed to see if the supplementary devices could provide the driver with a view of the passing vehicle.

All three devices tested (Fresnel lens, BDS mirror and Dobli mirror) offered additional benefits to the mandatory mirrors and eliminated some of the potential blind spots. It was estimated that, for the test vehicles and ocular points used in this study, the Fresnel lens could eliminate 78%† to 90%‡ of the blind spots, the BDS mirror 37%§ to 75%** of blind spots and the Dobli mirror between 43%† and 76%‡ of the blind spots.

For the pedal cyclist there was one position where, from the ocular point in the Renault, a complete blind spot was identified. In this instance the cyclist was positioned on the closest edge of the adjacent lane and the front wheel of the bike was two metres ahead of the driver's eye-line. In this position the cyclist's head was approximately one metre ahead of the driver's eye-line. Also, when the pedestrian was one metre ahead of the

§ These Percentages represent total of definitely eliminated
** These Percentages represent total of definitely + possibly eliminated

driver's ocular point he was hidden from view by the A pillar. The test vehicles were not required to be fitted with a Class VI (front) mirror but, were it possible to install such a mirror, these blind spots may not have existed.

The correct adjustment of the mandatory mirrors is also important in ensuring that the driver has the best possible field of vision. In particular it was found that by incorrectly adjusting a close proximity mirror which just meets the minimum requirement of Directive 71/127/EEC a passing car, positioned on the closest edge of the adjacent lane, might not be visible to the driver of the HGV. Similarly by incorrectly adjusting a Class V mirror meeting the minimum requirement of Directive 2003/97/EC; it was found that a passing car, positioned at the centre of the adjacent lane might not be visible to the driver of the HGV.

6 Conclusions

1. The size and shape of the passenger side window and the relative position of the driver's ocular point has a noticeable effect on the extent of the ground plane field of vision available to the driver of the HGV.
2. For the 5th and 95th percentile ocular points, the subjective analysis of the passing road users revealed that there were a total of 471 potential blind spots alongside the three test vehicles; 153 for the Iveco, 182 for the Renault and 136 for the DAF.
3. The mandatory mirrors meeting the requirements of Directive 2003/97/EC did offer an improved field of vision over the mandatory mirrors which just met the requirements of Directive 71/127/EEC, and they eliminated about a third of the potential blind spots identified when the test vehicles were configured with the older mirrors.
4. All three supplementary devices tested (Fresnel lens, BDS mirror and Dobli mirror) offered additional benefits to the mandatory mirrors and eliminated some of the potential blind spots. It was estimated that, for the test vehicles and ocular points used in this study, the Fresnel lens could eliminate 78%† to 90%‡ of the blind spots, the BDS mirror, 37%† to 75%‡ of blind spots and the Dobli mirror, 43%† to 76%‡ of the blind spots.
5. The Fresnel lens was able to provide good coverage of the area to the passenger side of the vehicle, although the view through the lens was sometimes obscured by glare from the sun. The optimum position on the window was determined to be at the bottom of the window. The lens offered a marginally better field of vision when positioned towards the rear of the window
6. An initial investigation into the feasibility of etching the Fresnel lens design into the window pane itself revealed that, for toughened glass, the strength of the window could be compromised. Including the design in a window made from laminated glass might be possible but is likely to substantially increase the cost.
7. Both the BDS and Dobli mirrors are approved to 2003/97/EC as separate technical units. This indicates that they have a lens with a radius of curvature which is capable of providing the field of view required by that Directive for a Class IV or Class V mirror. However, the test results showed that having the correct adjustment of these mirrors was critical in maximising the field of vision they could provide. Also, without markings on the ground to define the required field of vision, it is possible that it could be quite difficult for a driver, on his own, to ensure that he has correctly adjusted the mirror.
8. The field of vision of the supplementary mirrors was, in some cases obstructed by the window frame and/or the external rear-view mirrors. This suggests that the performance of the mirrors is also dependant on the vehicle to which they are fitted.
9. From the 5th and 95th percentile ocular points that were used in both test vehicles the BDS and Dobli mirrors were not able to achieve the field of vision requirements of Directive 2007/38/EC.
10. There were test conditions where the pedal cyclist and pedestrian were positioned at the closest edge of the adjacent lane and one metre in front of the driver's ocular point. For these conditions, none of the supplementary devices were able to eliminate a blind spot. Although not required for either of the first two test vehicles (Iveco and Renault), the results from the third test vehicle (DAF) showed that, if it were possible to install a Class VI (front) mirror, some of these blind spots may not have existed.

11. By taking a Class V (close proximity) mirror which provides a field of view meeting the minimum requirement of Directive 71/127/EEC and adjusting it inwards so that the side of the vehicle it is fitted to can be seen, it was found that a passing car, positioned on the closest edge of the adjacent lane might not be visible to the driver.
12. Similarly by incorrectly adjusting a Class V (close proximity) mirror which provides a field of view meeting the minimum requirement of Directive 2003/97/EC, it was found that a passing car, positioned at the centre or far side of the adjacent lane might not be visible to the driver of the HGV.

Acknowledgements

The work described in this report was carried out in the Vehicle Engineering Group of the Transport Research Laboratory. The author is grateful to Tim Gibson, Jon Harper and John Hogsflesh for their assistance during the test programme. The author is grateful to Pilkington Automotive for providing information about the feasibility of etching the Fresnel design in to a window pane. The author would also like the thank DAF Trucks for providing access to their vehicles.

The author would also like to thank Tanya Robinson who carried out the technical review of this report.

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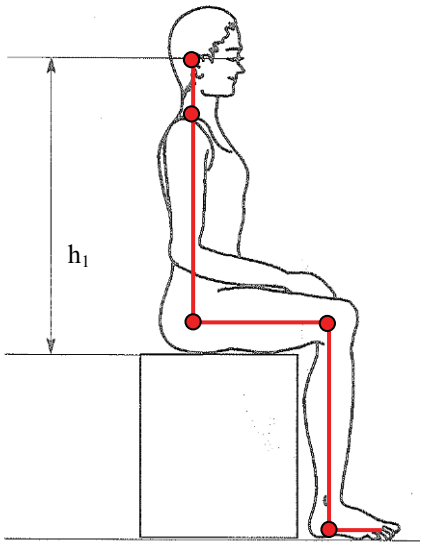
Appendix A Calculation of driver's ocular point

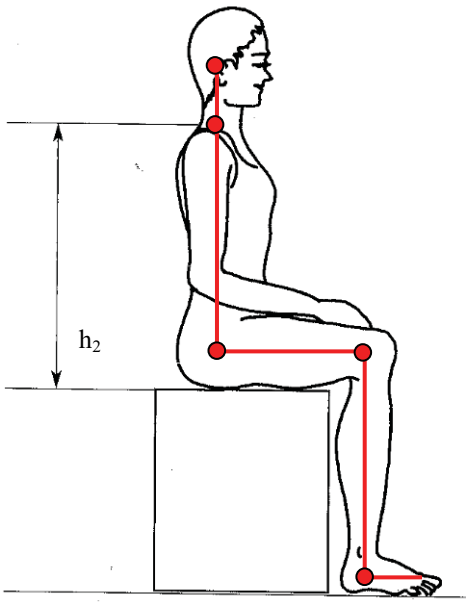
The ocular heights representative of a 5th, 50th, and 95th percentile drivers were calculated using anthropometric data from 'Adultdata', the 1998 Handbook of Adult Anthropometric and Strength Measurements published by the Department of Trade and Industry.

The standing height of a 5th percentile female is 1.51m (4'11"), and the standing height of a 95th percentile male is 1.87m (6'1"). The 5th percentile female and 95th percentile male were chosen to represent the upper and lower extremes of the likely driver eye height, and the height of the 50th percentile driver was calculated as the mean of these two extremes, specifically 169cm (5'6").



Driver size	Eye height - sitting (mm)
5th percentile	688
50th percentile	776
95th percentile	864

Figure 62: Eye height (sitting). Source: Table 31 - Adultdata



Driver size	Height of prominent neck vertebra - sitting (mm)
5th percentile	577
50th percentile	658
95th percentile	739

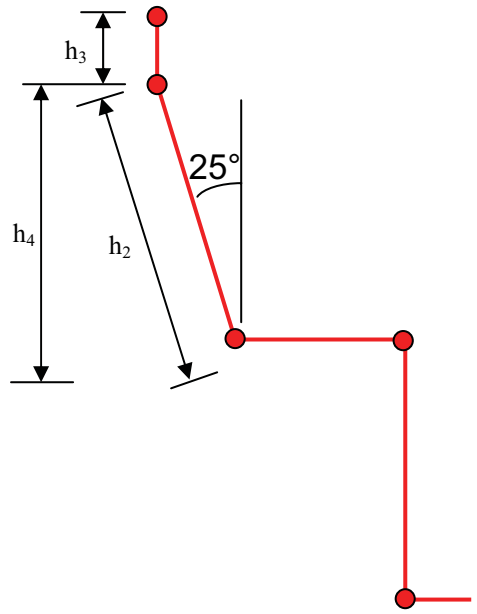
Figure 63: Height of prominent neck vertebra (C7) (sitting). Source: Table 51 – Adultdata

Using the above values, the height from the prominent neck vertebra to the eyes of the driver can be calculated using the following equation: $h_3 = h_1 - h_2$

Driver size	h_1 (mm)	h_2 (mm)	h_3 (mm)
5th percentile	688	577	111
50th percentile	776	658	118
95th percentile	864	739	125

The driver's seat in each test vehicle was set to its mid-height position and mid-position fore and aft with a seat back angle of 25°.

To account for a seat back angle of 25°, the posture was adjusted so that up to the height up to the prominent neck vertebra was angled back by 25°, and above this height remained vertical.

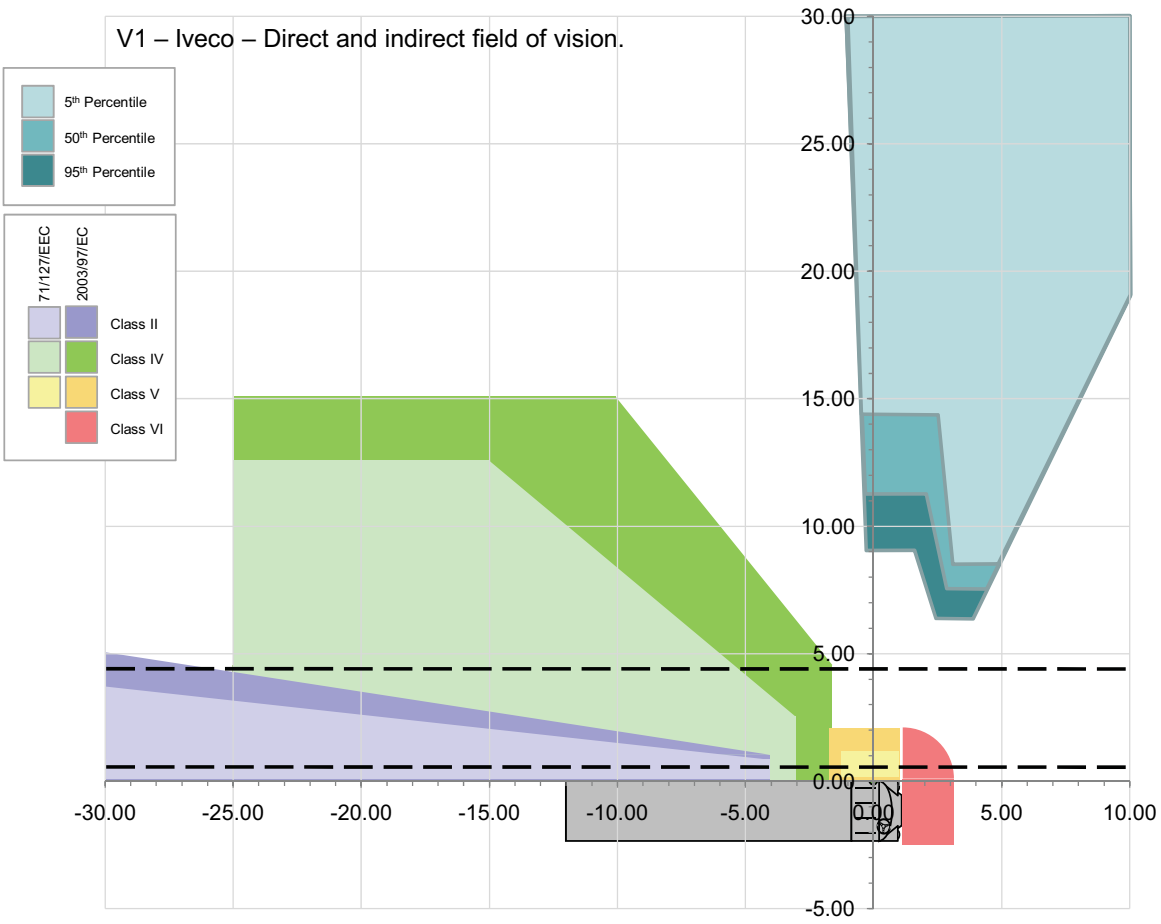


On this basis the height of the driver's ocular point (above the surface of the drivers seat) was calculated as $h_4 + h_3$, where: $h_4 = h_2 \times \text{Sin}(25)$.

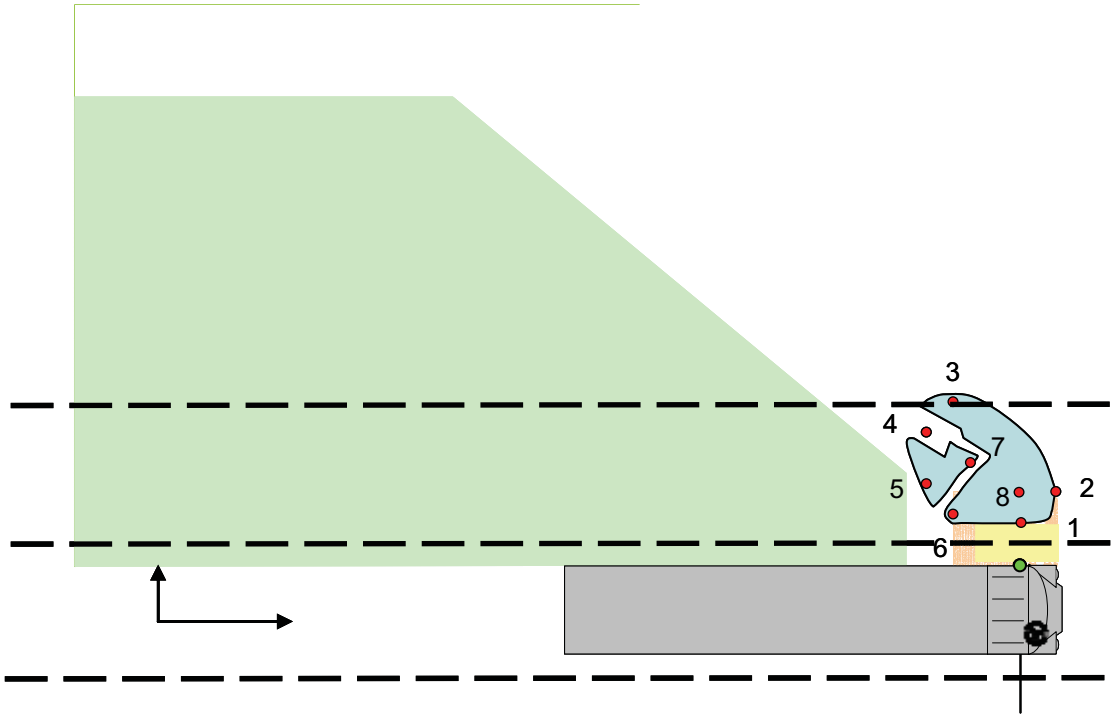
Driver size	Height above surface of drivers seat (mm)
5th percentile	634
50th percentile	715
95th percentile	795

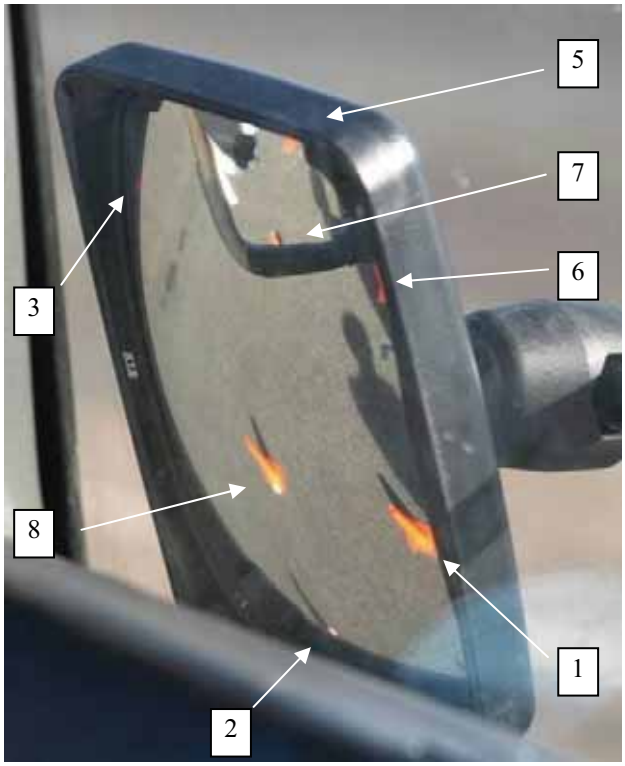
Appendix B Field of vision diagrams – test vehicle 1

B.1 Direct and indirect field of vision



B.2 Dobli Mirror - 5th Percentile Driver - Mirror angled towards the front edge of Class V Field of Vision



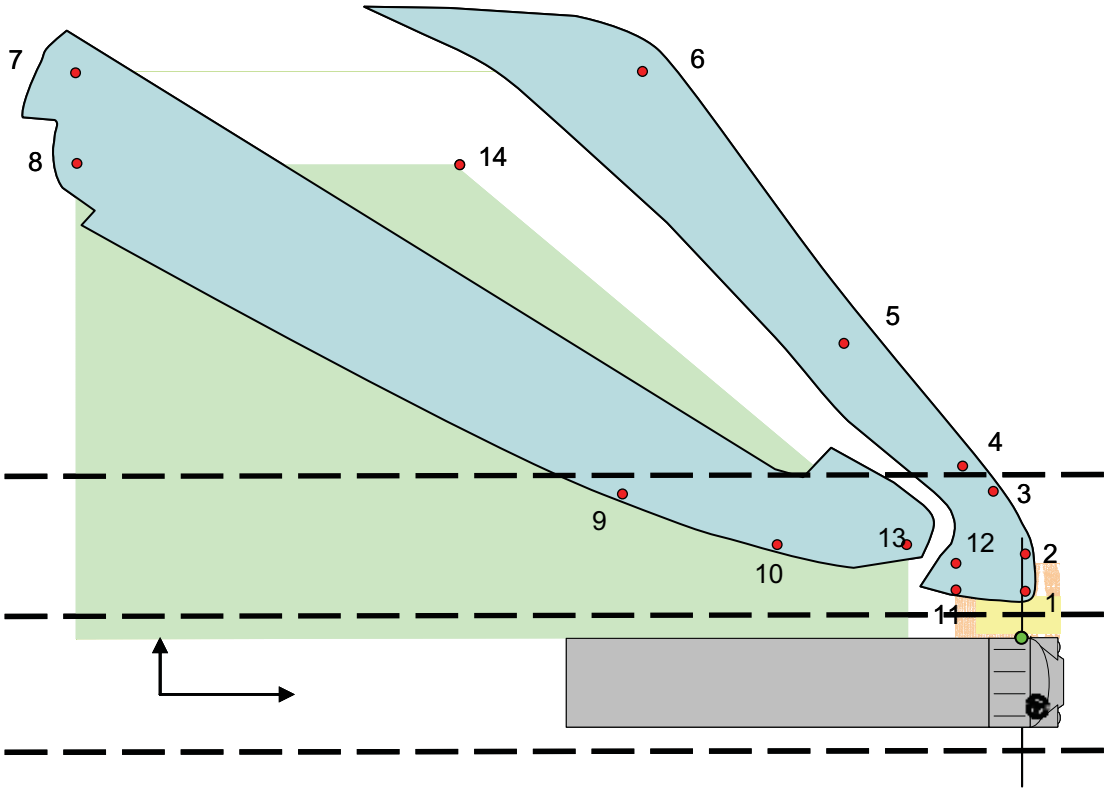


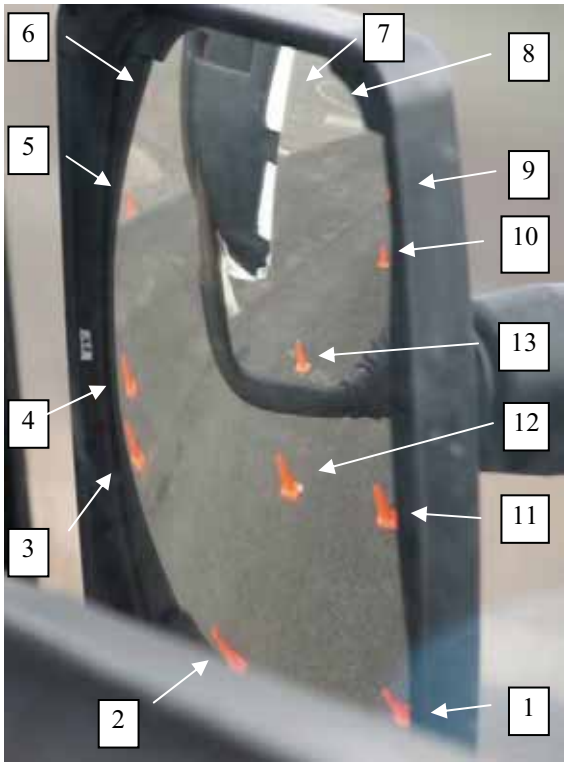
Location ID	Longitudinal Position	Lateral Position
Ref	0.0	0.0
1	0.0	1.2
2	1.0	2.0
3	-1.7	4.4
4	-2.5	3.6
5	-2.5	2.2
6	-1.8	1.4
7	-1.3	2.7
8	0.0	2.0

Legend

- Reference Point
- Orange cones
- Approximate ground plane visible in mirror

B.3 Dobli Mirror - 5th Percentile Driver - Mirror angled towards the rear edge of Class IV Field of Vision



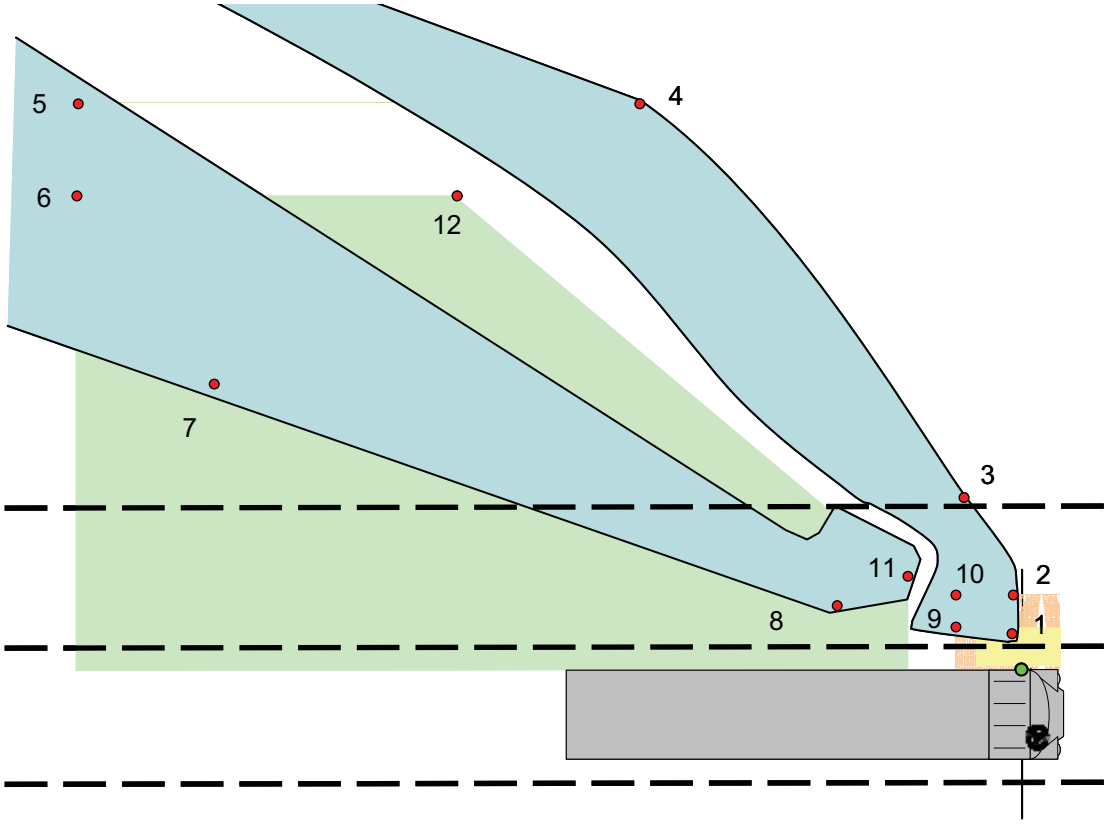


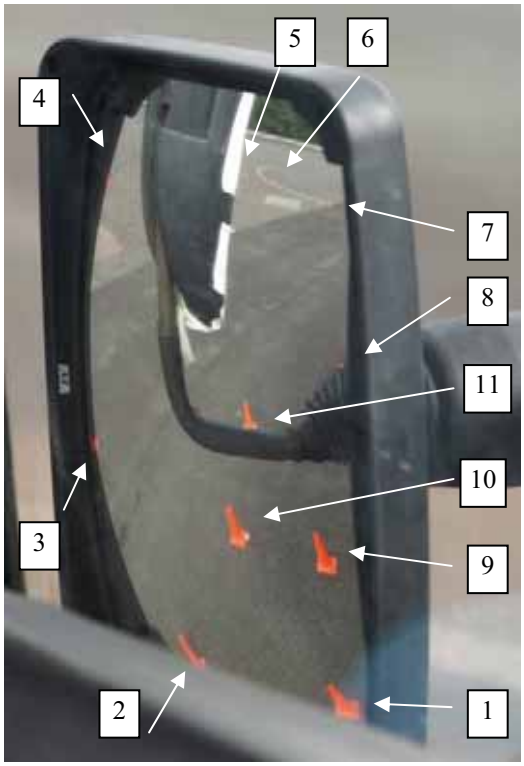
Location ID	Longitudinal Position	Lateral Position
Ref	0.0	0.0
1	0.2	1.4
2	0.2	2.2
3	-0.8	3.9
4	-1.5	4.5
5	-4.7	7.8
6	-10.0	15.0
7	-25.0	15.0
8	-25.0	12.5
9	-10.5	3.7
10	-6.5	2.5
11	-1.8	1.3
12	-1.8	2.0
13	-3.0	2.5
14	-15.0	12.5

Legend

- Reference Point
- Orange cones
- Approximate ground plane visible in mirror

B.4 Dobli Mirror - 5th Percentile Driver - Mirror angled as per instructions (with horizon in upper section of mirror)





Location ID	Longitudinal Position	Lateral Position
Ref	0.0	0.0
1	-0.6	1.1
2	-0.5	2.0
3	-1.5	4.5
4	-10.0	15.0
5	-25.0	15.0
6	-25.0	12.5
7	-10.5	3.7
8	-6.5	2.5
9	-1.8	1.3
10	-1.8	2.0
11	-3.0	2.5
12	-15.0	12.5

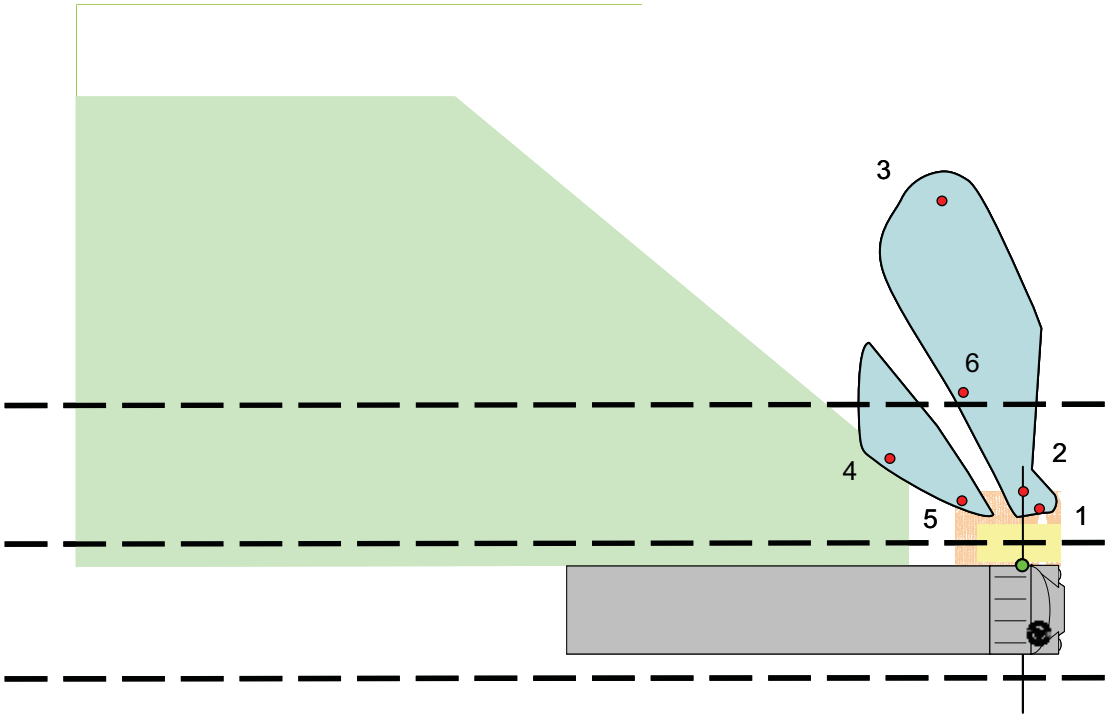
Legend

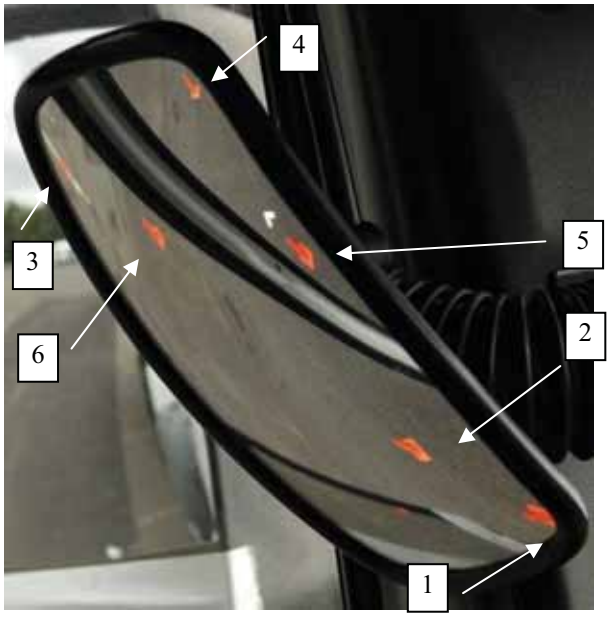
Reference Point

Orange cones

Approximate ground plane visible in mirror

B.5 BDS Mirror - 5th Percentile Driver - Mirror angled downwards as far as possible



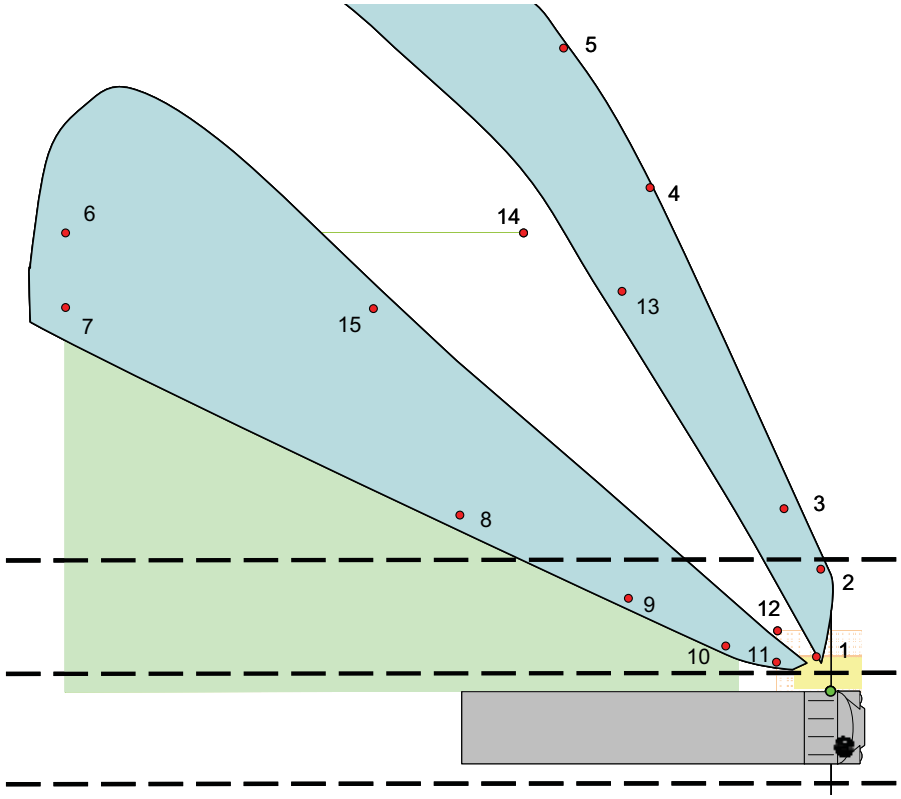


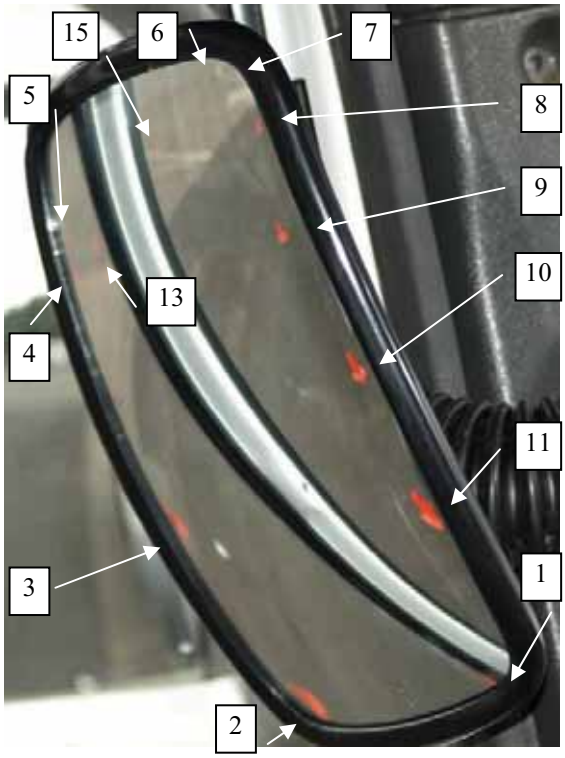
Location ID	Longitudinal Position	Lateral Position
Ref	0.0	0.0
1	0.5	1.5
2	0.0	2.0
3	-2.1	9.7
4	-3.5	2.9
5	-1.6	1.7
6	-1.5	4.5

Legend

- Reference Point
- Orange cones
- Approximate ground plane visible in mirror

B.6 BDS Mirror - 5th Percentile Driver - Mirror angled towards the rear edge of Class IV Field of Vision





Location ID	Longitudinal Position	Lateral Position
Ref	0.0	0.0
1	-0.5	1.2
2	-0.3	2.0
3	-1.5	6.0
4	-5.9	16.5
5	-8.7	21.0
6	-25.0	15.0
7	-25.0	12.5
8	-12.1	5.8
9	-6.6	3.1
10	-3.5	1.5
11	-1.8	1.0
12	-1.8	2.0
13	-6.8	13.1
14	-10.0	15.0
15	-1.50	12.5

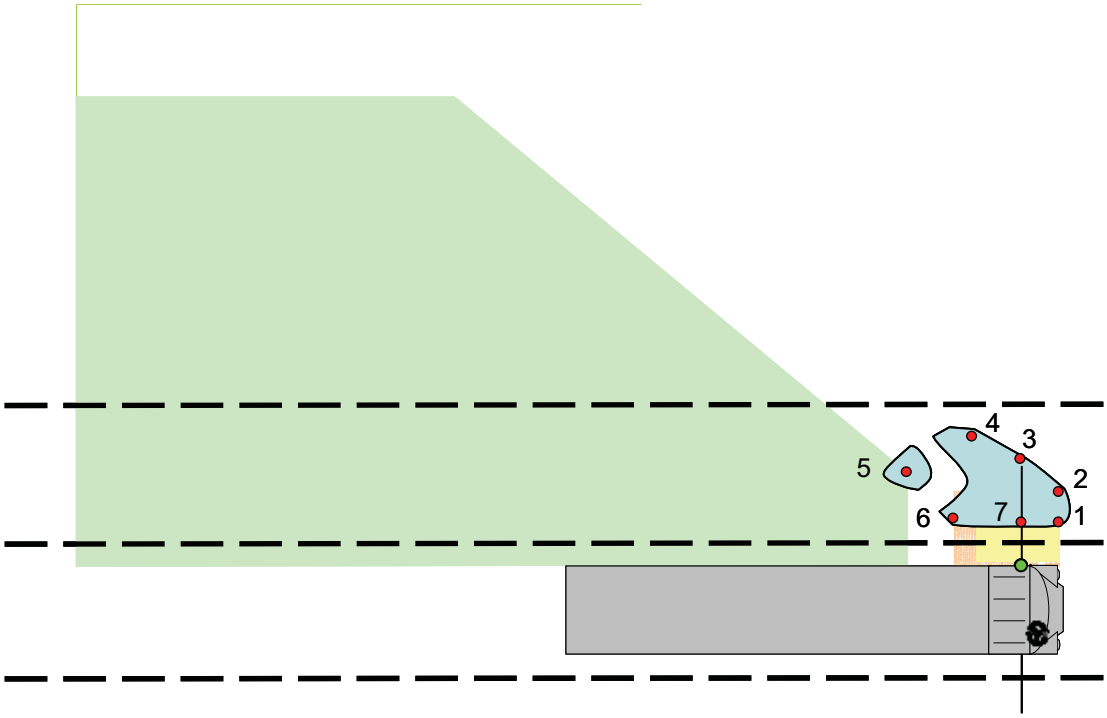
Legend

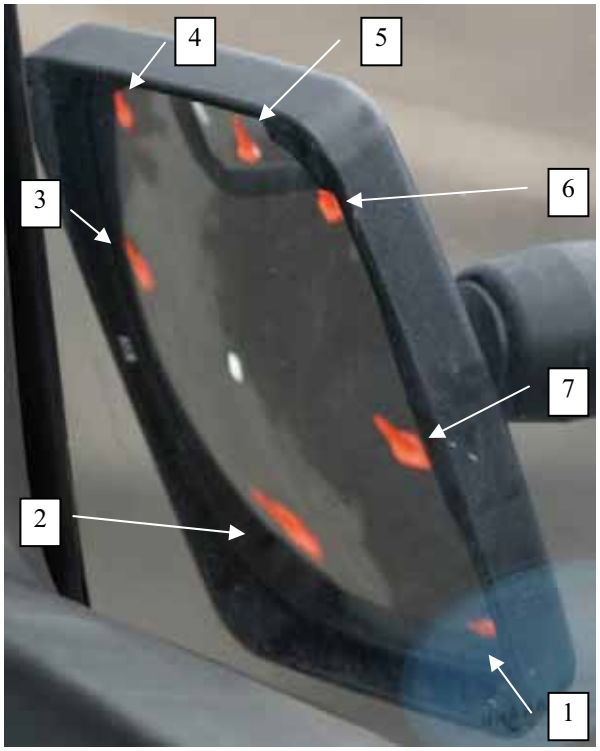
Reference Point

Orange cones

Approximate ground plane visible in mirror

B.7 Dobli Mirror - 95th Percentile Driver - Mirror angled towards the front edge of Class V Field of Vision



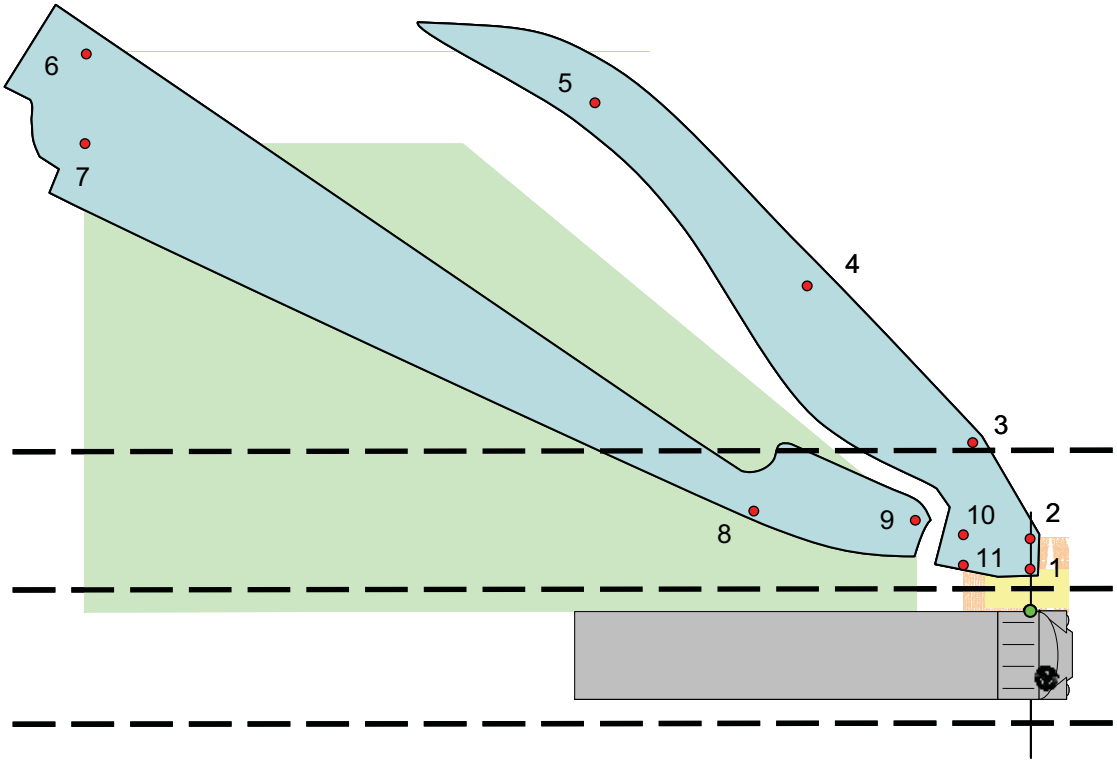


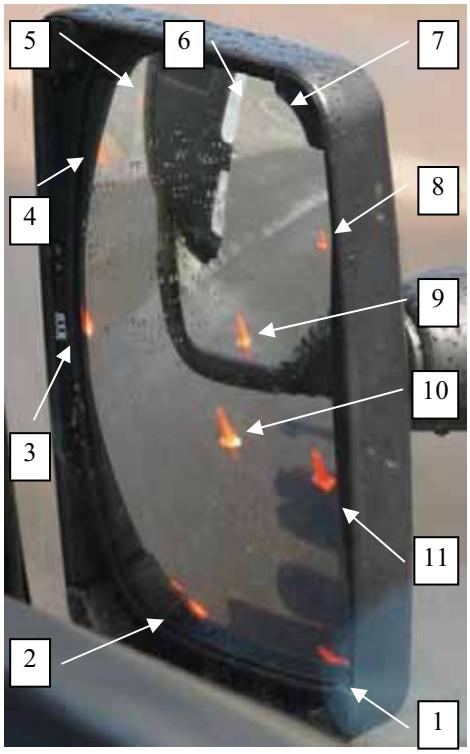
Location ID	Longitudinal Position	Lateral Position
Ref	0.0	0.0
1	1.0	1.2
2	1.0	2.0
3	0.0	2.9
4	-1.3	3.5
5	-3.0	2.5
6	-1.8	1.3
7	0.0	1.2

Legend

- Reference Point
- Orange cones
- Approximate ground plane visible in mirror

B.8 Dobli Mirror - 95th Percentile Driver - Mirror angled towards the rear edge of Class IV Field of Vision





Location ID	Longitudinal Position	Lateral Position
Ref	0.0	0.0
1	0.0	1.2
2	0.0	2.0
3	-1.5	4.5
4	-5.9	8.7
5	-11.5	13.6
6	-25.0	15.0
7	-25.0	12.5
8	-7.3	2.7
9	-3.0	2.5
10	-1.8	2.0
11	-1.8	1.3

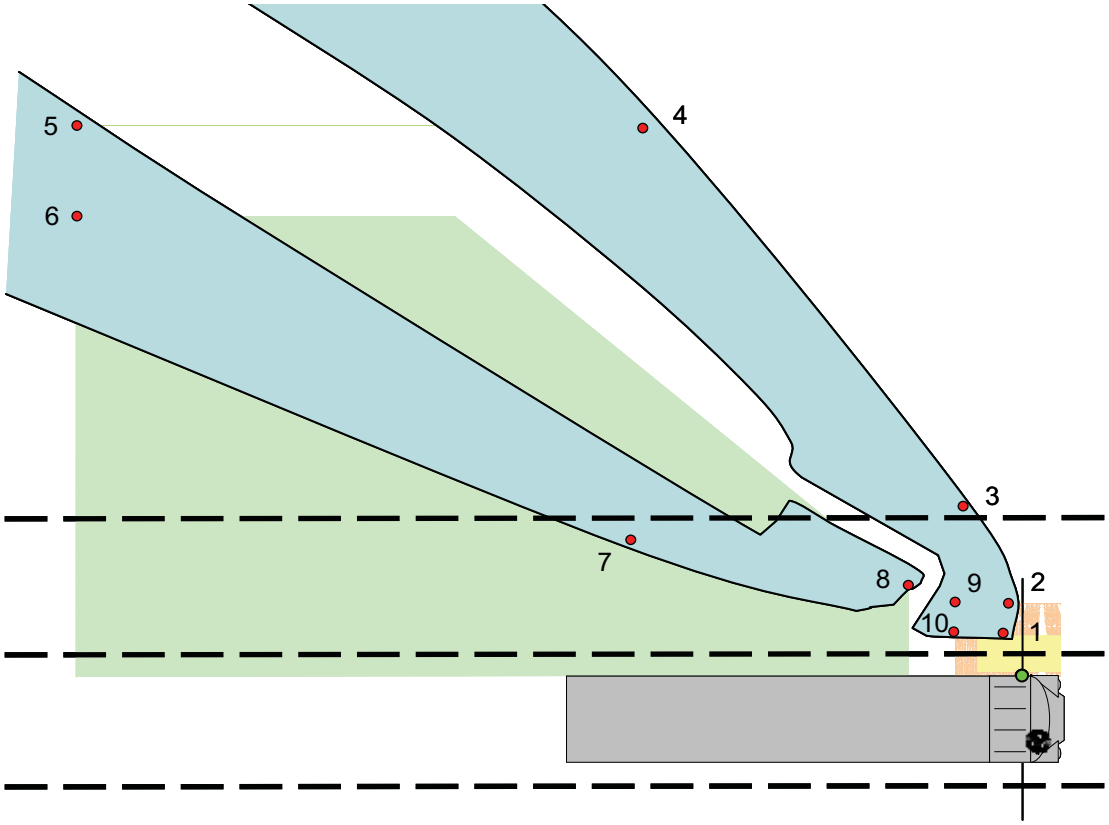
Legend

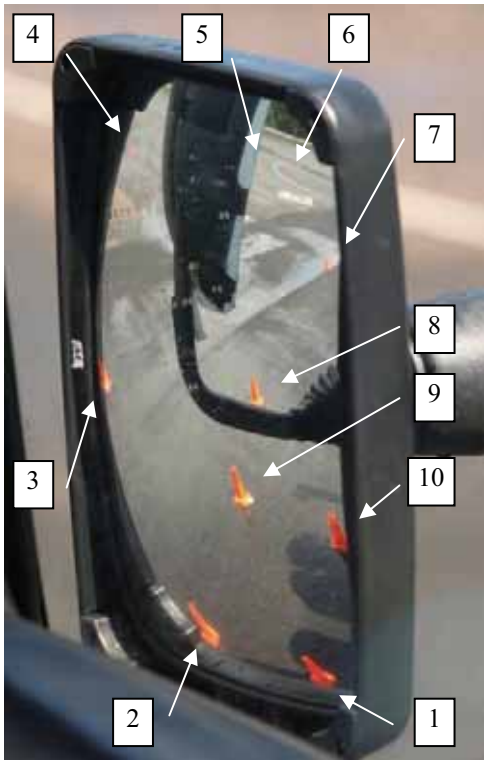
Reference Point

Orange cones

Approximate ground plane visible in mirror

B.9 Dobli Mirror - 5th Percentile Driver - Mirror angled as per instructions (with horizon in upper section of mirror)





Location ID	Longitudinal Position	Lateral Position
Ref	0.0	0.0
1	-0.5	1.2
2	-0.3	2.0
3	-1.5	4.5
4	-10.0	15.0
5	-25.0	15.0
6	-25.0	12.5
7	-10.3	3.7
8	-3.0	2.5
9	-1.8	2.0
10	-1.8	1.2

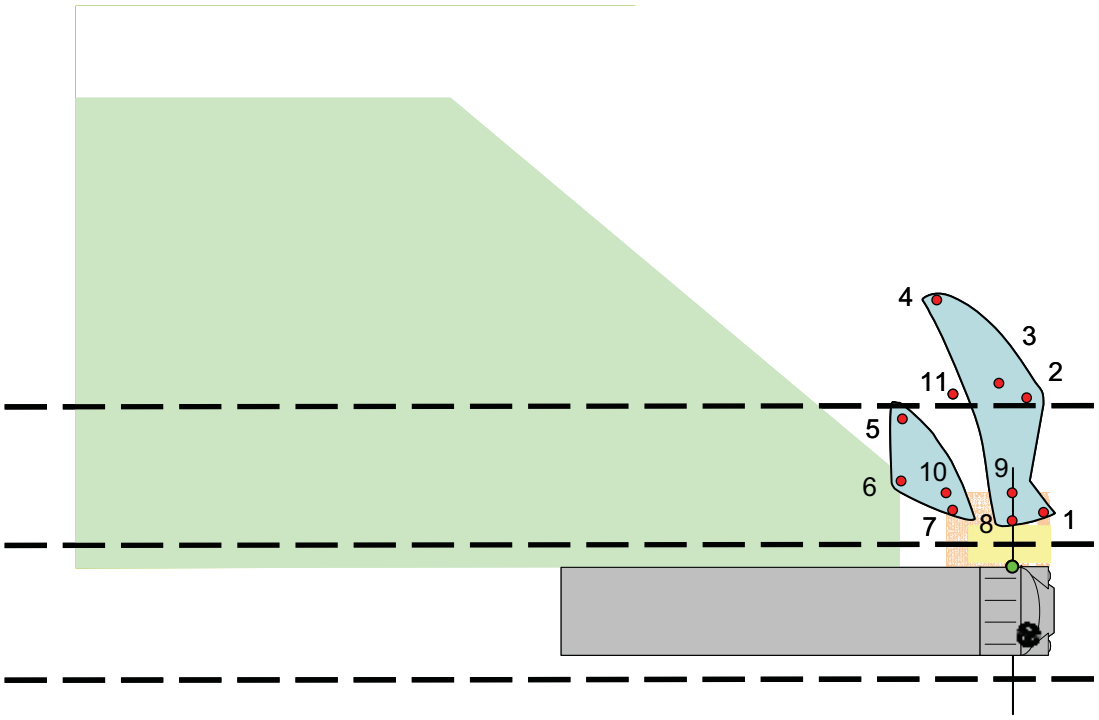
Legend

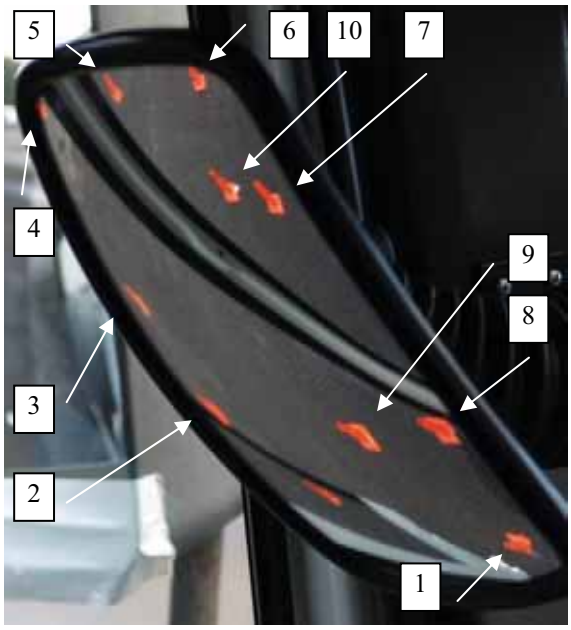
Reference Point

Orange cones

Approximate ground plane visible in mirror

B.10 BDS Mirror - 95th Percentile Driver - Mirror angled downwards as far as possible





Location ID	Longitudinal Position	Lateral Position
Ref	0.0	0.0
1	0.9	1.7
2	0.4	4.5
3	-0.4	4.9
4	-2.0	7.1
5	-2.9	4.0
6	-3.0	2.3
7	-1.6	1.6
8	0.0	1.2
9	0.0	2.0
10	-1.8	2.0
11	-1.5	4.5

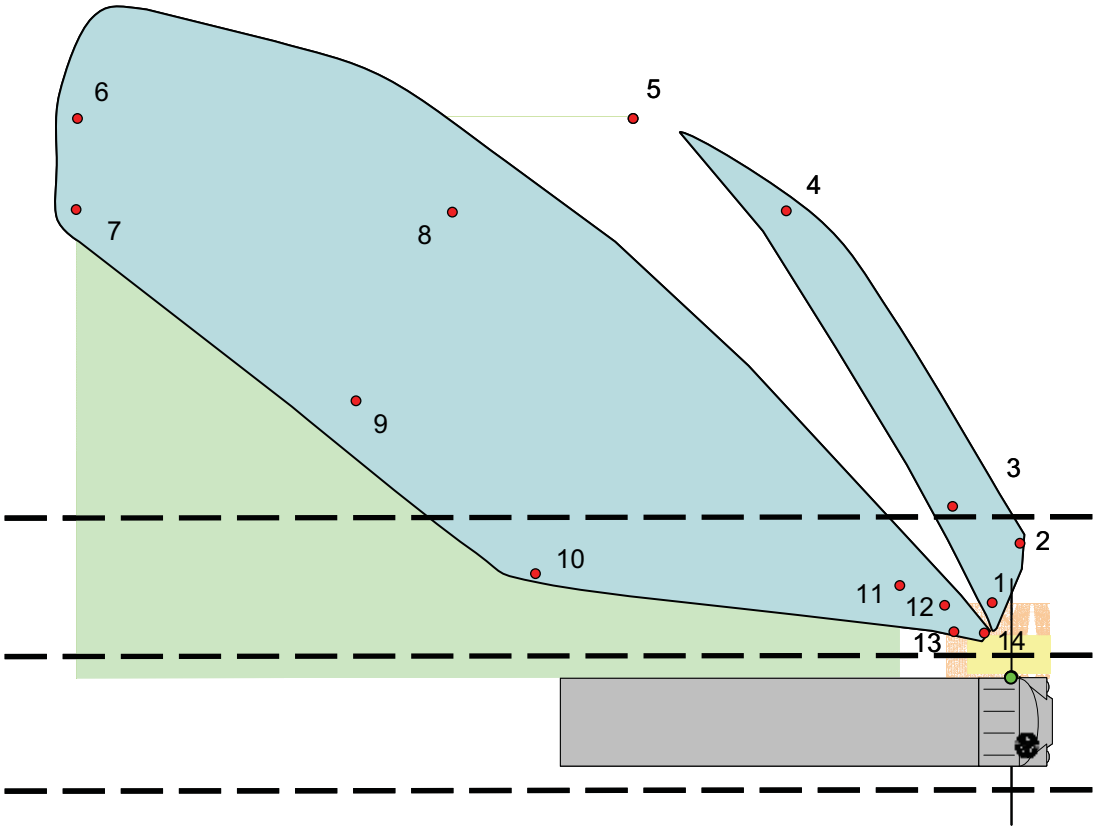
Legend

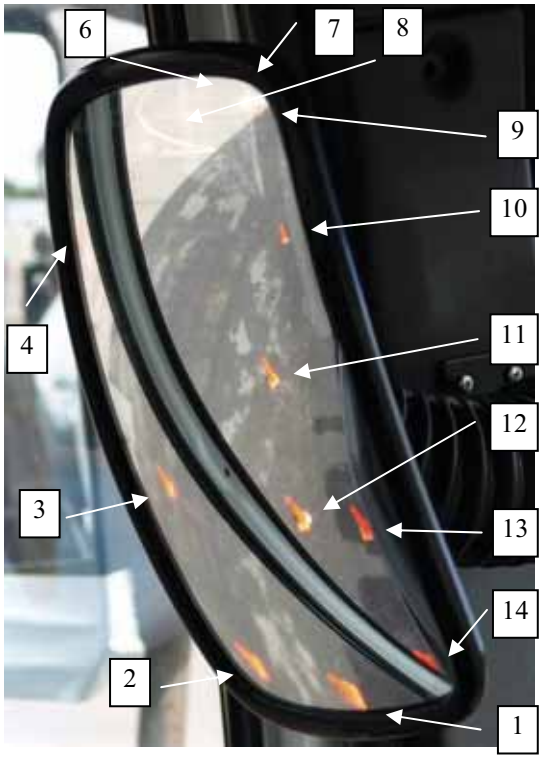
Reference Point

Orange cones

Approximate ground plane visible in mirror

B.11 BDS Mirror - 95th Percentile Driver - Mirror angled towards the rear edge of Class IV Field of Vision



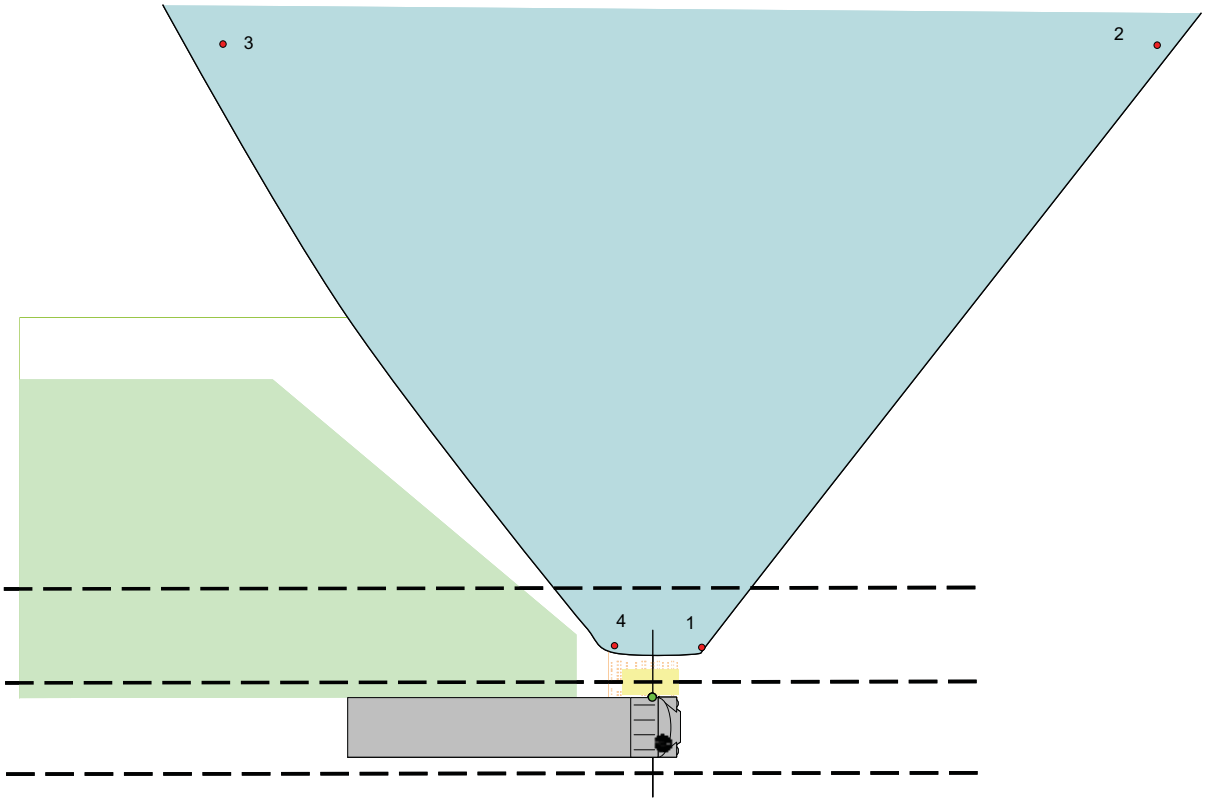


Location ID	Longitudinal Position	Lateral Position
Ref	0.0	0.0
1	-0.4	2.0
2	0.2	3.6
3	-1.5	4.5
4	-6.0	12.5
5	-10.0	15.0
6	-25.0	15.0
7	-25.0	12.5
8	-15.0	12.5
9	-17.5	7.4
10	-6.7	2.8
11	-3.0	2.5
12	-1.8	2.0
13	-1.5	1.2
14	-0.7	1.2

Legend

- Reference Point
- Orange cones
- Approximate ground plane visible in mirror

B.12 Fresnel Lens – 5th Percentile Driver – Lens mounted in the lower left corner of the passenger window

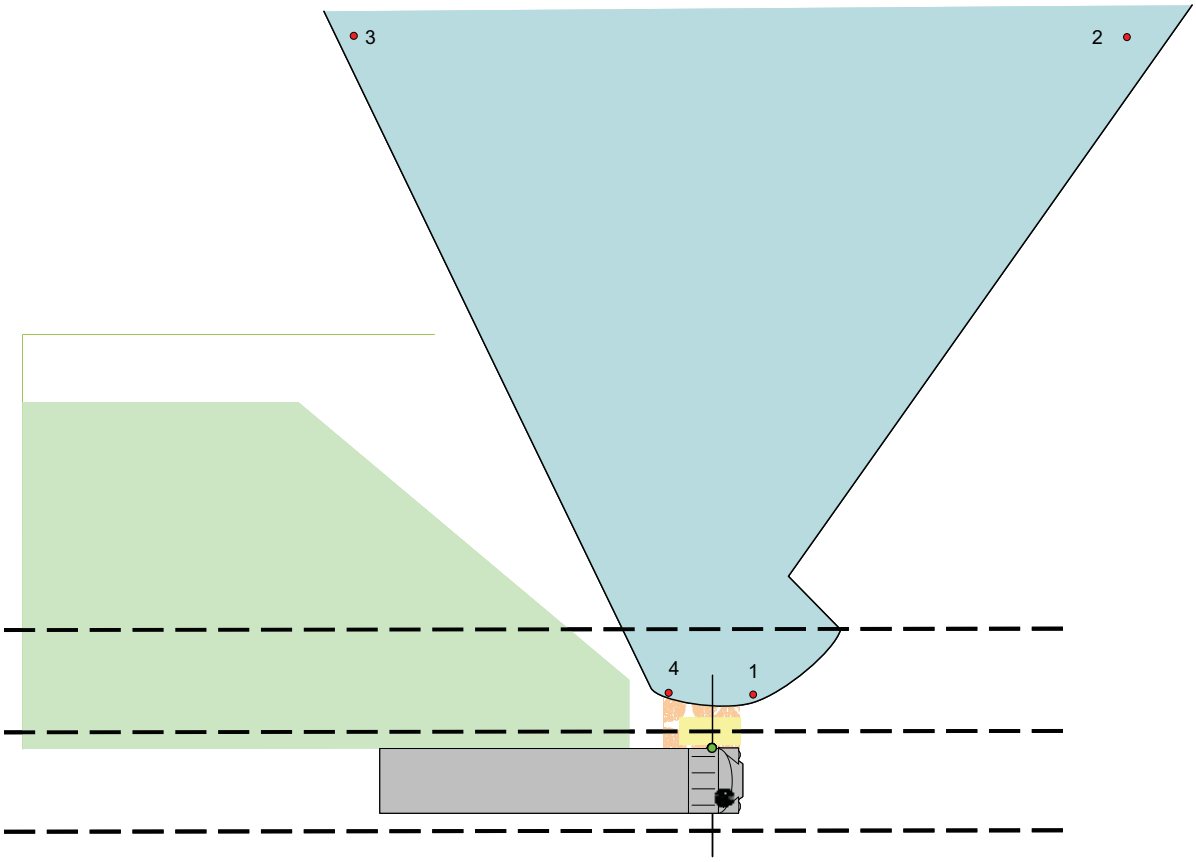


Location ID	Longitudinal Position	Lateral Position
Ref	0.0	0.0
1	2.0	1.9
2	20.0	25.8
3	-17.0	25.8
4	-1.5	1.9

Legend

- Reference Point
- Orange cones
- Approximate ground plane visible in mirror

B.13 Fresnel Lens – 5th Percentile Driver – Lens mounted in the lower right corner of the passenger window

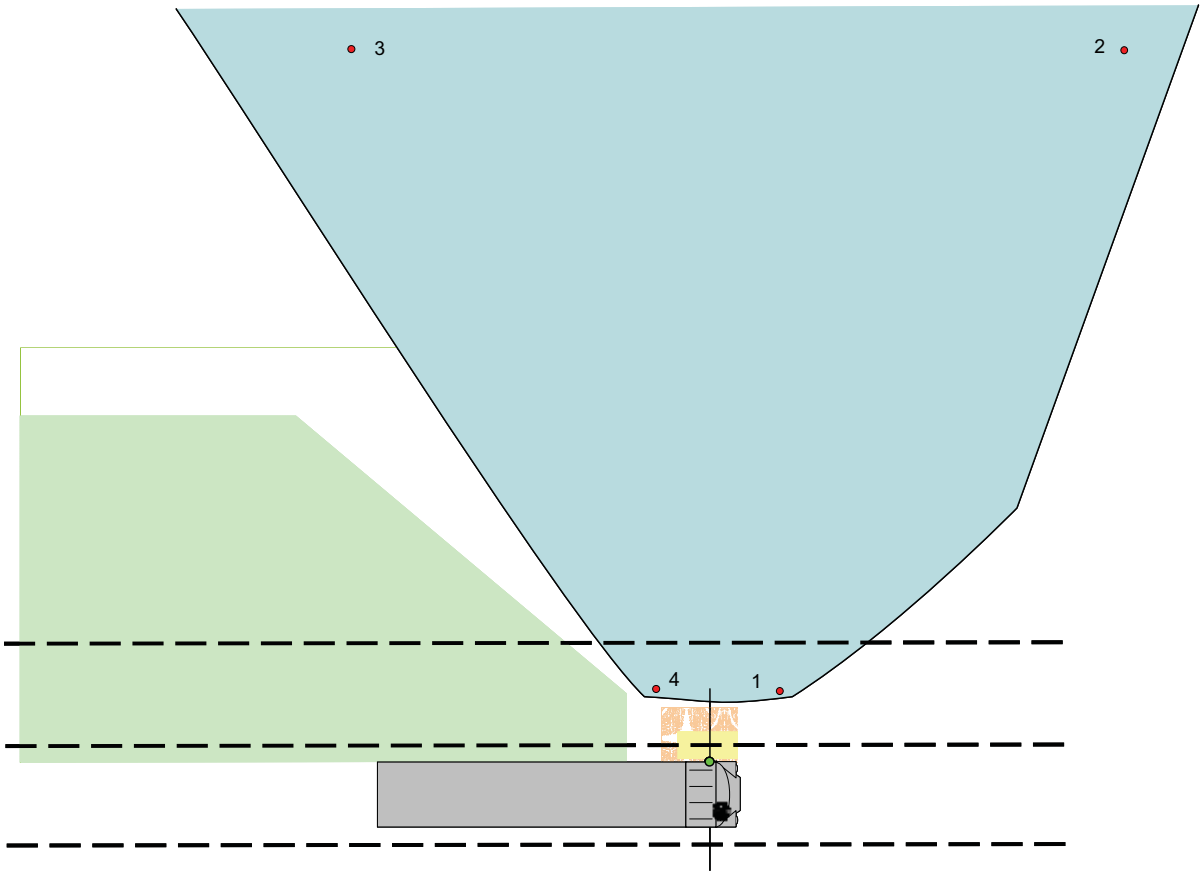


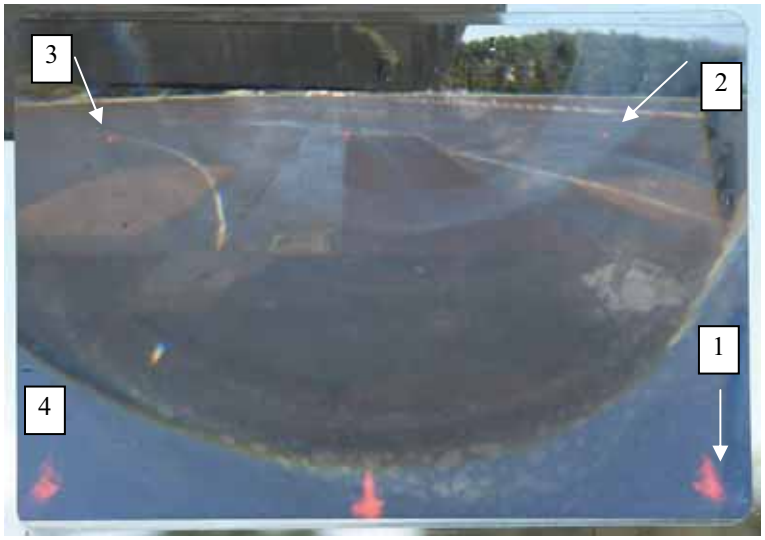
Location ID	Longitudinal Position	Lateral Position
Ref	0.0	0.0
1	1.5	1.9
2	15.0	25.8
3	-13.0	25.8
4	-1.6	1.9

Legend

- Reference Point
- Orange cones
- Approximate ground plane visible in mirror

B.14 Fresnel Lens – 5th Percentile Driver – Lens mounted at the top of the passenger window



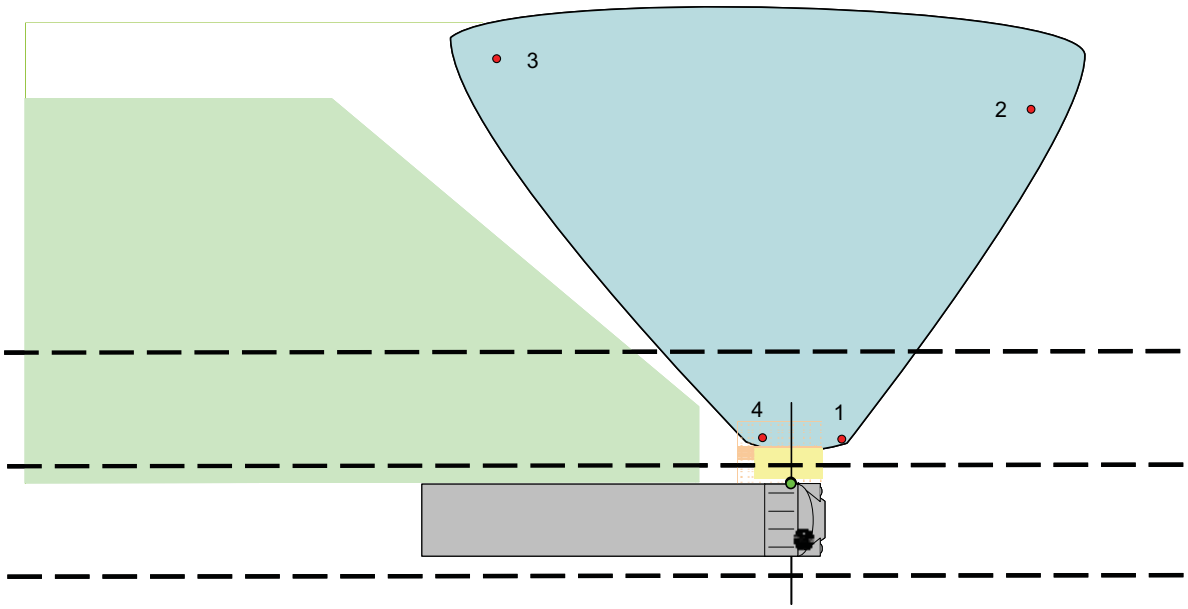


Location ID	Longitudinal Position	Lateral Position
Ref	0.0	0.0
1	2.5	2.6
2	15.0	25.8
3	-13.0	25.8
4	-2.0	2.6

Legend

- Reference Point
- Orange cones
- Approximate ground plane visible in mirror

B.15 Fresnel Lens – 95th Percentile Driver – Lens mounted in the lower left corner of the passenger window

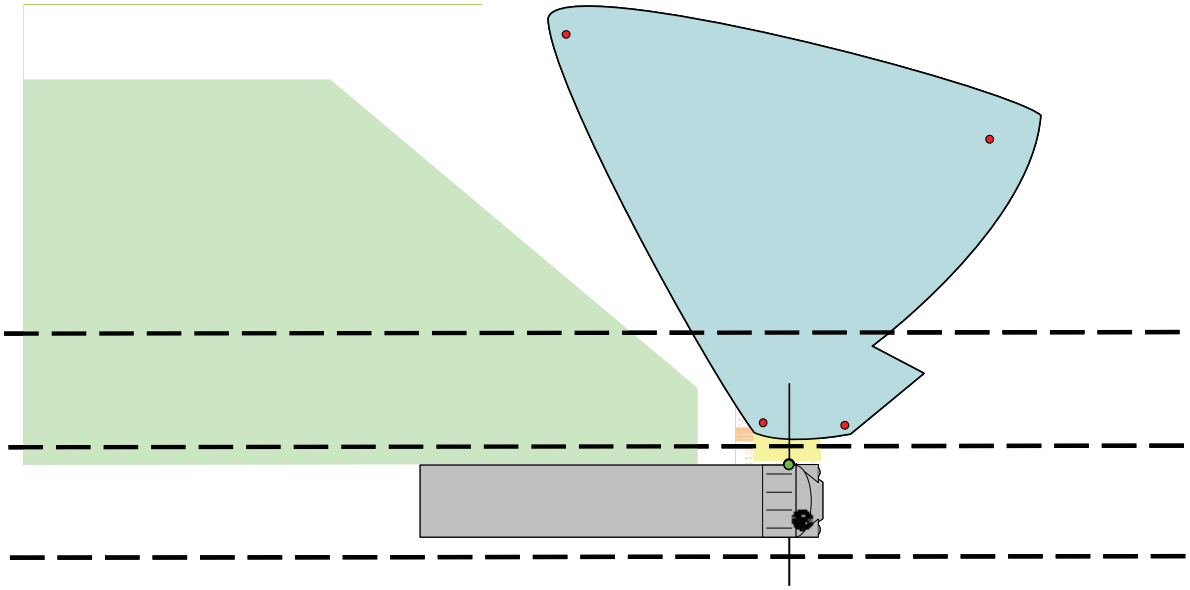


Location ID	Longitudinal Position	Lateral Position
Ref	0.0	0.0
1	1.6	1.5
2	7.9	12.2
3	-9.6	13.8
4	-1.0	1.5

Legend

- Reference Point
- Orange cones
- Approximate ground plane visible in mirror

B.16 Fresnel Lens – 95th Percentile Driver – Lens mounted in the lower right corner of the passenger window

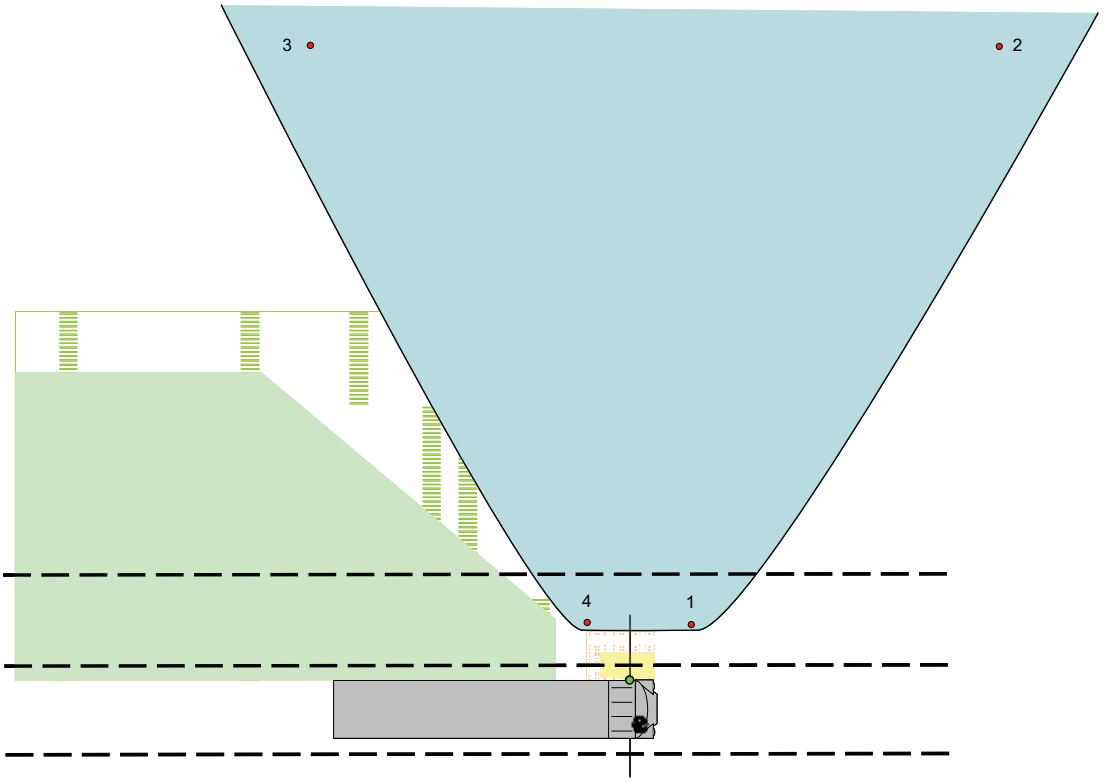


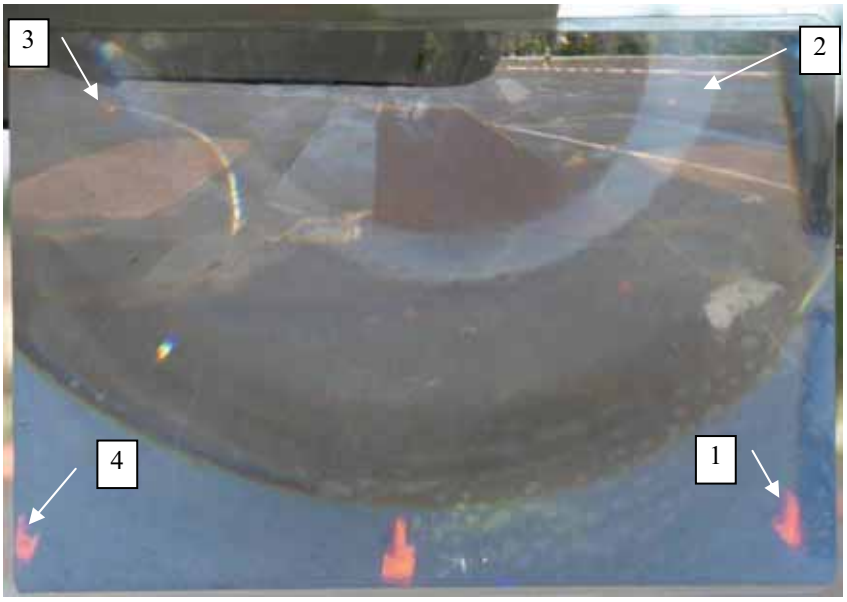
Location ID	Longitudinal Position	Lateral Position
Ref	0.0	0.0
1	1.8	1.3
2	6.5	10.5
3	-1.8	1.3
4	-7.3	14.0

Legend

- Reference Point
- Orange cones
- Approximate ground plane visible in mirror

B.17 Fresnel Lens – 95th Percentile Driver – Lens mounted at the top of the passenger window





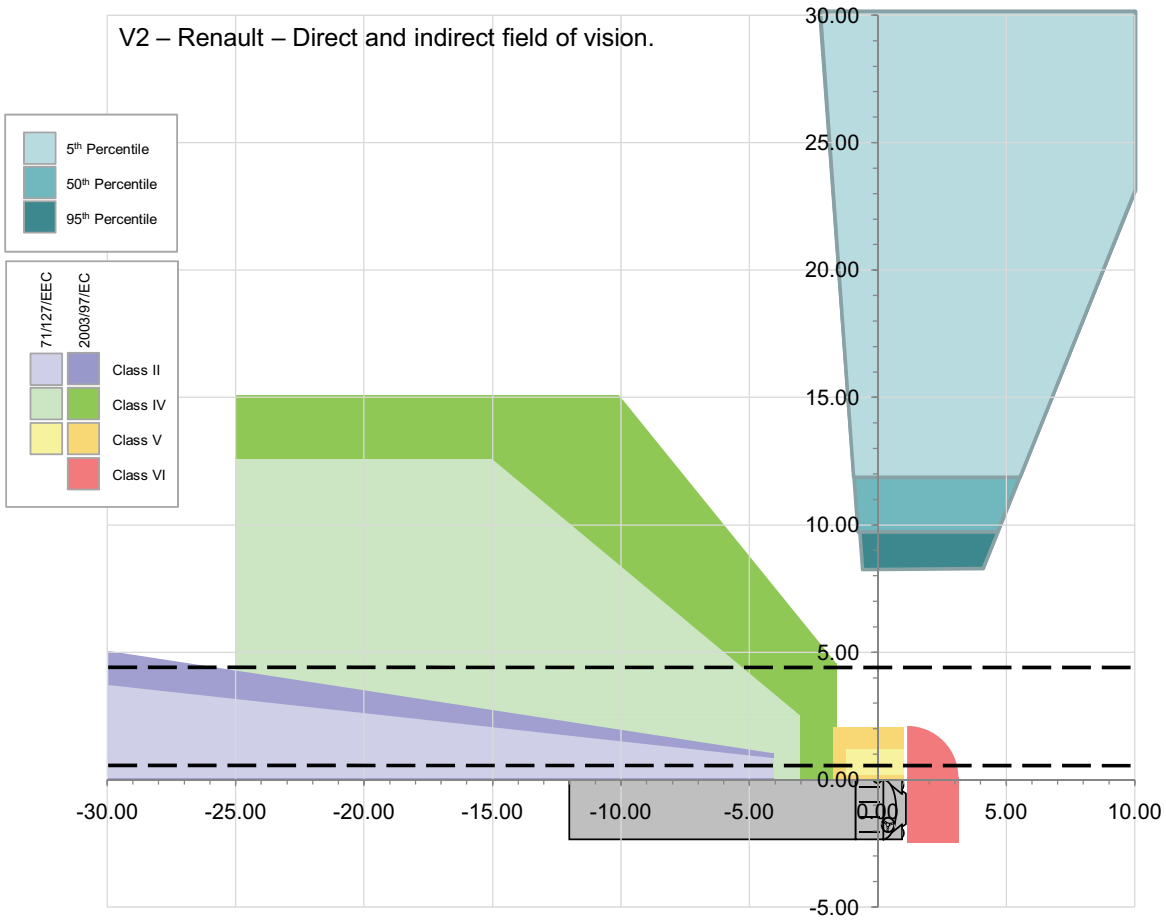
Location ID	Longitudinal Position	Lateral Position
Ref	0.0	0.0
1	2.5	2.3
2	15.0	25.8
3	-13.0	25.8
4	-1.7	2.3

Legend

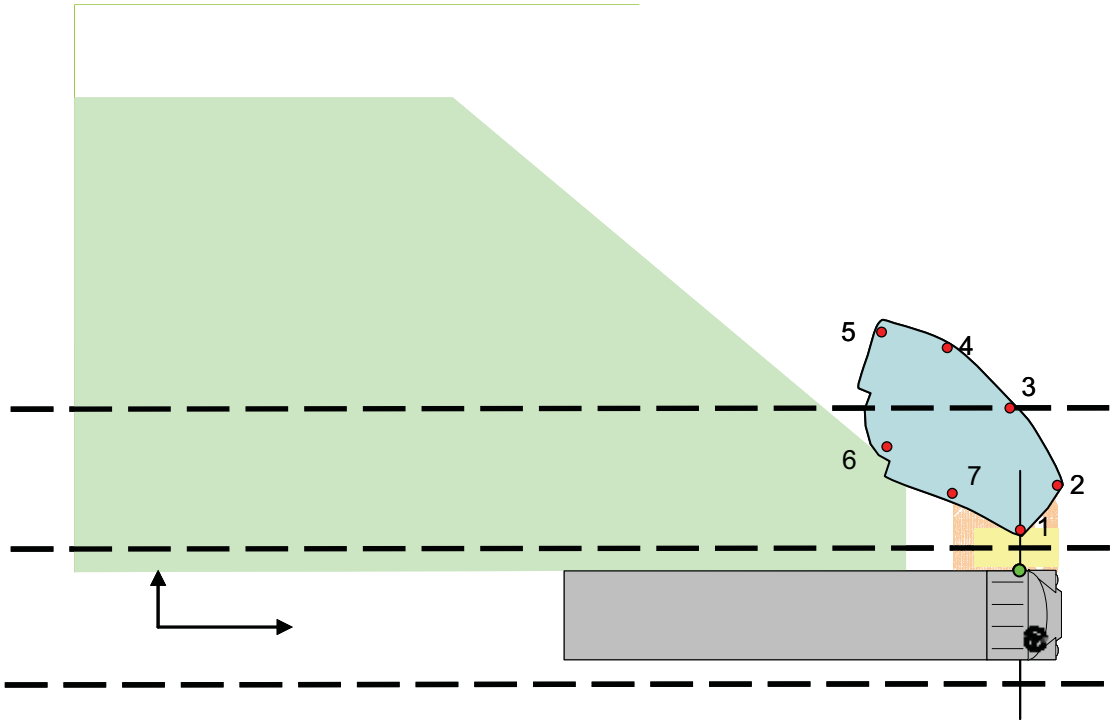
- Reference Point
- Orange cones
- Approximate ground plane visible in mirror

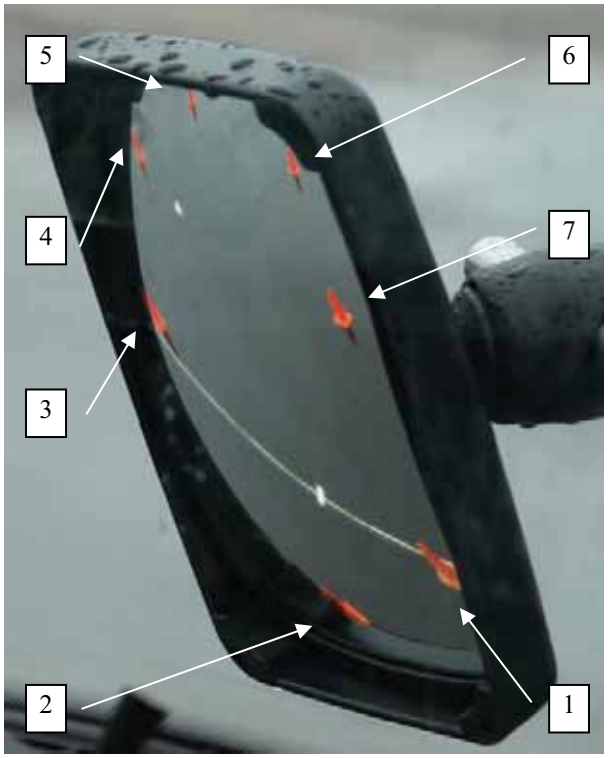
Appendix C Field of vision diagrams – test vehicle 2

C.1 Direct and indirect field of vision



C.2 Dobli Mirror - 5th Percentile Driver - Mirror angled towards the front edge of Class V Field of Vision





Location ID	Longitudinal Position	Lateral Position
Ref	0.0	0.0
1	0.0	1.2
2	1.0	2.2
3	-0.3	4.2
4	-2.0	5.9
5	-3.7	6.3
6	-3.6	3.3
7	-1.8	2.0

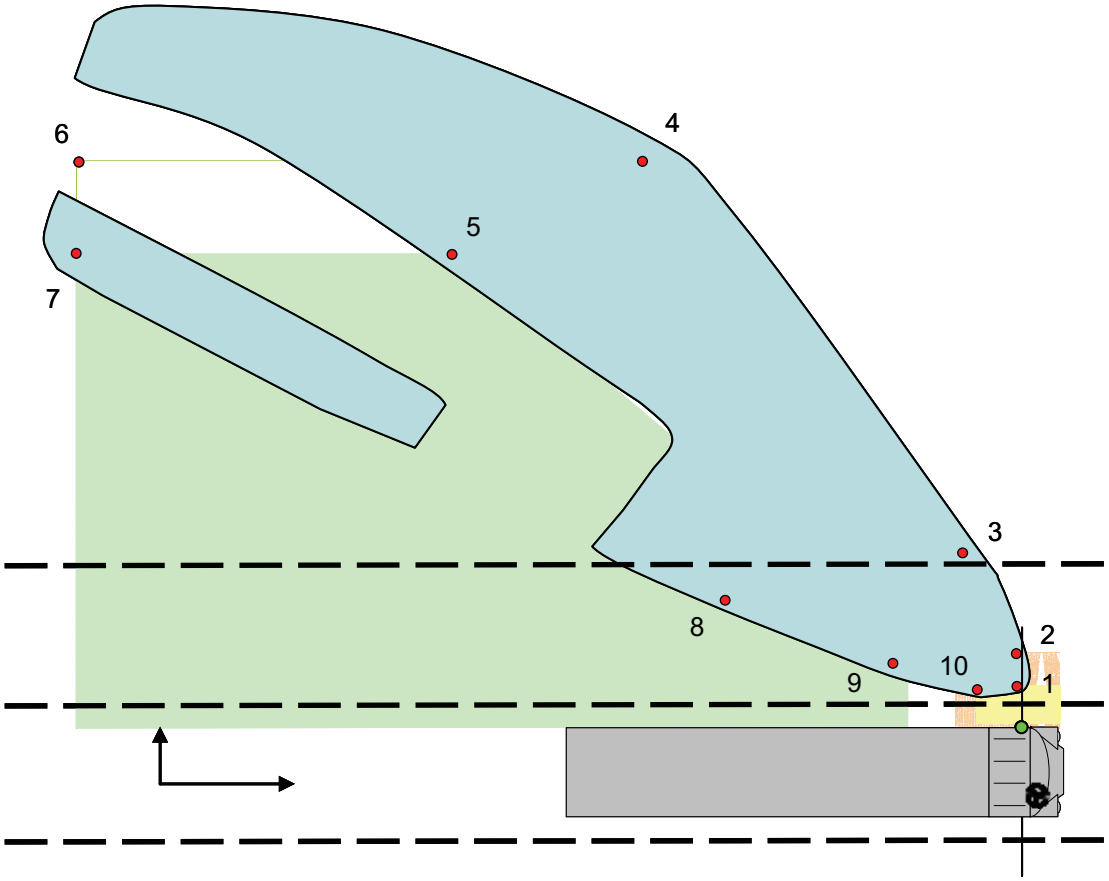
Legend

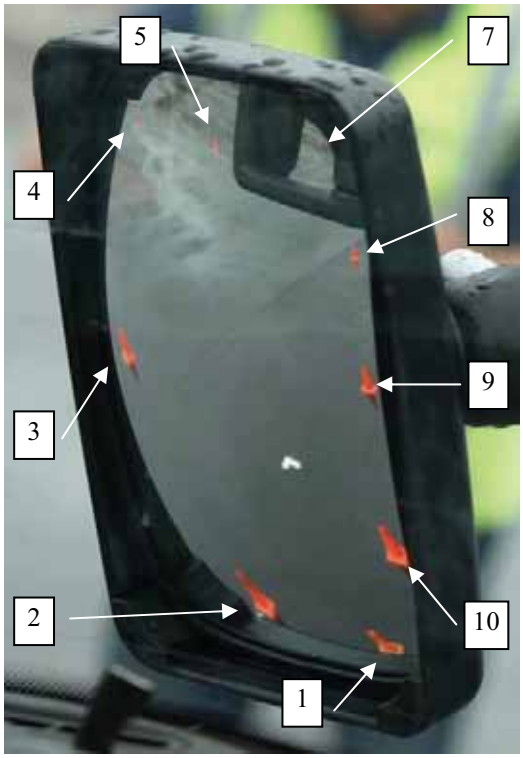
Reference Point

Orange cones

Approximate ground plane visible in mirror

C.3 Dobli Mirror - 5th Percentile Driver - Mirror angled towards the rear edge of Class IV Field of Vision



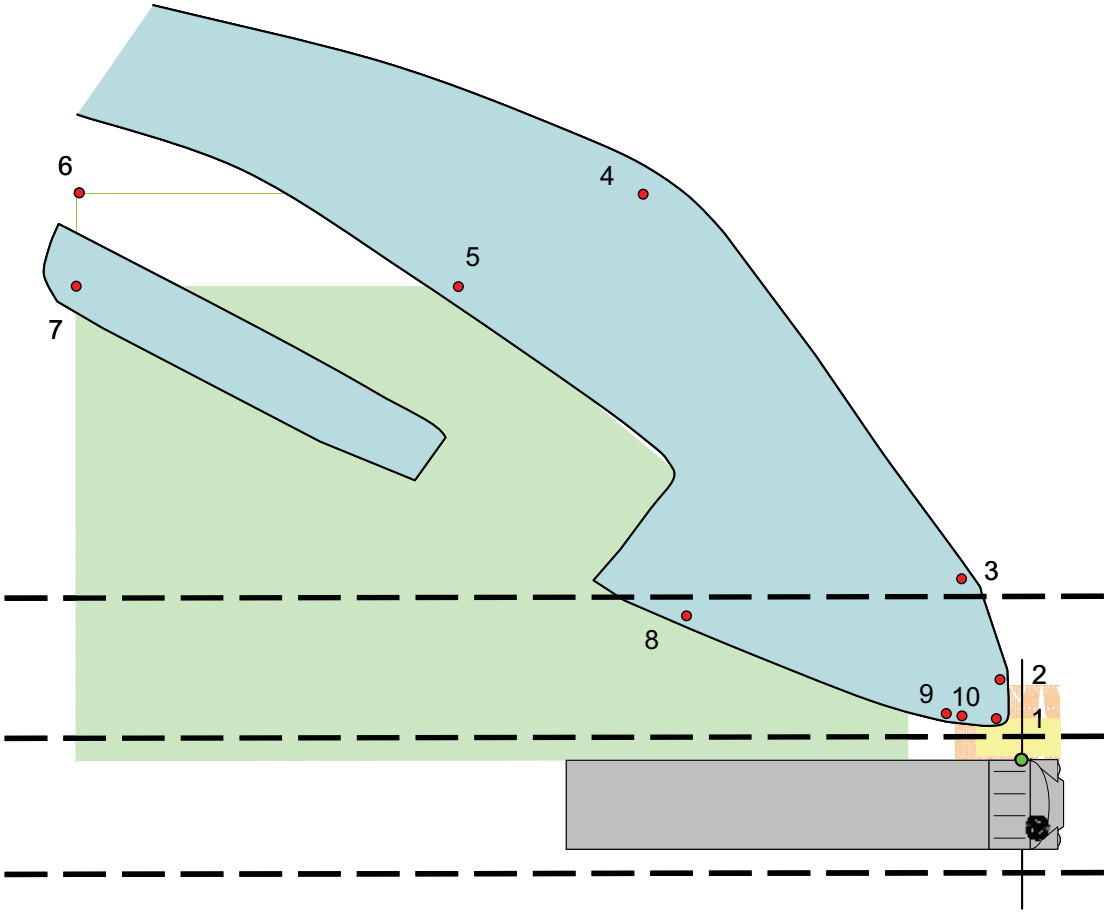


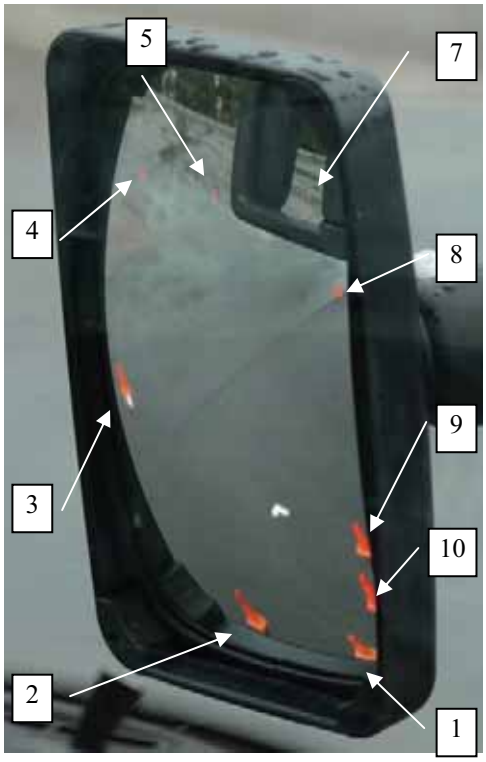
Location ID	Longitudinal Position	Lateral Position
Ref	0.0	0.0
1	-0.2	1.2
2	-0.2	2.2
3	-1.5	4.5
4	-10.0	15.0
5	-15.0	12.5
6	-25.0	15.0
7	-25.0	12.5
8	-7.9	3.4
9	-3.4	1.7
10	-1.2	1.1

Legend

- Reference Point
- Orange cones
- Approximate ground plane visible in mirror

C.4 Dobli Mirror - 5th Percentile Driver - Mirror angled as per instructions (with horizon in upper section of mirror)





Location ID	Longitudinal Position	Lateral Position
Ref	0.0	0.0
1	-0.7	1.1
2	-0.6	2.1
3	-1.5	4.5
4	-10.0	15.0
5	-15.0	12.5
6	-25.0	15.0
7	-25.0	12.5
8	-8.9	3.8
9	-1.8	1.2
10	-1.7	1.1

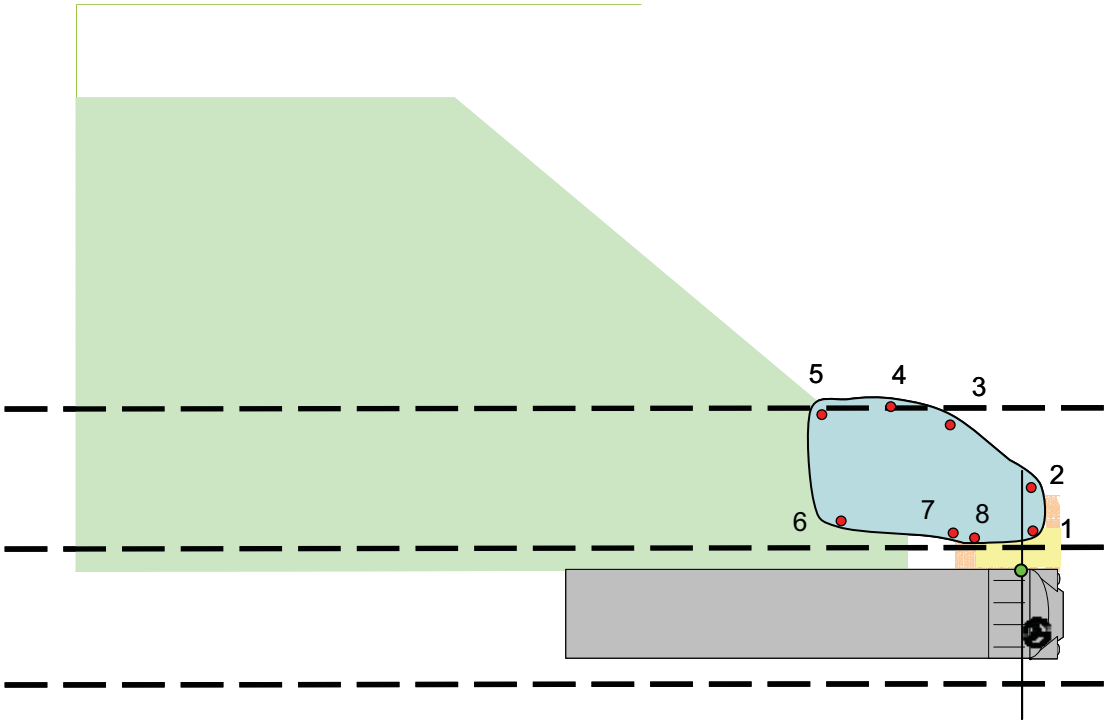
Legend

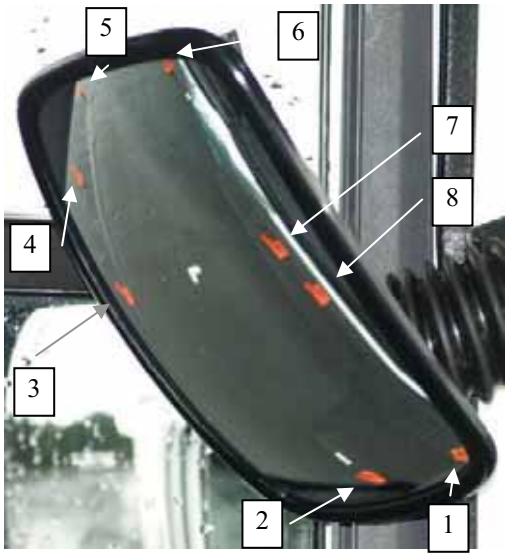
Reference Point

Orange cones

Approximate ground plane visible in mirror

C.5 BDS Mirror - 5th Percentile Driver - Mirror angled downwards as far as possible





Location ID	Longitudinal Position	Lateral Position
Ref	0.0	0.0
1	0.3	1.1
2	0.2	2.2
3	-1.9	3.8
4	-3.5	4.3
5	-5.3	4.1
6	-4.8	1.3
7	-1.8	0.9
8	-1.3	0.8

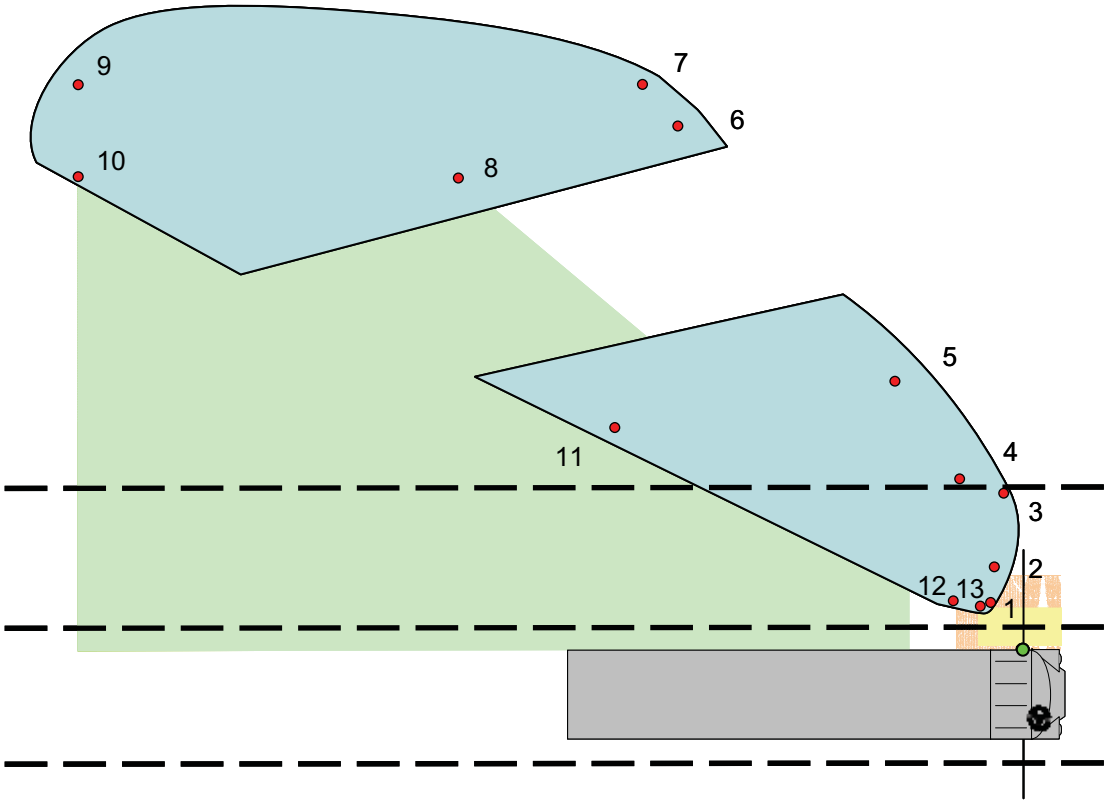
Legend

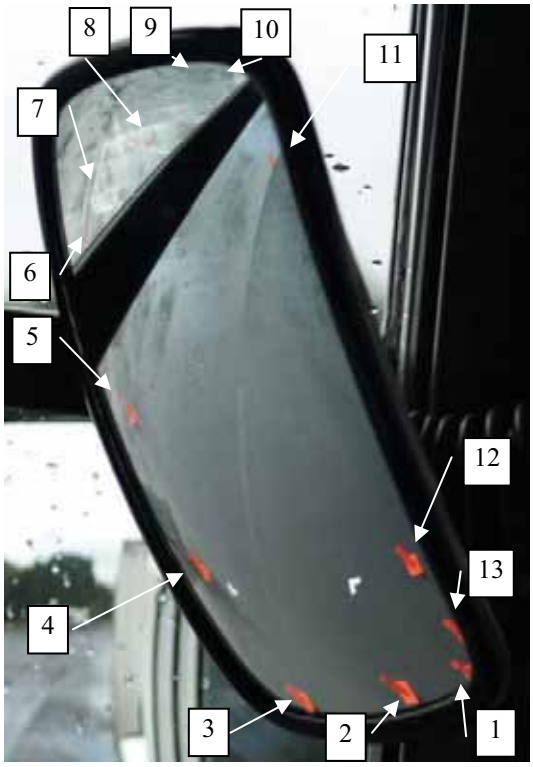
Reference Point

Orange cones

Approximate ground plane visible in mirror

C.6 BDS Mirror - 5th Percentile Driver - Mirror angled towards the rear edge of Class IV Field of Vision





Location ID	Longitudinal Position	Lateral Position
Ref	0.0	0.0
1	-0.9	1.3
2	-0.8	2.2
3	-0.5	4.2
4	-1.7	5.5
5	-3.4	7.1
6	-9.1	13.9
7	-10.0	15.0
8	-15.0	12.5
9	-25.0	15.0
10	-25.0	12.5
11	-10.8	3.9
12	-1.8	1.3
13	-1.1	1.2

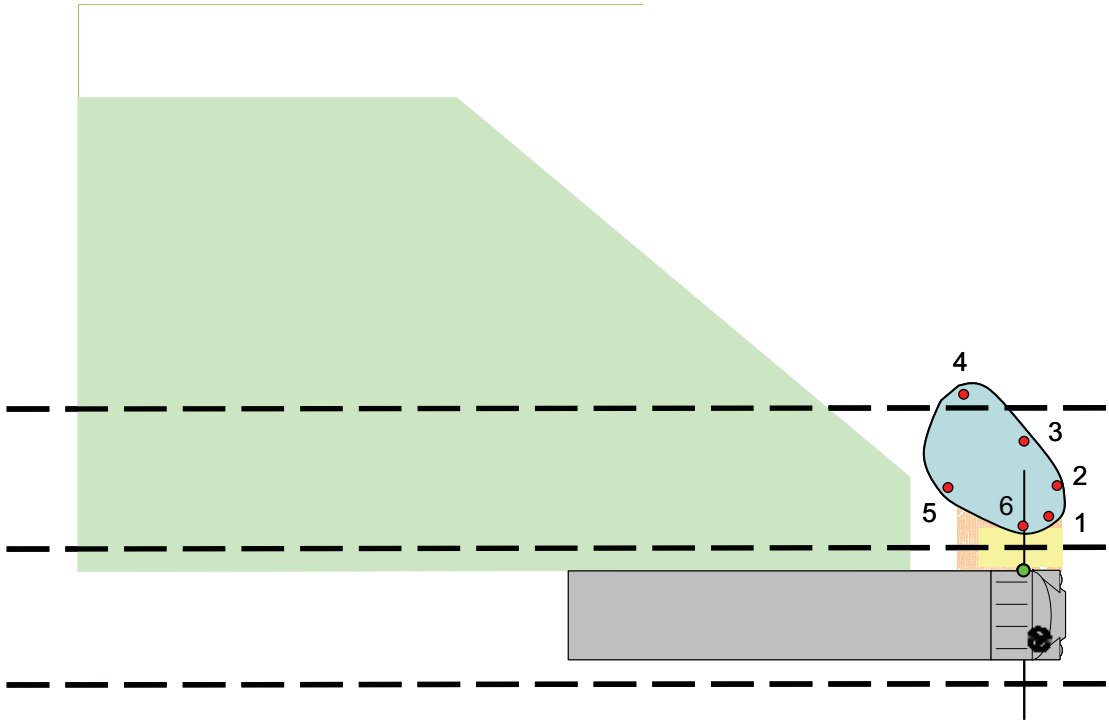
Legend

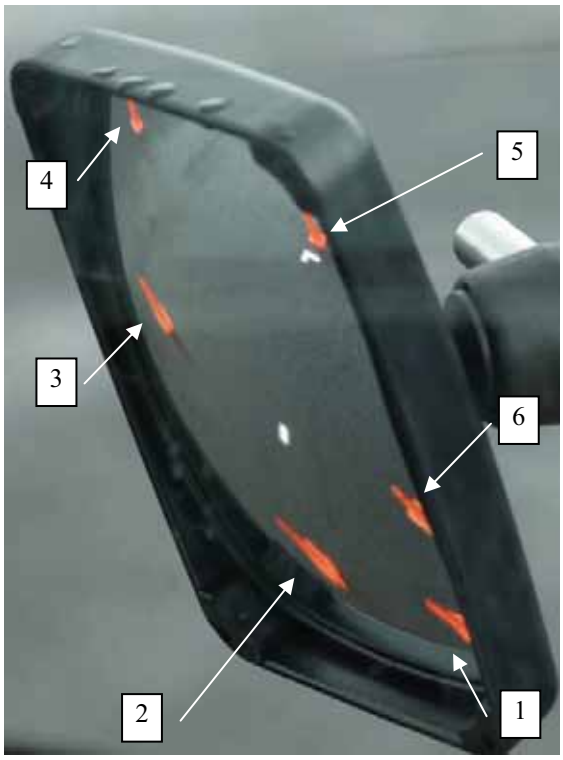
Reference Point

Orange cones

Approximate ground plane visible in mirror

C.7 Dobli Mirror - 95th Percentile Driver - Mirror angled towards the front edge of Class V Field of Vision



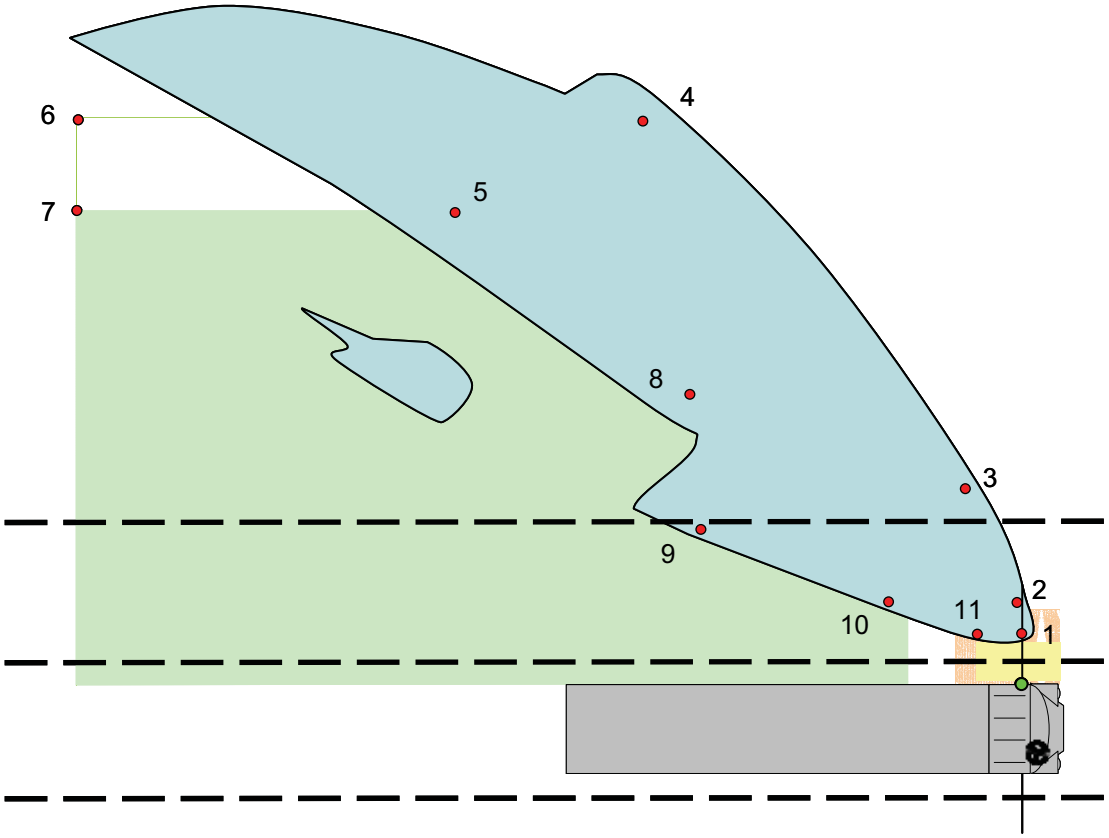


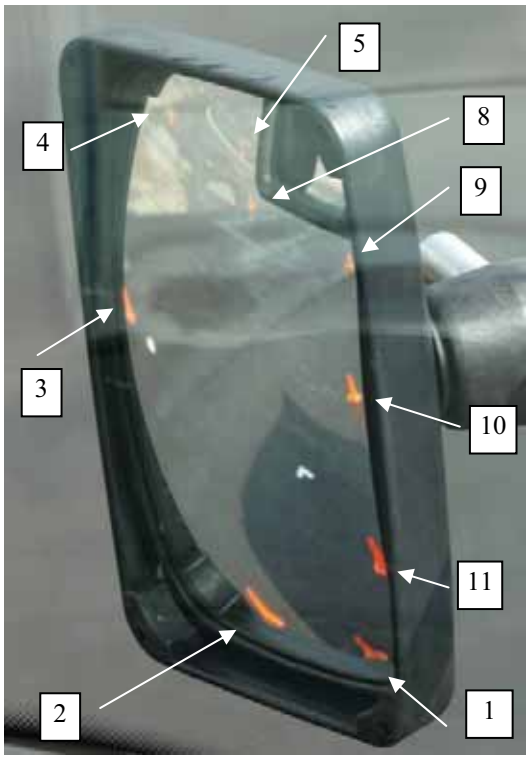
Location ID	Longitudinal Position	Lateral Position
Ref	0.0	0.0
1	0.7	1.4
2	0.9	2.2
3	0.0	3.4
4	-1.8	4.5
5	-2.0	2.2
6	0.0	1.3

Legend

- Reference Point
- Orange cones
- Approximate ground plane visible in mirror

C.8 Dobli Mirror - 95th Percentile Driver - Mirror angled towards the rear edge of Class IV Field of Vision



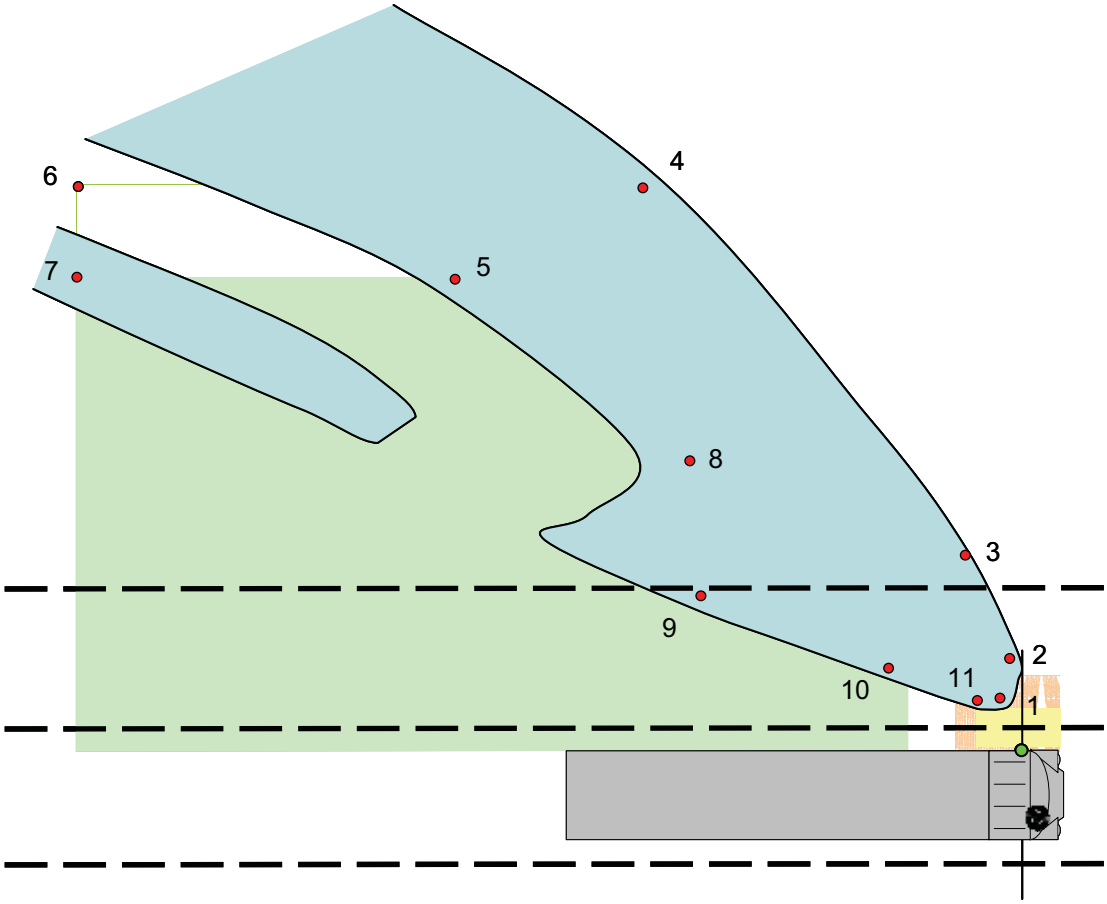


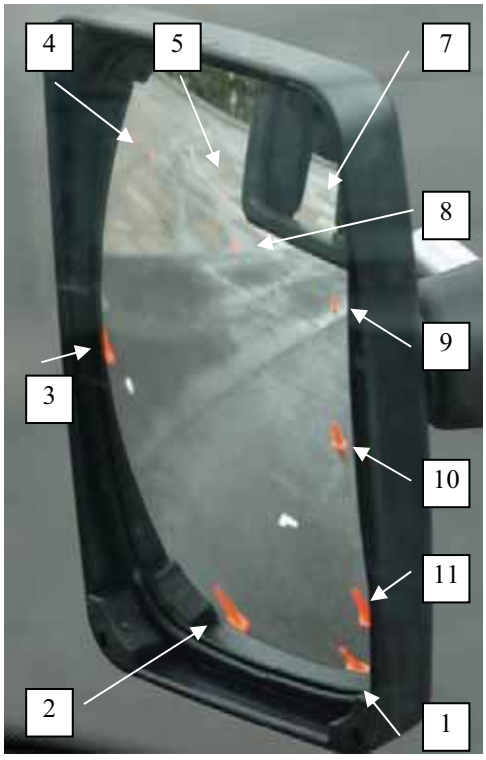
Location ID	Longitudinal Position	Lateral Position
Ref	0.0	0.0
1	0.0	1.4
2	-0.2	2.2
3	-1.5	5.2
4	-10.0	15.0
5	-15.0	12.5
6	-25.0	15.0
7	-25.0	12.5
8	-8.8	7.7
9	-8.5	4.1
10	-3.5	2.2
11	-1.2	1.3

Legend

- Reference Point
- Orange cones
- Approximate ground plane visible in mirror

C.9 Dobli Mirror - 95th Percentile Driver - Mirror angled as per instructions (with horizon in upper section of mirror)





Location ID	Longitudinal Position	Lateral Position
Ref	0.0	0.0
1	-0.6	1.4
2	-0.3	2.4
3	-1.5	5.2
4	-10.0	15.0
5	-15.0	12.5
6	-25.0	15.0
7	-25.0	12.5
8	-8.8	7.7
9	-8.5	4.1
10	-3.5	2.2
11	-1.2	1.3

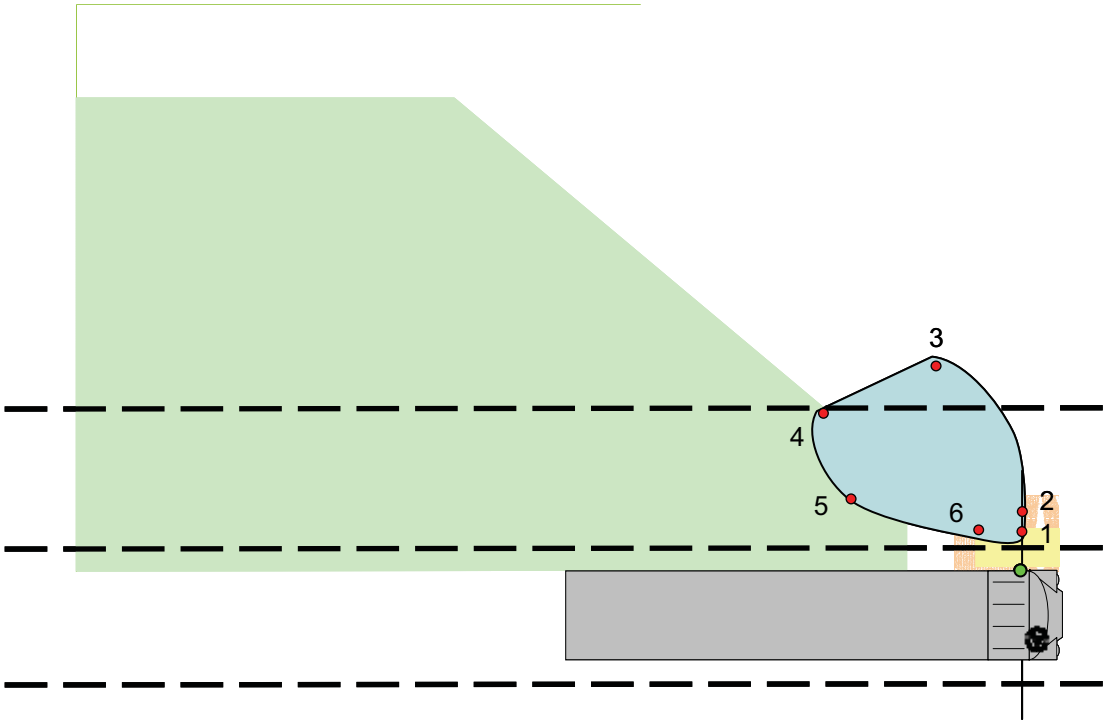
Legend

Reference Point

Orange cones

Approximate ground plane visible in mirror

C.10 BDS Mirror - 95th Percentile Driver - Mirror angled downwards as far as possible

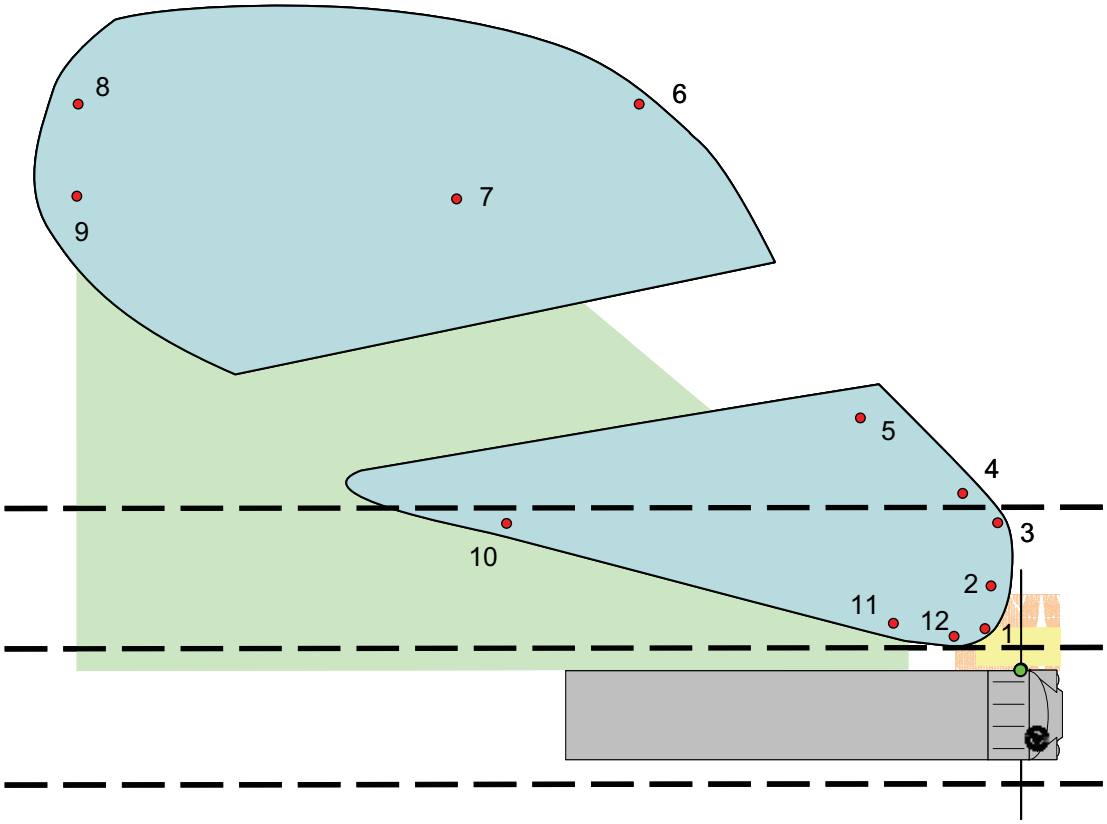


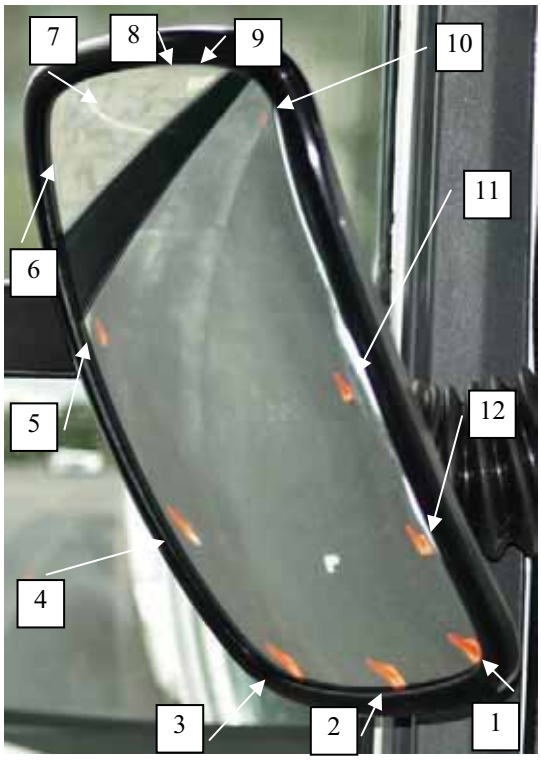
Location ID	Longitudinal Position	Lateral Position
Ref	0.0	0.0
1	0.0	1.1
2	0.0	1.6
3	-2.3	5.4
4	-5.3	4.2
5	-4.6	1.9
6	-1.2	1.1

Legend

- Reference Point
- Orange cones
- Approximate ground plane visible in mirror

C.11 BDS Mirror - 95th Percentile Driver - Mirror angled towards the rear edge of Class IV Field of Vision



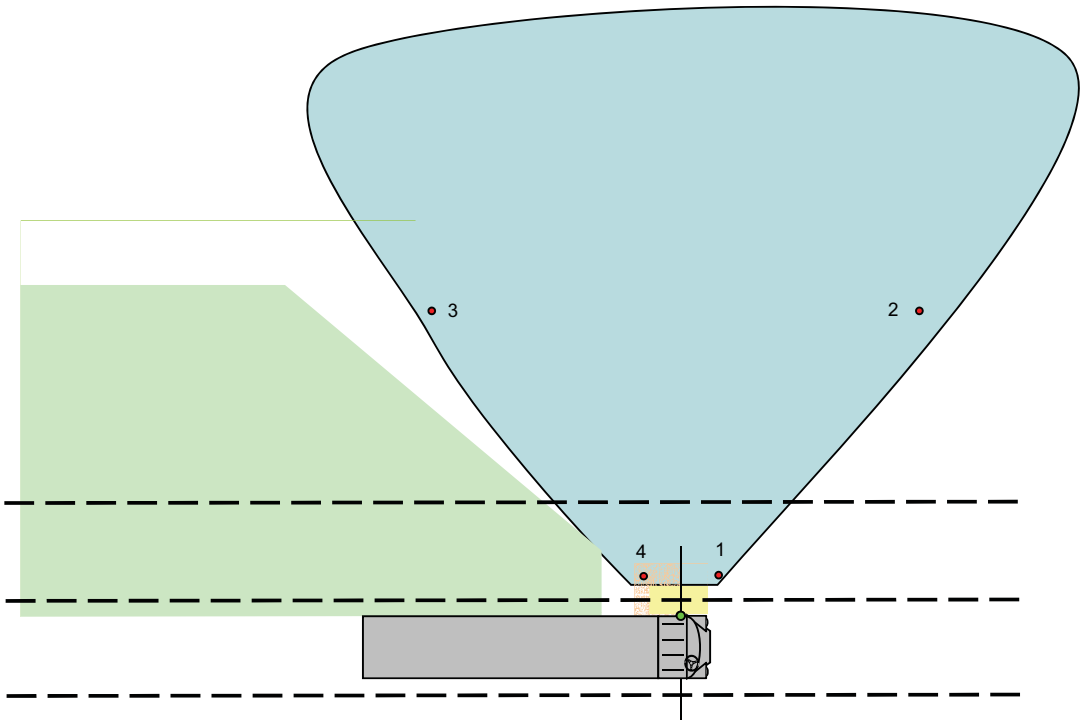


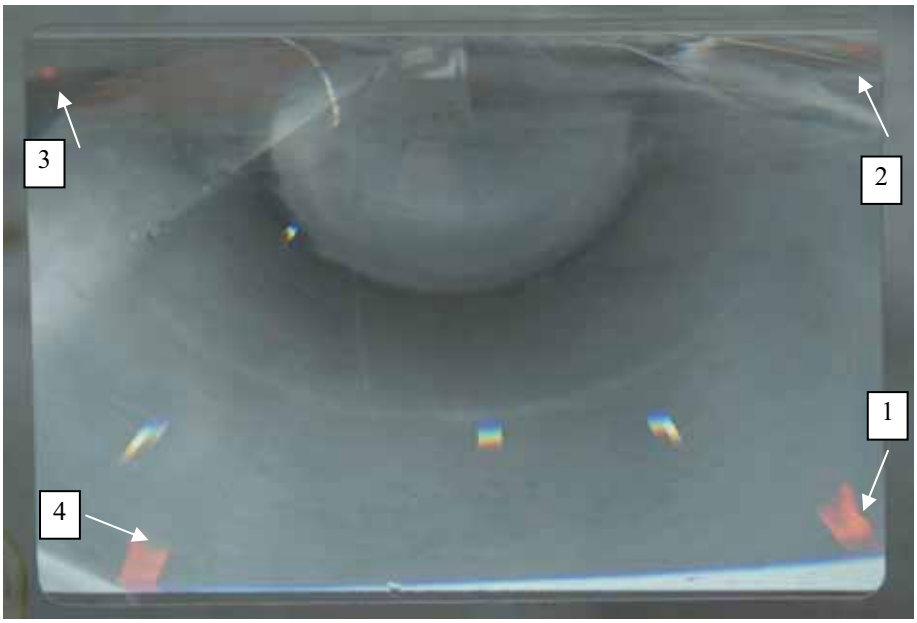
Location ID	Longitudinal Position	Lateral Position
Ref	0.0	0.0
1	-1.0	1.1
2	-0.8	2.2
3	-0.6	3.9
4	-1.8	4.5
5	-4.2	6.7
6	-10.0	15.0
7	-15.0	12.5
8	-25.0	15.0
9	-25.0	12.5
10	-13.6	3.9
11	-3.4	1.3
12	-1.8	0.9

Legend

- Reference Point
- Orange cones
- Approximate ground plane visible in mirror

C.12 Fresnel Lens – 5th Percentile Driver – Lens mounted in the lower left corner of the passenger window





Location ID	Longitudinal Position	Lateral Position
Ref	0.0	0.0
1	1.5	1.5
2	9.0	11.5
3	-9.5	11.5
4	1.4	1.5

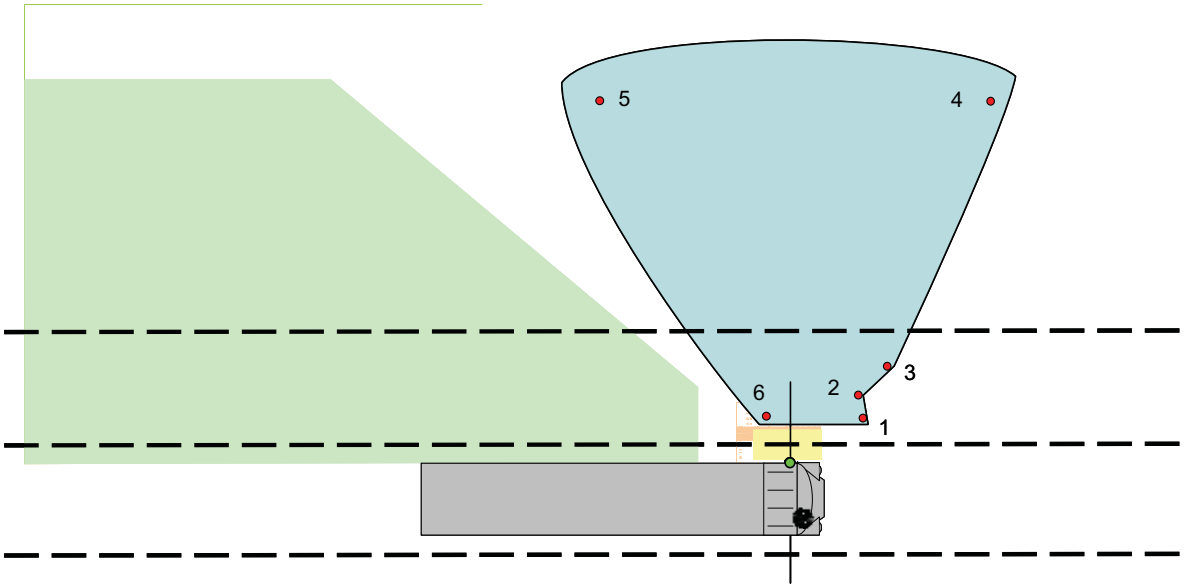
Legend

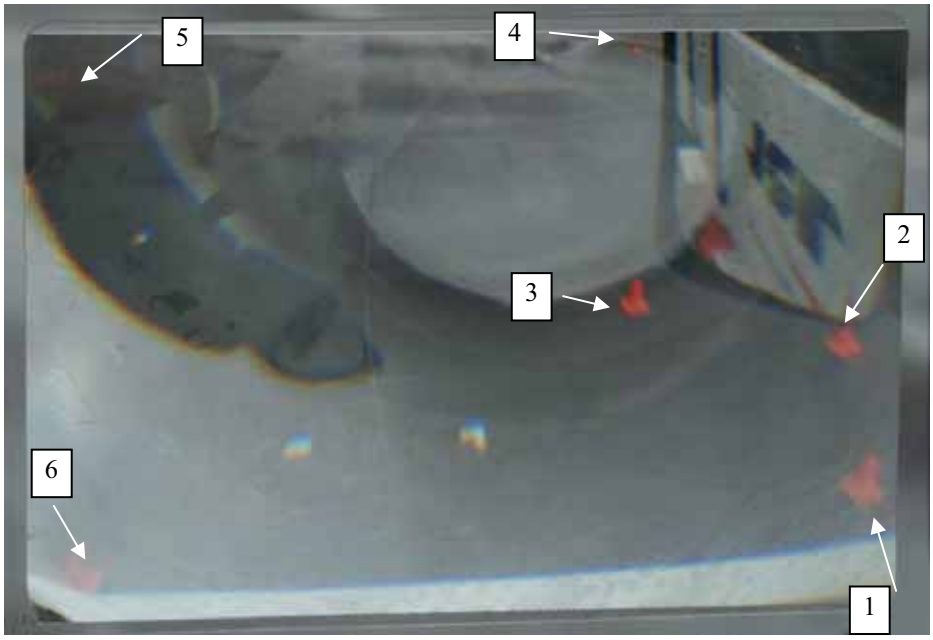
Reference Point

Orange cones

Approximate ground plane visible in mirror

C.13 Fresnel Lens – 5th Percentile Driver – Lens mounted in the lower right corner of the passenger window



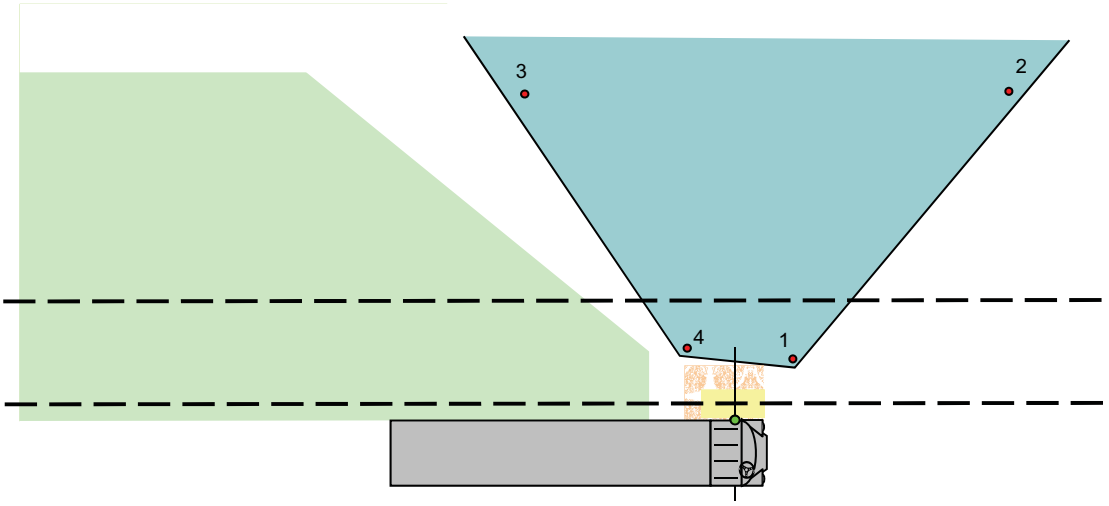


Location ID	Longitudinal Position	Lateral Position
Ref	0.0	0.0
1	2.4	1.5
2	2.2	2.2
3	3.2	3.2
4	6.5	11.8
5	-6.2	11.8
6	-0.9	1.5

Legend

- Reference Point
- Orange cones
- Approximate ground plane visible in mirror

C.14 Fresnel Lens – 5th Percentile Driver – Lens mounted at the top of the passenger window

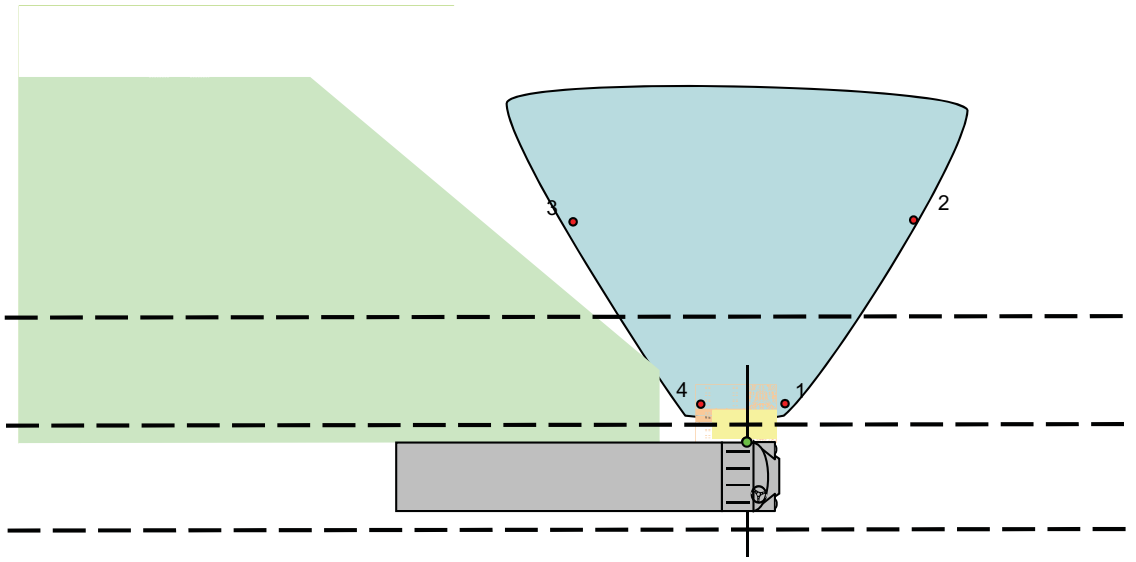


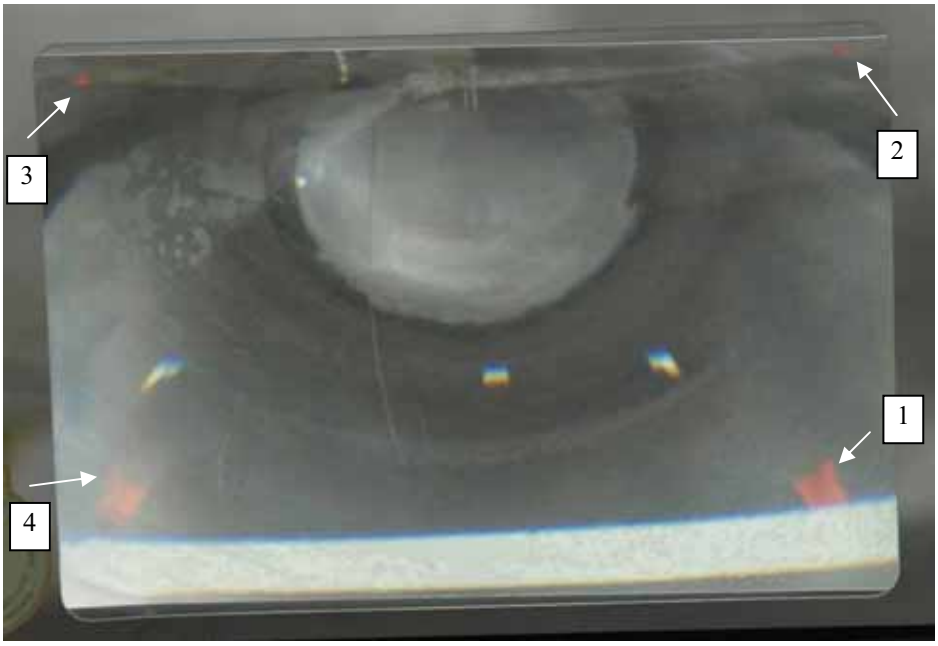
Location ID	Longitudinal Position	Lateral Position
Ref	0.0	0.0
1	2.0	2.2
2	9.5	11.8
3	-1.7	2.6
4	-7.3	11.8

Legend

- Reference Point
- Orange cones
- Approximate ground plane visible in mirror

C.15 Fresnel Lens – 95th Percentile Driver – Lens mounted in the lower left corner of the passenger window



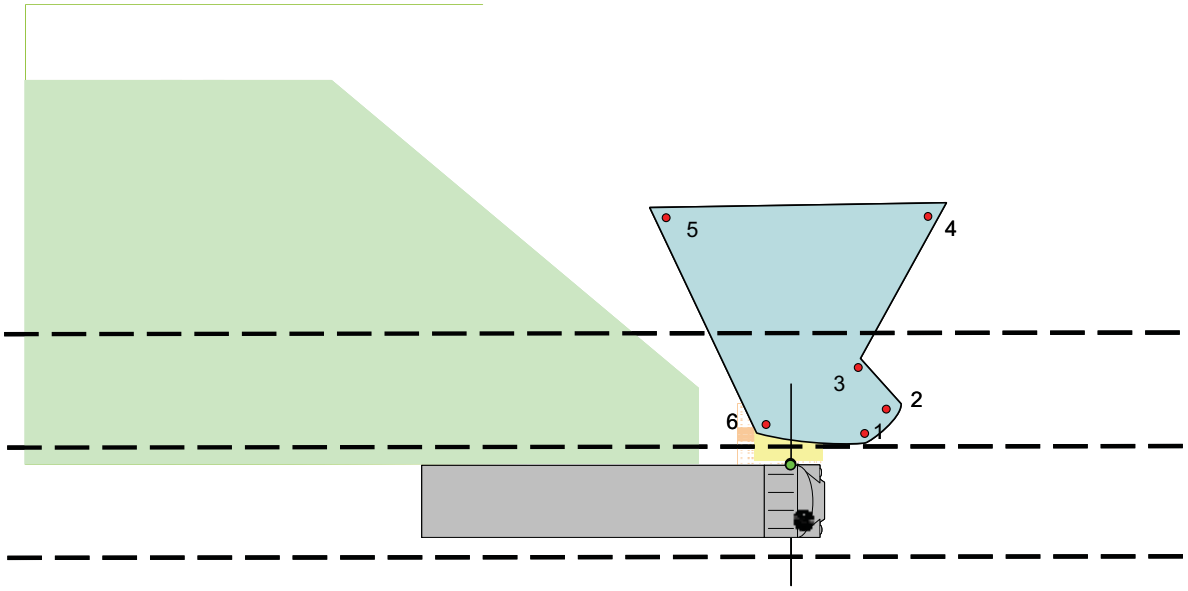


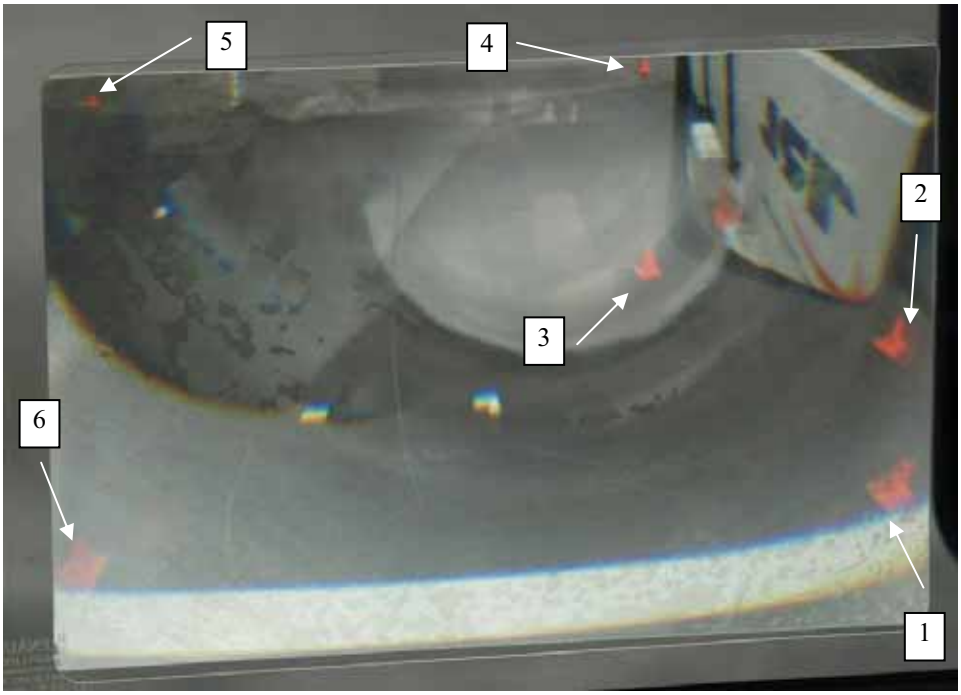
Location ID	Longitudinal Position	Lateral Position
Ref	0.0	0.0
1	1.3	1.3
2	5.7	7.6
3	-6.0	7.6
4	-1.6	1.3

Legend

- Reference Point
- Orange cones
- Approximate ground plane visible in mirror

C.16 Fresnel Lens – 95th Percentile Driver – Lens mounted in the lower right corner of the passenger window



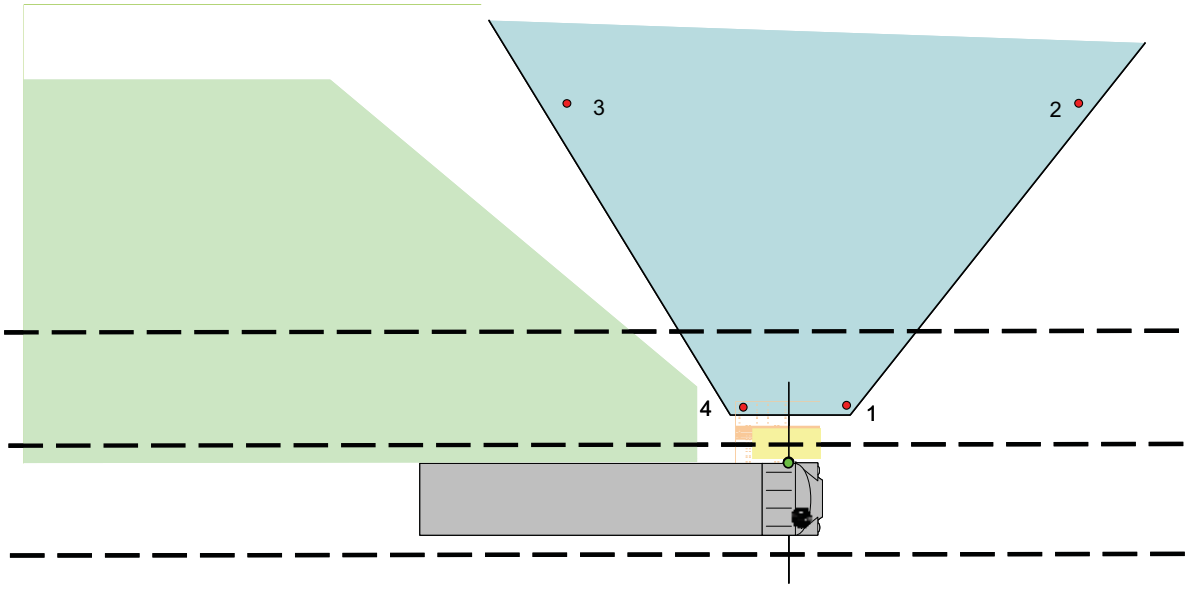


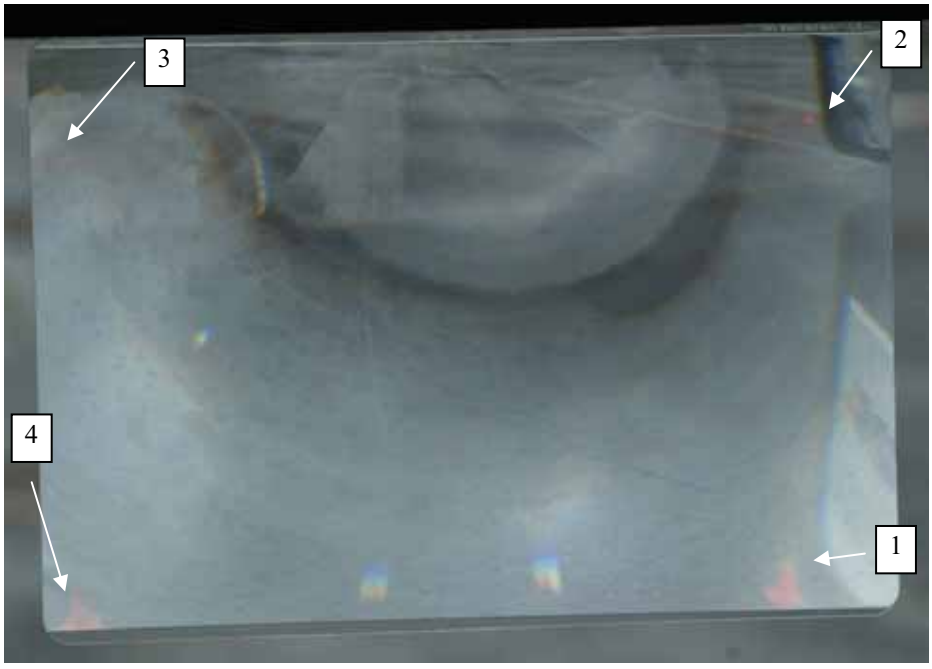
Location ID	Longitudinal Position	Lateral Position
Ref	0.0	0.0
1	2.4	1.0
2	3.2	1.8
3	2.2	3.2
4	4.5	8.1
5	-4.1	8.1
6	-0.8	1.3

Legend

- Reference Point
- Orange cones
- Approximate ground plane visible in mirror

C.17 Fresnel Lens – 95th Percentile Driver – Lens mounted at the top of the passenger window





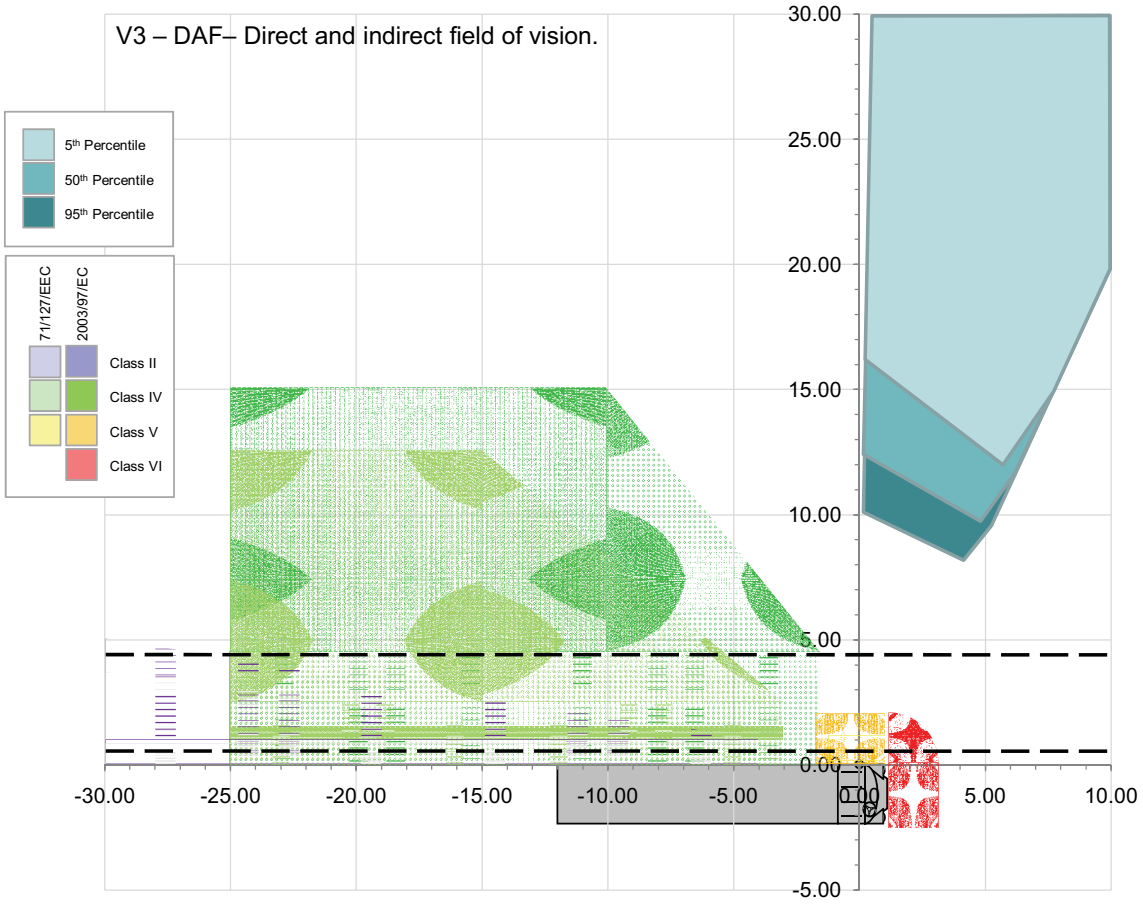
Location ID	Longitudinal Position	Lateral Position
Ref	0.0	0.0
1	1.9	1.9
2	9.5	11.8
3	-7.3	11.8
4	-1.5	1.9

Legend

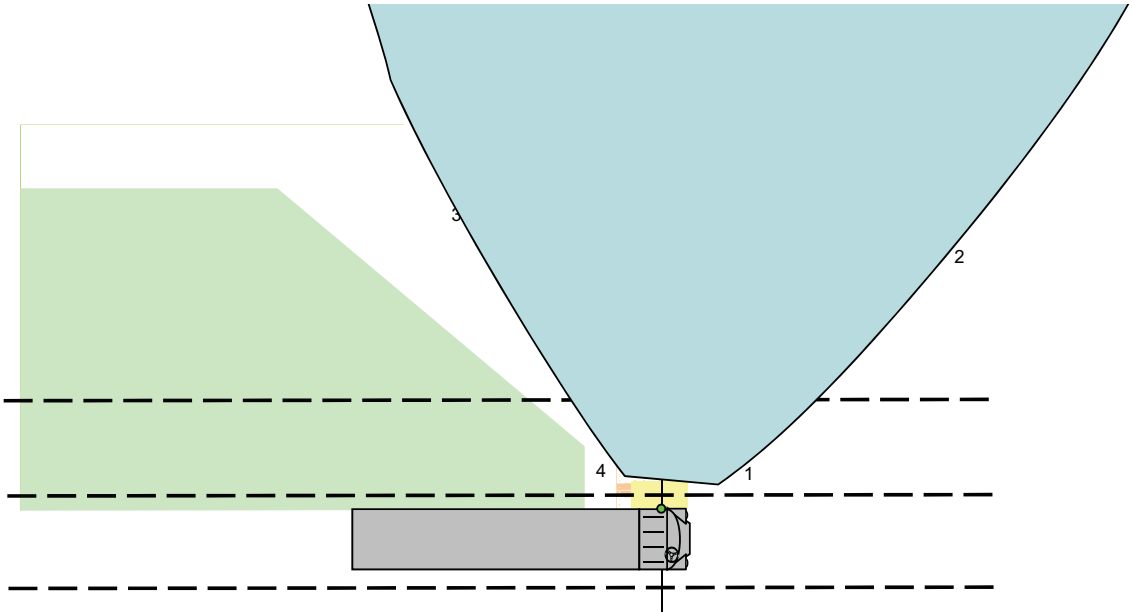
- Reference Point
- Orange cones
- Approximate ground plane visible in mirror

Appendix D Field of vision diagrams – test vehicle 3

D.1 Direct and indirect field of vision



D.2 Fresnel Lens – 5th Percentile Driver – Lens mounted in the lower left corner of the passenger window

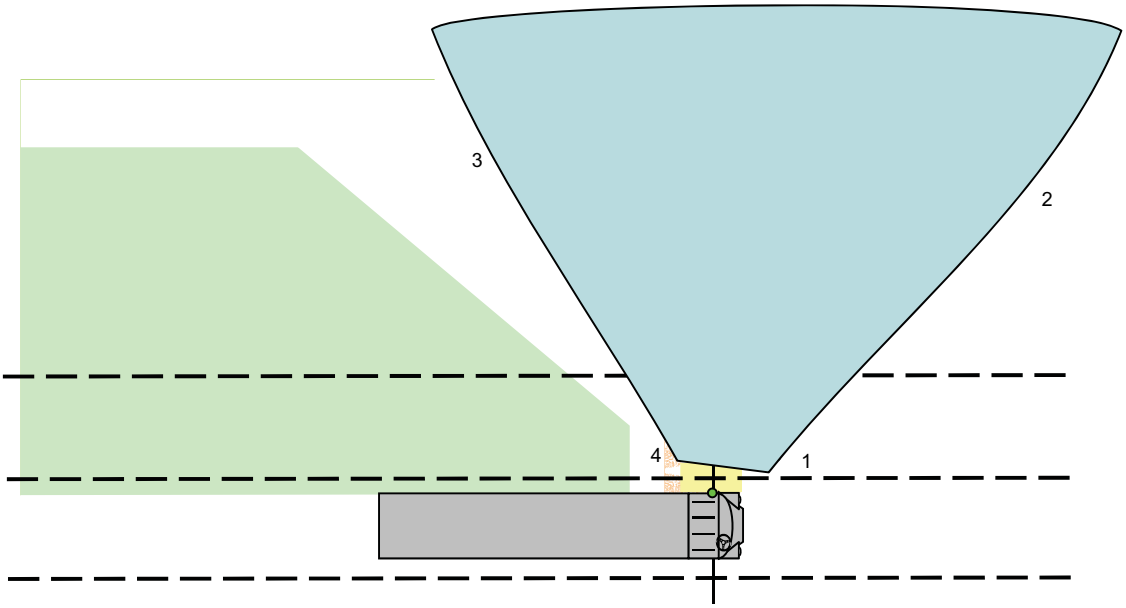


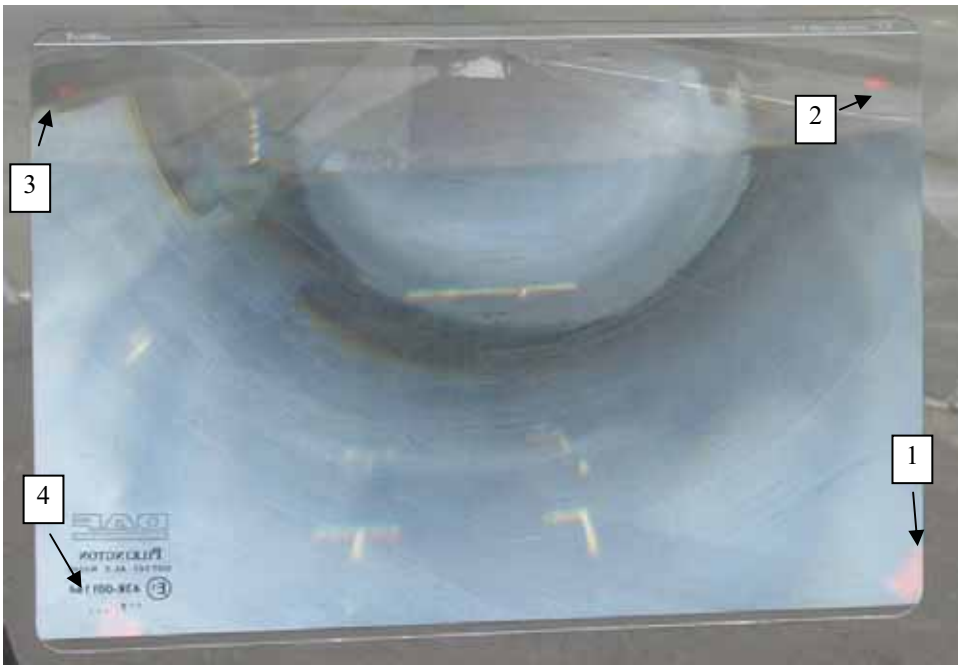
Location ID	Longitudinal Position	Lateral Position
Ref	0.0	0.0
1	2.1	1.3
2	10.7	10.1
3	-6.9	11.6
4	-1.1	1.6

Legend

- Reference Point
- Orange cones
- Approximate ground plane visible in mirror

D.3 Fresnel Lens – 50th Percentile Driver – Lens mounted in the lower left corner of the passenger window



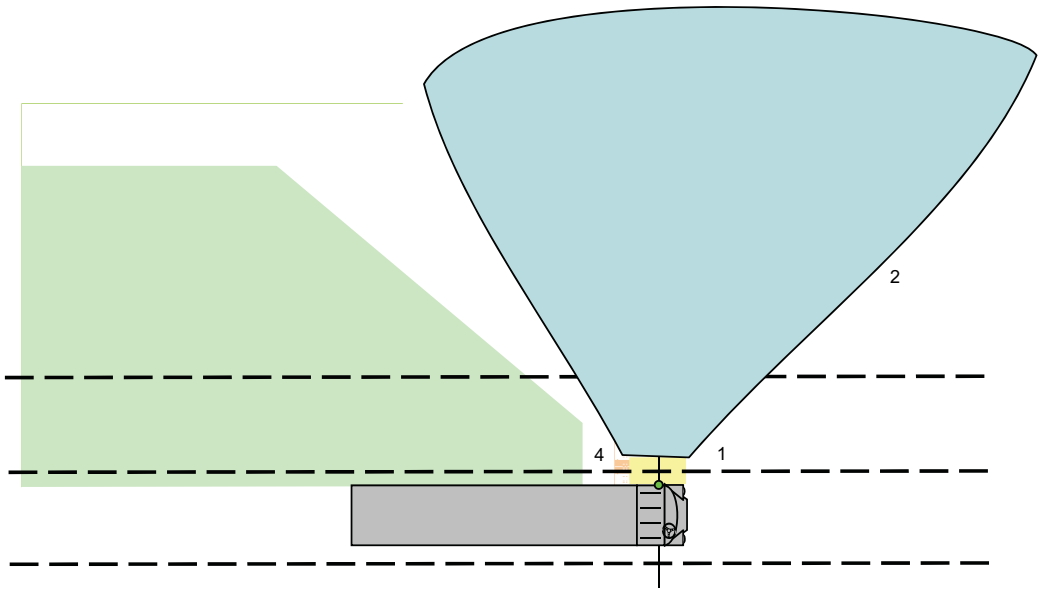


Location ID	Longitudinal Position	Lateral Position
Ref	0.0	0.0
1	2.2	1.2
2	10.4	11.3
3	-7.7	12.3
4	-0.8	1.5

Legend

- Reference Point
- Orange cones
- Approximate ground plane visible in mirror

D.4 Fresnel Lens – 95th Percentile Driver – Lens mounted in the lower left corner of the passenger window



Location ID	Longitudinal Position	Lateral Position
Ref	0.0	0.0
1	1.2	1.4
2	8.0	8.2
3	-5.9	11.0
4	-1.2	1.5

Legend

- Reference Point
- Orange cones
- Approximate ground plane visible in mirror

Appendix E Spreadsheet showing visibility of passing road users

Test Vehicle	V1 - Iveco Eurotrakker
Passing vehicle	Large passenger car (Ford Mondeo)
Mirrors	71/127/EEC
Driver	5th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	1.5	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m
Direct view - front window											
Direct view - side window											✓
Class II	✓	✓	✓	✓	✓	✓	?	?			
Class IV	✓	✓	✓	✓	✓	✓	✓	?			
Class V						?	✓	✓	✓	✓	?
Fresnel					?	✓	✓	✓	✓	✓	?
BDS				?	✓	✓	✓	✓	✓	✓	?
Dobli					?	✓	✓	✓	✓	✓	✓
Photo ID (P722....)	6768	6769	6770	6771	6772	6773	6774	6775	6776	6777	6778

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window											?
Direct view - side window										?	?
Class II	?	?	?								
Class IV	✓	✓	✓	✓	✓	✓	✓	?			
Class V											
Fresnel*				✓	✓	✓	✓	✓	✓	✓	✓
BDS		?	?	✓	✓	✓	✓	✓	✓	?	
Dobli				?	✓	✓	✓	✓	✓	?	
Photo ID (P722....)	6525	6527	6529	6531	6533	6535	6537	6539	6542	6545	6548

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position C	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m
Direct view - front window											
Direct view - side window										?	✓
Class II											
Class IV	✓	✓	✓	✓	✓	✓	?	?			
Class V											
Fresnel				?	✓	✓	✓	✓	✓	✓	✓
BDS	?	?	✓	✓	✓	✓	✓	✓	✓	?	
Dobli				?	✓	✓	✓	✓	✓	?	
Photo ID (P722....)	6779	6780	6781	6782	6783	6784	6785	6786	6787	6788	6789

Test Vehicle	V1 - Iveco Eurotrakker
Passing vehicle	Large passenger car (Ford Mondeo)
Mirrors	71/127/EEC
Driver	95th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m
Direct view - front window										✓	✓
Direct view - side window									✓	?	
Class II	✓	✓	✓	?	?	?					
Class IV	✓	✓	✓	✓	✓	✓	✓	?			
Class V					?	?	?	?	?	?	
Fresnel					?	✓	✓	✓	✓	✓	✓
BDS			✓	✓	✓	✓	✓	✓	✓	?	
Dobli			?	?	✓	✓	✓	✓	✓	?	
Photo ID (P722....)	7068	7069	7070	7071	7072	7073	7074	7075	7076	7077	7078

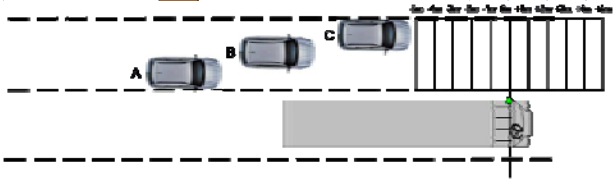
Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window											✓
Direct view - side window									?	✓	✓
Class II	?										
Class IV	✓	✓	✓	✓	✓	✓	✓	?			
Class V											
Fresnel*				✓	✓	✓	✓	✓	✓	✓	✓
BDS		?	✓	✓	✓	✓	✓	✓	✓	✓	?
Dobli				?	✓	✓	✓	✓	✓	✓	?
Photo ID (P722....)	6881	6883	6885	6887	6889	6891	6893/97	6895	6898/900	6901/03	6904/07

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position C	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m
Direct view - front window										?	✓
Direct view - side window									?	✓	✓
Class II											
Class IV	✓	✓	✓	✓	✓	?	?				
Class V											
Fresnel				?	✓	✓	✓	✓	✓	✓	✓
BDS	?	?	✓	✓	✓	✓	✓	✓	✓	?	
Dobli			?	?	✓	✓	✓	✓	✓	?	
Photo ID (P722....)	7079	7080	7081	7082	7083	7084	7085	7086	7087	7088	7089

Key

*	Estimated coverage based on other measurements
✓	Clearly visible
?	Visible but could be missed with a quick glance

Vehicle length :	4.8m
Vehicle width :	2.1m
Vehicle height:	1.5m



Test Vehicle	V1 - Iveco Eurotrakker
Passing vehicle	Large passenger car (Ford Mondeo)
Mirrors	2003/97/EC
Driver	5th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m
Direct view - front window											
Direct view - side window											
Class II	✓	✓	✓	✓	✓	✓	✓	?			
Class IV	✓	✓	✓	✓	✓	✓	✓	✓			
Class V					?	✓	✓	✓	✓	✓	✓
Fresnel*					?	✓	✓	✓	✓	✓	✓
BDS	?	?	✓	✓	✓	✓	✓	✓	✓	✓	
Dobli	?	?	✓	✓	✓	✓	✓	✓	✓	✓	

Photo ID (P801....)	7349	7350	7351	7352	7353	7354	7355	7356	7357/58	7359	7360/61

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window											?
Direct view - side window										?	?
Class II	✓	✓	✓	✓	✓						
Class IV	✓	✓	✓	?	?	✓	✓	?			
Class V					?	?	?	?	?	?	?
Fresnel*				✓	✓	✓	✓	✓	✓	✓	✓
BDS	✓	✓	✓	✓	✓	✓	✓	✓	✓	?	
Dobli	✓	✓	✓	✓	✓	✓	✓	✓	✓	?	

Photo ID (P801....)	7362	7363	7364	7365	7366	7367	7368	7369	7370/71	7373/74	7375/76

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position C	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m
Direct view - front window											?
Direct view - side window									?	✓	✓
Class II	?										
Class IV	✓	✓	✓	✓	✓	✓	?	?			
Class V											
Fresnel*				✓	✓	✓	✓	✓	✓	✓	✓
BDS	✓	✓	✓	✓	✓	✓	✓	✓	?	?	
Dobli	✓	✓	✓	✓	✓	✓	✓	✓	?		

Photo ID (P801....)	7377	7378	7379	7380	7381	7382	7383	7384	7385	7386	7387/88

Test Vehicle	V1 - Iveco Eurotrakker
Passing vehicle	Large passenger car (Ford Mondeo)
Mirrors	2003/97/EC
Driver	95th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m
Direct view - front window											✓
Direct view - side window										?	?
Class II	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Class IV	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Class V					?	✓	✓	✓	✓	✓	✓
Fresnel*					✓	✓	✓	✓	✓	✓	✓
BDS	?	?	✓	✓	✓	✓	✓	✓	✓	✓	
Dobli	?	?	✓	✓	✓	✓	✓	✓	✓	✓	?

Photo ID (P801....)	7193	7194	7195	7196/97	7198	7199	7200	7201/02	7203/04	7205/06	09/08/7207

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window											✓
Direct view - side window									?	✓	✓
Class II	✓	✓	✓	✓	?	?					
Class IV	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Class V					?	?	?	?	?	?	?
Fresnel*				✓	✓	✓	✓	✓	✓	✓	✓
BDS	?	✓	✓	✓	✓	✓	✓	✓	✓	?	
Dobli	✓	✓	✓	✓	✓	✓	✓	✓	✓	?	

Photo ID (P801....)	7210	7211	7212	7213	7214	7215	7216	7217	7218/19	7220/21	7222/23/24

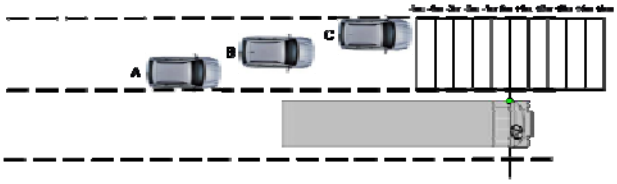
Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position C	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m
Direct view - front window										?	✓
Direct view - side window								?	✓	✓	✓
Class II	?										
Class IV	✓	✓	✓	✓	✓	✓	✓	?			
Class V											
Fresnel*				✓	✓	✓	✓	✓	✓	✓	✓
BDS	✓	✓	✓	✓	✓	✓	✓	✓	?	?	
Dobli	✓	✓	✓	✓	✓	✓	✓	✓	?	?	

Photo ID (P801....)	7225	7226	7227	7228	7229	7230	7231	7232	7233	7234/35	7236/37

Key

*	Estimated coverage based on other measurements
✓	Clearly visible
?	Visible but could be missed with a quick glance

Vehicle length : 4.8m
Vehicle width : 2.1m
Vehicle height: 1.5m



Test Vehicle	V1 - Iveco Eurotrakker
Passing vehicle	Small passenger car (Vauxhall Corsa)
Mirrors	71/127/EEC
Driver	5th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m
Direct view - front window											
Direct view - side window											
Class II	✓	✓	✓	✓	?	?					
Class IV	✓	✓	✓	✓	✓	✓	✓	?			
Class V						?	?	?	?	?	
Fresnel*					?	✓	✓	✓	✓	✓	
BDS				?	✓	✓	✓	✓	✓		
Dobli					?	✓	✓	✓	✓	?	
Photo ID (P722....)	6578	6581	6583	6584	6586	6588	6590	6592	6594/96	6597/99	6600/02

Test Vehicle	V1 - Iveco Eurotrakker
Passing vehicle	Small passenger car (Vauxhall Corsa)
Mirrors	71/127/EEC
Driver	95th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m
Direct view - front window											✓
Direct view - side window											
Class II	✓	✓	✓	?	?	?					
Class IV	✓	✓	✓	✓	✓	✓	✓				
Class V					?	?	?	?	?	?	
Fresnel*					✓	✓	✓	✓	✓	✓	
BDS			?	?	✓	✓	✓	✓	✓		
Dobli					?	?	✓	✓	✓	?	
Photo ID (P722....)	6932	6934	6936	6938	6940	6942	6944	6946/48	6949/51	6952/53	6954/55

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window											
Direct view - side window											
Class II											
Class IV	✓	✓	✓	✓	✓	✓	?				
Class V											
Fresnel*				✓	✓	✓	✓	✓	✓	✓	
BDS		?	?	✓	✓	✓	✓	✓	✓	?	
Dobli				?	✓	✓	✓	✓	✓	?	
Photo ID (P722...)	6603	6605	6607	6609	6611	6613	6615	6617/19	6620/23	6624/26	6627/29

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window										?	✓
Direct view - side window										?	✓
Class II											
Class IV	✓	✓	✓	✓	✓	✓	?				
Class V											
Fresnel*				✓	✓	✓	✓	✓	✓	✓	
BDS	?	?	✓	✓	✓	✓	✓	✓	?		
Dobli				?	✓	✓	✓	✓	?		
Photo ID (P722....)	6956	6957	6959	6961	6963	6965	6967	6969/70	6971/72	6973/74	6975/76

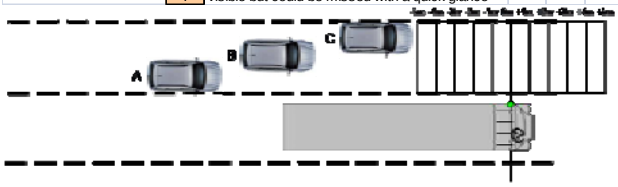
Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position C	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m
Direct view - front window											
Direct view - side window										?	?
Class II											
Class IV	✓	✓	✓	✓	✓	?					
Class V											
Fresnel*				✓	✓	✓	✓	✓	✓	✓	
BDS	?	✓	✓	✓	✓	✓	✓	?			
Dobli			?	✓	✓	✓	✓	✓	✓	?	
Photo ID (P722....)	6630	6632	6634	6636	6638	6640	6642	6644/46	6647/49	6651/52	6653/54

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position C	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m
Direct view - front window											?
Direct view - side window								?	✓	✓	✓
Class II											
Class IV	✓	✓	✓	✓	✓	?	?				
Class V											
Fresnel*				✓	✓	✓	✓	✓	✓	✓	
BDS	?	✓	✓	✓	✓	✓	✓	✓	✓	?	
Dobli			?	✓	✓	✓	✓	✓	✓	?	
Photo ID (P722....)	6977	6978	6980	6982	6984	6986	6988	6990	6992/93	6994/95	699697

Key

*	Estimated coverage based on other measurements
✓	Clearly visible
?	Visible but could be missed with a quick glance

Vehicle length : 3.7m
Vehicle width : 1.6m
Vehicle height: 1.4m



Test Vehicle	V1 - Iveco Eurotrakker
Passing vehicle	Small passenger car (Vauxhall Corsa)
Mirrors	2003/97/EC
Driver	5th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m
Direct view - front window											
Direct view - side window											
Class II	✓	✓	✓	✓	✓	✓	✓	?			
Class IV	✓	✓	✓	✓	✓	✓	✓	?			
Class V					?	✓	✓	✓	✓	?	
Fresnel*					?	✓	✓	✓	✓	✓	
BDS	?	?	?	✓	✓	✓	✓	✓	✓		
Dobli		?	?	✓	✓	✓	✓	✓	✓		
Photo ID (P801....)	7389	7390	7391	7392	7393	7394	7395	7396	7397	7398	7399/400

Test Vehicle	V1 - Iveco Eurotrakker
Passing vehicle	Small passenger car (Vauxhall Corsa)
Mirrors	2003/97/EC
Driver	95th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m
Direct view - front window										?	✓
Direct view - side window											
Class II	✓	✓	✓	✓	✓	✓	?				
Class IV	✓	✓	✓	✓	✓	✓	✓	?			
Class V					?	✓	✓	✓	✓	?	
Fresnel*					✓	✓	✓	✓	✓	✓	
BDS		?	✓	✓	✓	✓	✓	✓	?		
Dobli		?	✓	✓	✓	✓	✓	✓	?		
Photo ID (P801....)	7238	7239	7240	7241	7242	7243	7244	7245	7246/47	7248/49	7250/51

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window											?
Direct view - side window										?	
Class II	✓	✓	?	?							
Class IV	✓	✓	✓	✓	✓	✓	?				
Class V					?	?	?	?	?	?	
Fresnel*				✓	✓	✓	✓	✓	✓	✓	
BDS	✓	✓	✓	✓	✓	✓	✓	✓	?		
Dobli	✓	✓	✓	✓	✓	✓	✓	✓	?		
Photo ID (P801....)	7401	7402	7403	7404	7405	7406	7407	7408	7409	7410/11	7412

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window										?	✓
Direct view - side window										?	?
Class II	✓	?	?	?							
Class IV	✓	✓	✓	✓	✓	✓	?				
Class V					?	?	?	?	?	?	
Fresnel*				✓	✓	✓	✓	✓	✓	✓	
BDS	✓	✓	✓	✓	✓	✓	✓	✓	?		
Dobli	✓	✓	✓	✓	✓	✓	✓	✓	?		
Photo ID (P801....)	7252	7253	7254	7255	7256	7257	7258	7259	7260/61	7262/63	7264

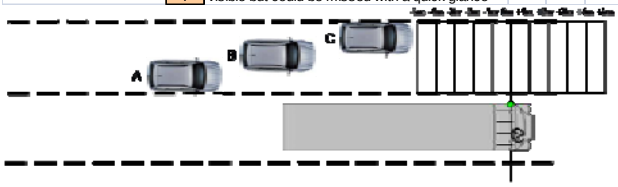
Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position C	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m
Direct view - front window											✓
Direct view - side window									?	✓	?
Class II											
Class IV	✓	✓	✓	✓	✓	?					
Class V											
Fresnel*				✓	✓	✓	✓	✓	✓	✓	
BDS	✓	✓	✓	✓	✓	✓	?	?			
Dobli	✓	✓	✓	✓	✓	✓	?	?			
Photo ID (P801....)	7413	7414	7415	7416	7417	7418	7419	7420	7421/22	7423	7424

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position C	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m
Direct view - front window											✓
Direct view - side window									?	✓	✓
Class II											
Class IV	✓	✓	✓	✓	✓	?	?				
Class V											
Fresnel*				✓	✓	✓	✓	✓	✓	✓	
BDS	✓	✓	✓	✓	✓	✓	✓	?			
Dobli	✓	✓	✓	✓	✓	✓	✓	?			
Photo ID (P801....)	7265	7266	7267	7268	7269	7270	7271	7272/73	7274/75	7276/77	7278

Key

*	Estimated coverage based on other measurements
✓	Clearly visible
?	Visible but could be missed with a quick glance

Vehicle length : 3.7m
Vehicle width : 1.6m
Vehicle height: 1.4m



Test Vehicle	V1 - Iveco Eurotrakker
Passing vehicle:	Pedal cyclist
Mirrors	71/127/EEC
Driver	5th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m
Direct view - front window									?	✓	✓
Direct view - side window											
Class II	✓	✓	✓	✓	?	?					
Class IV	✓	✓	✓	✓	✓	?					
Class V					?	✓	✓	?			
Fresnel							✓	?			
BDS						?	?				
Dobli						?	✓				
Photo ID (P722....)	6790	6791	6792	6793	6794	6795	6796	6797	6798	6675	----

Test Vehicle	V1 - Iveco Eurotrakker
Passing vehicle:	Pedal cyclist
Mirrors	71/127/EEC
Driver	95th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m
Direct view - front window								✓	✓	✓	✓
Direct view - side window											
Class II	✓	✓	✓	✓	?						
Class IV	✓	✓	✓	✓	?						
Class V				?	✓	✓	?				
Fresnel						?	✓	✓			
BDS				?	?	✓					
Dobli					?	✓					
Photo ID (P722....)	6998	7000	7001	7003	7005	7006	7007/08	7009/10	7011	----	----

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window										?	✓
Direct view - side window								?	✓		
Class II											
Class IV	✓	✓	✓	✓	?						
Class V											
Fresnel*				✓	✓	✓	✓	✓	✓		
BDS			?	✓	✓	?	✓	?			
Dobli					?	✓	✓	?			
Photo ID (P722....)	6679	6680	6682	6684	6686	6688	6690	6692	6695	6696/97	6698/99

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window								?	✓	✓	✓
Direct view - side window						✓	✓	?			
Class II											
Class IV	✓	✓	?								
Class V											
Fresnel*				✓	✓	✓	✓	✓	✓		
BDS	?	✓	✓	?	✓	?					
Dobli			?	✓	✓	?					
Photo ID (P722....)	7013	7014	7016	7017	7018	7019	7020/21	7022/23	7024	----	----

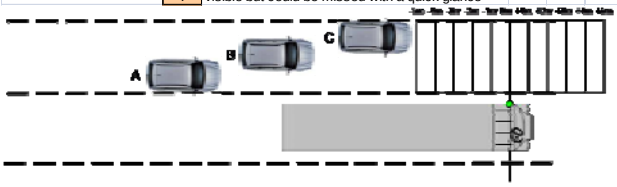
Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position C	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m
Direct view - front window										?	✓
Direct view - side window						?	?	✓	?		
Class II											
Class IV	✓	✓									
Class V											
Fresnel				✓	✓	✓	✓	✓	✓	✓	
BDS	?	✓	✓	?	✓	✓	?				
Dobli			?	✓	✓	✓	?				
Photo ID (P722....)	6799	6800	6801	6802	6803	6804	6805	6806	6807	6808	----

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position C	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m
Direct view - front window										?	✓
Direct view - side window							✓	✓	?		
Class II											
Class IV	✓	?	?								
Class V											
Fresnel				✓	✓	✓	✓	✓	✓	✓	
BDS	?	✓	?	?	✓	?					
Dobli		?	?	✓	✓	✓	?				
Photo ID (P722....)	7100	7101	7102	7103	7104	7105	7106	7107	7108	7109	----

Key

*	Estimated coverage based on other measurements
✓	Clearly visible
?	Visible but could be missed with a quick glance

Bike length: 1.4m
Cyclist Height: 1.7m



Test Vehicle	V1 - Iveco Eurotrakker
Passing vehicle:	Pedal cyclist
Mirrors	2003/97/EC
Driver	5th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m
Direct view - front window									?	✓	✓
Direct view - side window											
Class II	✓	✓	✓	✓	✓	?					
Class IV	✓	✓	✓	✓	✓	✓					
Class V					?	✓	✓	?			
Fresnel*						?	✓	✓			
BDS					?	✓	?				
Dobli					?	✓	✓				
Photo ID (P801....)	7425	7426	7427	7428	7429	7430	7431	7432/33	7434	7435	7436

Test Vehicle	V1 - Iveco Eurotrakker
Passing vehicle:	Pedal cyclist
Mirrors	2003/97/EC
Driver	95th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m
Direct view - front window									✓	✓	✓
Direct view - side window											
Class II	✓	✓	✓	✓	✓	✓					
Class IV	✓	✓	✓	✓	✓	✓					
Class V					?	✓	✓	?			
Fresnel*						?	✓	✓			
BDS						✓	?				
Dobli						✓	✓				
Photo ID (P801....)	7459	7460	7461	7462	7463	7464	7465	7466/67	7468	7469	7470

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window									?	✓	✓
Direct view - side window							?	✓			
Class II											
Class IV	✓	✓	✓	✓	?						
Class V					?	?	?	?			
Fresnel*				✓	✓	✓	✓	✓	✓		
BDS	?	✓	✓	✓	?	?	?				
Dobli	?	✓	✓	?	✓	✓	?				
Photo ID (P801....)	7437	7438	7439	7440	7441	7442	7443	7444	7445	7446	7447

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window											
Direct view - side window								✓	✓		
Class II											
Class IV	✓	✓	✓	✓	?						
Class V					?	?	?				
Fresnel*				✓	✓	✓	✓	✓	✓		
BDS	?	✓	✓	✓	?	?	?				
Dobli	?	✓	✓	?	✓	✓	?				
Photo ID (P801....)	7471	7472	7473	7474	7475	7476	7477	7478	7479	7480	7481

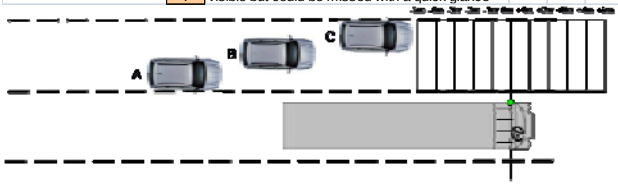
Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position C	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m
Direct view - front window										✓	✓
Direct view - side window						?	?	✓	?		
Class II											
Class IV	✓	✓	?								
Class V											
Fresnel*				✓	✓	✓	✓	✓	✓	✓	
BDS	✓	✓	✓	?	?	?					
Dobli	✓	?	?	✓	?	?					
Photo ID (P801....)	7448	7449	7450	7451	7452	7453	7454	7455	7456	7457	7458

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position C	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m
Direct view - front window										✓	✓
Direct view - side window						?	✓	✓	?		
Class II											
Class IV	✓	✓	?								
Class V											
Fresnel*				✓	✓	✓	✓	✓	✓	✓	
BDS	✓	✓	✓	?	?	?					
Dobli	?	?	?	✓	?						
Photo ID (P801....)	7482	7483	7484	7485	7486	7487	7488	7489	7490	7491	7492

Key

*	Estimated coverage based on other measurements
✓	Clearly visible
?	Visible but could be missed with a quick glance

Bike length: 1.4m
Cyclist Height: 1.7m



Test Vehicle	V1 - Iveco Eurotrakker
Passing vehicle:	Pedestrian
Mirrors	71/127/EEC
Driver	5th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m
Direct view - front window								?	✓	✓	✓
Direct view - side window											
Class II	✓	✓	✓	✓	?						
Class IV	✓	✓	✓	✓	✓						
Class V					?	✓	?				
Fresnel*							✓	✓			
BDS					?	?					
Dobli						?					
Photo ID (P722....)	6720	6722	6724	6726	6728	6730	6732/33	6734/35	6736	6737	----

Test Vehicle	V1 - Iveco Eurotrakker
Passing vehicle:	Pedestrian
Mirrors	71/127/EEC
Driver	95th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m
Direct view - front window								✓	✓	✓	✓
Direct view - side window							?				
Class II	✓	✓	✓	✓	?						
Class IV	✓	✓	✓	✓	✓						
Class V					?	?	?				
Fresnel*						?	✓	✓			
BDS					?	?					
Dobli						?	?				
Photo ID (P722....)	7036	7037	7038	7039	7040	7041	7042/43	7044	7045	7046	----

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window									✓	✓	✓
Direct view - side window						?	✓	?			
Class II											
Class IV	✓	✓	✓								
Class V											
Fresnel*				✓	✓	✓	✓	✓	✓		
BDS		?	✓	?	?	✓					
Dobli				?	✓	✓					
Photo ID (P722....)	6738	6739	6740	6741	6742	6743	6744	6745	6746/47	6748/49	----

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window										✓	✓
Direct view - side window									✓	✓	?
Class II											
Class IV	✓	✓	✓	?							
Class V											
Fresnel*				✓	✓	✓	✓	✓	✓		
BDS		?	✓	?	✓	✓					
Dobli				?	✓	✓					
Photo ID (P722....)	7047	7048	7049	7050	7051	7052	7053	7054	7055	7056	----

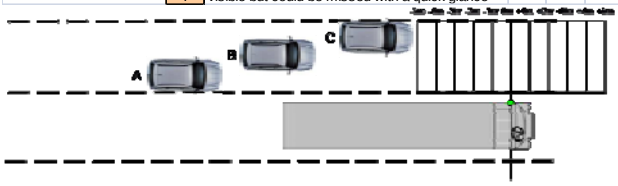
Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position C	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m
Direct view - front window										✓	✓
Direct view - side window						✓	✓	?			
Class II											
Class IV	✓	?									
Class V											
Fresnel*				✓	✓	✓	✓	✓	✓	✓	
BDS	✓	✓	?	?	✓	?					
Dobli		?	?	✓	✓	?					
Photo ID (P722....)	6751	6752	6754	6756	6758	6760	6762	6763	6764	6765/66	----

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position C	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m
Direct view - front window										✓	✓
Direct view - side window						✓	✓	✓	?		
Class II											
Class IV	✓	?									
Class V											
Fresnel*				✓	✓	✓	✓	✓	✓	✓	
BDS	✓	✓			✓	?					
Dobli			?	✓	✓	?					
Photo ID (P722....)	7057	7058	7059	7060	7061	7062	7063	7064	7065	7066	----

Key

*	Estimated coverage based on other measurements
✓	Clearly visible
?	Visible but could be missed with a quick glance

Pedestrian Height: 1.8m



Test Vehicle	V1 - Iveco Eurotrakker
Passing vehicle:	Pedestrian
Mirrors	2003/97/EC
Driver	5th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m
Direct view - front window								?	✓	✓	✓
Direct view - side window											
Class II	✓	✓	✓	✓	✓						
Class IV	✓	✓	✓	✓	✓						
Class V					✓	✓	?				
Fresnel*						?	✓	✓			
BDS				?	?	?					
Dobli					?	✓					
Photo ID (P801....)	7315	7316	7317	7318	7319	7320	7321/22	7323	7324	7325	7326

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window								?	✓	✓	✓
Direct view - side window							✓				
Class II											
Class IV	✓	✓	✓	✓							
Class V					?	?	?				
Fresnel*				✓	✓	✓	✓	✓	✓		
BDS	✓	✓	✓	✓	?	?					
Dobli	✓	✓	✓	?	✓	?					
Photo ID (P801....)	7327	7328	7329	7330	7331	7332	7333	7334	7335	7336	7337

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position C	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m
Direct view - front window									?	✓	✓
Direct view - side window						✓	✓	?			
Class II											
Class IV	✓	✓									
Class V											
Fresnel*				✓	✓	✓	✓	✓	✓	✓	
BDS	✓	✓	?	?	?						
Dobli	?	?	?	✓							
Photo ID (P801....)	7338	7339	7340	7341	7342	7343	7344	7345	7346	7347	7348

Test Vehicle	V1 - Iveco Eurotrakker
Passing vehicle:	Pedestrian
Mirrors	2003/97/EC
Driver	95th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m
Direct view - front window								✓	✓	✓	✓
Direct view - side window											
Class II	✓	✓	✓	✓	✓						
Class IV	✓	✓	✓	✓	✓						
Class V					✓	✓	?				
Fresnel*						?	✓	✓			
BDS				?	✓	?					
Dobli				?	✓	✓	?				
Photo ID (P801....)	7279	7280	7281	7282	7283	7284	7285/86	7287/88	7289	7290	7291

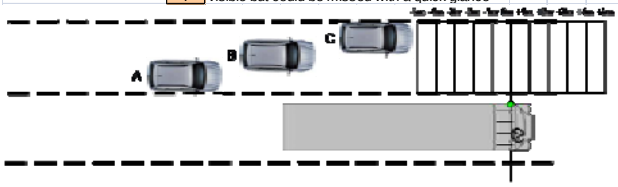
Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window								?	✓	✓	✓
Direct view - side window						?	✓				
Class II											
Class IV	✓	✓	✓	✓							
Class V					?	?	?				
Fresnel*				✓	✓	✓	✓	✓	✓		
BDS	✓	✓	✓	✓	?	?					
Dobli	✓	✓	✓	?	✓	?					
Photo ID (P814....)	7292	7293	7294	7295	7296	7297	7298	7299	7300	7301	7302

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position C	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m
Direct view - front window										?	✓	✓
Direct view - side window							✓	✓	?			
Class II												
Class IV	✓	✓										
Class V												
Fresnel*				✓	✓	✓	✓	✓	✓	✓		
BDS	✓	✓	?		?							
Dobli	?	?	?	✓	?							
Photo ID (P814....)	7303	7304	7305	7306	7307	7308	7309	7310	7311	7312	7313

Key

*	Estimated coverage based on other measurements
✓	Clearly visible
?	Visible but could be missed with a quick glance

Pedestrian Height: 1.8m



Test Vehicle	V2 - Renault Magnum
Passing vehicle	Large passenger car (Ford Mondeo)
Mirrors	71/127/EEC
Driver	5th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m
Direct view - front window										?	✓
Direct view - side window											
Class II	✓	✓	✓	✓	✓	?	?				
Class IV	✓	✓	✓	✓	✓	✓	?				
Class V						?	?	?	?	?	
Fresnel					?	✓	✓	✓	✓	✓	✓
BDS	?	✓	✓	✓	✓	✓	✓	✓	✓	?	
Dobli	?	?	✓	✓	✓	✓	✓	✓	✓	✓	
Photo ID (P814....)	7643	7644	7645	7646	7647	7648	7649	7650	7651	7652	7653/54

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window										?	✓
Direct view - side window											
Class II											
Class IV	✓	✓	✓	✓	?	?	?				
Class V											
Fresnel				?	✓	✓	✓	✓	✓	✓	✓
BDS	✓	✓	✓	✓	✓	✓	✓	✓	✓	?	
Dobli	?	✓	✓	✓	✓	✓	✓	✓	✓	?	
Photo ID (P814....)	7655	7656	7657	7658	7659	7660	7661	7662	7663	7664/65	7666/67

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m
Direct view - front window										✓	✓
Direct view - side window											
Class II											
Class IV	✓	✓	✓	?	?	?					
Class V											
Fresnel			?	✓	✓	✓	✓	✓	✓	✓	✓
BDS	?	✓	✓	✓	✓	✓	✓	✓	?	?	
Dobli	?	✓	✓	✓	✓	✓	✓	✓	?	?	
Photo ID (P814....)	7668	7669	7670	7671	7672	7673	7674	7675	7676	7677/78	7679/80

Test Vehicle	V2 - Renault Magnum
Passing vehicle	Large passenger car (Ford Mondeo)
Mirrors	71/127/EEC
Driver	95th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m
Direct view - front window										?	✓
Direct view - side window											
Class II	✓	✓	✓	✓	✓	?	?	?			
Class IV	✓	✓	✓	✓	✓	?	?				
Class V					?	?	?	?	?	?	
Fresnel				?	✓	✓	✓	✓	✓	✓	✓
BDS	?	✓	✓	✓	✓	✓	✓	✓	✓	?	
Dobli		?	✓	✓	✓	✓	✓	✓	✓	?	
Photo ID (P814....)	7604	7606	7607	7608	7609	7610	7611	7612	7613	7614/15	7616/17

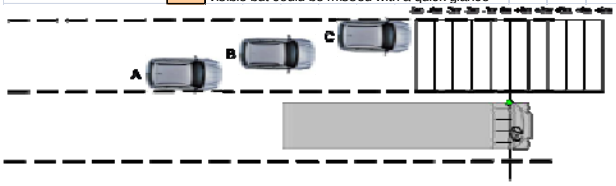
Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window										✓	✓
Direct view - side window								?	?	?	
Class II											
Class IV	✓	✓	✓	✓	✓	?	?				
Class V											
Fresnel				?	✓	✓	✓	✓	✓	✓	✓
BDS	?	✓	✓	✓	✓	✓	✓	✓	✓	?	
Dobli	?	✓	✓	✓	✓	✓	✓	✓	✓	?	
Photo ID (P814....)	7618	7619	7620	7621	7622	7623	7624	7625	7626	7627/28	7629/30

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m
Direct view - front window										✓	✓
Direct view - side window							?	✓	✓	✓	✓
Class II											
Class IV	✓	✓	✓	?	?						
Class V											
Fresnel			?	✓	✓	✓	✓	✓	✓	✓	✓
BDS	?	✓	✓	✓	✓	✓	✓	✓	?		
Dobli	?	✓	✓	✓	✓	✓	✓	✓	?		
Photo ID (P814....)	7631	7632	7633	7634	7635	7636	7637	7638	7639	7640	7641/42

Key

*	Estimated coverage based on other measurements
✓	Clearly visible
?	Visible but could be missed with a quick glance

Vehicle length : 4.8m
Vehicle width : 2.1m
Vehicle height: 1.5m



Test Vehicle	V2 - Renault Magnum
Passing vehicle	Large passenger car (Ford Mondeo)
Mirrors	2003/97/EC
Driver	5th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m
Direct view - front window										?	✓
Direct view - side window											
Class II	✓	✓	✓	✓	✓	✓	✓	?			
Class IV	✓	✓	✓	✓	✓	✓	✓	?			
Class V					?	✓	✓	✓	✓	?	?
Fresnel					?	✓	✓	✓	✓	✓	✓
BDS	?	?	✓	✓	✓	✓	✓	✓	✓	?	
Dobli	?	?	✓	✓	✓	✓	✓	✓	✓	✓	
Photo ID (P814....)	8077	8078	8079	8080	8081	8082	8083	8084	8085	8086	8087/88

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window										?	✓
Direct view - side window											
Class II	✓	✓	✓	?							
Class IV	✓	✓	✓	✓	✓	✓	?	?			
Class V					?	?	?	?	?	?	
Fresnel				?	✓	✓	✓	✓	✓	✓	✓
BDS	?	✓	✓	✓	✓	✓	✓	✓	✓	?	
Dobli	✓	✓	✓	✓	✓	✓	✓	✓	✓	?	
Photo ID (P814....)	8089	8090	8091	8092	8093	8094	8095	8096	8097	8098	8099/100

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position											
Direct view - front window										?	✓
Direct view - side window								?	?	?	?
Class II	?										
Class IV	✓	✓	✓	✓	✓	?	?	?			
Class V											
Fresnel			?	?	✓	✓	✓	✓	✓	✓	✓
BDS	✓	✓	✓	✓	✓	✓	✓	✓	?	?	
Dobli	✓	✓	✓	✓	✓	✓	✓	✓	?	?	
Photo ID (P814....)	8101	8102	8103	8104	8105	8106	8107	8108	8109	8110	8111/12

Test Vehicle	V2 - Renault Magnum
Passing vehicle	Large passenger car (Ford Mondeo)
Mirrors	2003/97/EC
Driver	95th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m
Direct view - front window										✓	✓
Direct view - side window											
Class II	✓	✓	✓	✓	✓	✓	✓	?			
Class IV	✓	✓	✓	✓	✓	✓	✓	?			
Class V					✓	✓	✓	✓	✓	✓	?
Fresnel				?	✓	✓	✓	✓	✓	✓	✓
BDS	?	✓	✓	✓	✓	✓	✓	✓	✓	?	
Dobli	?	?	?	✓	✓	✓	✓	✓	✓	?	
Photo ID (P814....)	8038	8039	8040	8041	8042	8043	8044	8045	8046	8047/48	8049/50

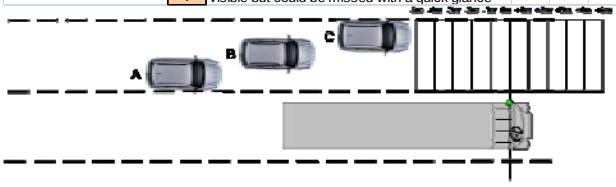
Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window									?	✓	✓
Direct view - side window								?	?	?	
Class II	?	?	?	?							
Class IV	✓	✓	✓	✓	✓	✓	?	?			
Class V					?	?	?	?	?	?	?
Fresnel			?	?	✓	✓	✓	✓	✓	✓	✓
BDS	✓	✓	✓	✓	✓	✓	✓	✓	?	?	
Dobli	?	?	✓	✓	✓	✓	✓	✓	✓	?	
Photo ID (P814....)	8051	8052	8053	8054	8055	8056	8057	8058	8059/60	8061/62	8063/64

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m
Direct view - front window									?	✓	✓
Direct view - side window								?	✓	✓	✓
Class II											
Class IV	✓	✓	✓	✓	✓	?	?	?			
Class V					?	?	?	?	?	?	
Fresnel			?	✓	✓	✓	✓	✓	✓	✓	✓
BDS	✓	✓	✓	✓	✓	✓	✓	?	?		
Dobli	?	✓	✓	✓	✓	✓	✓	✓	?	?	
Photo ID (P814....)	8065	8066	8067	8068	8069	8070	8071	8072	8073	8074	8075/76

Key

*	Estimated coverage based on other measurements
✓	Clearly visible
?	Visible but could be missed with a quick glance

Vehicle length : 4.8m
Vehicle width : 2.1m
Vehicle height: 1.5m



Test Vehicle	V2 - Renault Magnum
Passing vehicle	Small passenger car (Vauxhall Corsa)
Mirrors	71/127/EEC
Driver	5th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m
Direct view - front window											✓
Direct view - side window											
Class II	✓	✓	✓	✓	?	?	?				
Class IV	✓	✓	✓	✓	✓	?					
Class V					?	✓	✓	✓	?	?	
Fresnel					✓	✓	✓	✓	✓	✓	
BDS	?	✓	✓	✓	✓	✓	✓	✓	?		
Dobli		?	?	✓	✓	✓	✓	✓	?		
Photo ID (P814....)	7858	7859	7860	7861	7862	7863	7864	7865	7866	7867	7868/69

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window										?	✓
Direct view - side window											
Class II											
Class IV	✓	✓	✓	✓	?	?					
Class V											
Fresnel				?	✓	✓	✓	✓	✓	✓	✓
BDS	✓	✓	✓	✓	✓	✓	✓	✓			
Dobli	✓	✓	✓	✓	✓	✓	✓	✓	?		
Photo ID (P814....)	7870	7871	7872	7873	7874	7875	7876	7877	7878	7879/80	7881/82

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position C	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m
Direct view - front window										✓	✓
Direct view - side window											
Class II											
Class IV	✓	✓	?	?							
Class V											
Fresnel			?	✓	✓	✓	✓	✓	✓	✓	?
BDS	✓	✓	✓	✓	✓	✓	✓	?			
Dobli	✓	✓	✓	✓	✓	✓	✓	?			
Photo ID (P814....)	7883	7884	7885	7886	7887	7888	7889	7890	7891	7892/93	7894/95

Test Vehicle	V2 - Renault Magnum
Passing vehicle	Small passenger car (Vauxhall Corsa)
Mirrors	71/127/EEC
Driver	95th %

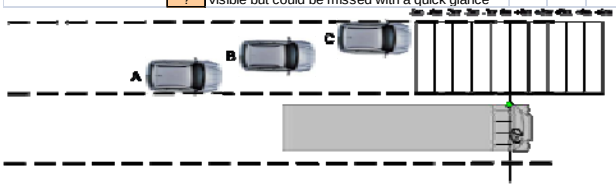
Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m
Direct view - front window										?	✓
Direct view - side window											
Class II	✓	✓	✓	✓	?	?	?				
Class IV	✓	✓	✓	✓	✓	?	?				
Class V					?	✓	✓	✓	✓	?	
Fresnel					✓	✓	✓	✓	✓	✓	
BDS	?	✓	✓	✓	✓	✓	✓	✓	?		
Dobli	?	?	?	✓	✓	✓	✓	✓	?		
Photo ID (P814....)	7820	7821	7822	7823	7824	7825	7826	7827	7828	7829/30	7831

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window										✓	✓
Direct view - side window											
Class II											
Class IV	✓	✓	✓	✓	?	?					
Class V											
Fresnel				?	✓	✓	✓	✓	✓	✓	?
BDS	✓	✓	✓	✓	✓	✓	✓	✓	?		
Dobli	✓	✓	✓	✓	✓	✓	✓	✓	?		
Photo ID (P814....)	7832	7833	7834	7835	7836	7837	7838	7839	7840	7841/42	7843/44

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position C	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m
Direct view - front window									?	✓	✓
Direct view - side window							?	✓	✓	?	
Class II											
Class IV	✓	?	?	?	?						
Class V											
Fresnel			?	✓	✓	✓	✓	✓	✓	✓	?
BDS	✓	✓	✓	✓	✓	✓	✓	?			
Dobli	✓	✓	✓	✓	✓	✓	✓	?			
Photo ID (P814....)	7845	7846	7847	7848	7849	7850	7851	7852	7853	7854/55	7856/57

Key	
*	Estimated coverage based on other measurements
✓	Clearly visible
?	Visible but could be missed with a quick glance

Vehicle length :	3.7m
Vehicle width :	1.6m
Vehicle height:	1.4m



Test Vehicle	V2 - Renault Magnum
Passing vehicle	Small passenger car (Vauxhall Corsa)
Mirrors	2003/97/EC
Driver	5th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m
Direct view - front window											✓
Direct view - side window											
Class II	✓	✓	✓	✓	✓	✓	?				
Class IV	✓	✓	✓	✓	✓	✓	?				
Class V					✓	✓	✓	✓	✓	?	
Fresnel					?	✓	✓	✓	✓	✓	
BDS	?	?	✓	✓	✓	✓	✓	✓	?		
Dobli		?	?	✓	✓	✓	✓	✓	✓		
Photo ID (P814....)	7897	7898	7899	7900	7901	7902	7903	7904	7905	7906	7907/08

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window										✓	✓
Direct view - side window											
Class II	✓	?	?								
Class IV	✓	✓	✓	✓	✓	?					
Class V					?	?	?	?	?		
Fresnel				?	✓	✓	✓	✓	✓	✓	?
BDS	✓	✓	✓	✓	✓	✓	✓	✓	?		
Dobli	✓	✓	✓	✓	✓	✓	✓	✓	?		
Photo ID (P814....)	7909	7910	7911	7912	7913	7914	7915	7916	7917	7918/19	7920/21

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position C	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m
Direct view - front window										✓	✓
Direct view - side window											
Class II											
Class IV	✓	✓	✓	✓	?	?					
Class V											
Fresnel			?	✓	✓	✓	✓	✓	✓	✓	?
BDS	✓	✓	✓	✓	✓	✓	?	?			
Dobli	✓	✓	✓	✓	✓	✓	?	?			
Photo ID (P814....)	7922	7923	7924	7925	7926	7927	7928	7929	7930	7931/32	7933/34

Test Vehicle	V2 - Renault Magnum
Passing vehicle	Small passenger car (Vauxhall Corsa)
Mirrors	2003/97/EC
Driver	95th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m
Direct view - front window										?	✓
Direct view - side window											
Class II	✓	✓	✓	✓	✓	✓	?				
Class IV	✓	✓	✓	✓	✓	✓	✓				
Class V					?	✓	✓	✓	✓	?	
Fresnel					?	✓	✓	✓	✓	✓	
BDS	?	✓	✓	✓	✓	✓	✓	✓	?		
Dobli		?	?	✓	✓	✓	✓	✓	?		
Photo ID (P814....)	7935	7936	7937	7938	7939	7940	7941	7942	7943	7944/45	7946/47

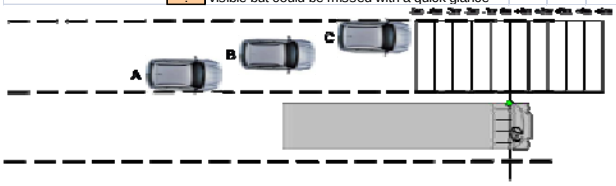
Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window										✓	✓
Direct view - side window											
Class II	✓	?	?	?							
Class IV	✓	?	✓	✓	✓	✓	?				
Class V					?	✓	✓	✓	?	?	
Fresnel				?	✓	✓	✓	✓	✓	✓	?
BDS	✓	✓	✓	✓	✓	✓	✓	✓	?		
Dobli	?	✓	✓	✓	✓	✓	✓	✓	?		
Photo ID (P814....)	7948	7949	7950	7951	7952	7953	7954	7955	7956	7957/58	7959/60

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position C	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m
Direct view - front window										✓	✓
Direct view - side window							?	✓	✓	✓	?
Class II											
Class IV	✓	✓	✓	✓	✓	?	?				
Class V					?	?	?	?	?		
Fresnel			?	✓	✓	✓	✓	✓	✓	✓	✓
BDS	✓	✓	✓	✓	✓	✓	✓	?	?		
Dobli	✓	✓	✓	✓	✓	✓	✓	?	?		
Photo ID (P814....)	7961	7962	7963	7964	7965	7966	7967	7968	7969	7970	7971/72

Key

*	Estimated coverage based on other measurements
✓	Clearly visible
?	Visible but could be missed with a quick glance

Vehicle length : 3.7m
Vehicle width : 1.6m
Vehicle height: 1.4m



Test Vehicle	V2 - Renault Magnum
Passing vehicle:	Pedal cyclist
Mirrors	71/127/EEC
Driver	5th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m
Direct view - front window									✓	✓	✓
Direct view - side window											
Class II	✓	✓	✓	✓	?						
Class IV	✓	✓	✓	✓							
Class V					?	✓	✓				
Fresnel						?	?				
BDS				?	?	✓					
Dobli					?	✓	✓				
Photo ID (P814....)	7718	7719	7720	7721	7722	7723	7724	7725	7726/27	7728	7729

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window									✓	✓	✓
Direct view - side window						?	?				
Class II											
Class IV	✓	?	?								
Class V											
Fresnel				?	✓	✓	✓	✓			
BDS	?	✓	✓	✓	✓	?					
Dobli	?	✓	✓	✓	✓	?					
Photo ID (P814....)	7730	7731	7732	7733	7734	7735	7736	7737	7738	7739	7740

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position C	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m
Direct view - front window										✓	✓
Direct view - side window						✓	✓	✓			
Class II											
Class IV											
Class V											
Fresnel			?	✓	✓	✓	✓	✓	✓	?	
BDS	?	?	?	?	?						
Dobli	?	✓	✓	✓	?						
Photo ID (P814....)	7741	7742	7743	7744	7745	7746	7747	7748	7749	7750	7751

Test Vehicle	V2 - Renault Magnum
Passing vehicle:	Pedal cyclist
Mirrors	71/127/EEC
Driver	95th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m
Direct view - front window									✓	✓	✓
Direct view - side window											
Class II	✓	✓	✓	✓	✓						
Class IV	✓	✓	✓	✓	✓						
Class V					?	✓	✓				
Fresnel						✓	✓				
BDS				?	?	?					
Dobli					?	?	✓				
Photo ID (P814....)	7752	7753	7754	7755	7756	7757	7758	7759	7760	7761	7762

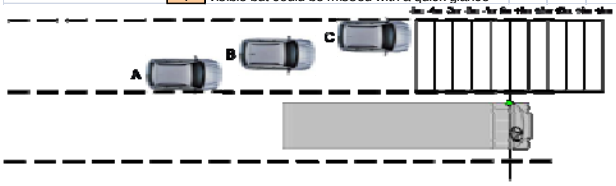
Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window									✓	✓	✓
Direct view - side window						?	✓	?			
Class II											
Class IV	✓	✓	?								
Class V											
Fresnel				?	✓	✓	✓	✓	?		
BDS	?	✓	✓	✓	✓	?					
Dobli	?	?	✓	✓	✓	?					
Photo ID (P814....)	7764	7765	7766	7767	7768	7769	7770	7771	7772	7773	7774

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position C	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m
Direct view - front window									?	✓	✓
Direct view - side window						✓	✓	?			
Class II											
Class IV											
Class V											
Fresnel			?	✓	✓	✓	✓	✓	✓	?	
BDS	?	?	?	?	?	?					
Dobli	?	✓	✓	✓	?						
Photo ID (P814....)	7775	7776	7777	7778	7779	7780	7781	7782	7783	7784	7785

Key

*	Estimated coverage based on other measurements
✓	Clearly visible
?	Visible but could be missed with a quick glance

Bike length: 1.4m
Cyclist Height: 1.7m



Test Vehicle	V2 - Renault Magnum
Passing vehicle:	Pedal cyclist
Mirrors	2003/97/EC
Driver	5th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m
Direct view - front window									✓	✓	✓
Direct view - side window											
Class II	✓	✓	✓	✓	✓						
Class IV	✓	✓	✓	✓	✓						
Class V					?	✓	✓				
Fresnel						?	?				
BDS				?	?	?					
Dobli						✓	✓				
Photo ID (P814....)	8113	8114	8115	8116	8117	8118	8119	8120	8121	8122	8123

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window									✓	✓	✓
Direct view - side window											
Class II											
Class IV	✓	✓	✓	?							
Class V					?	?	?				
Fresnel				?	✓	✓	✓	✓			
BDS	✓	✓	✓	✓	✓	?					
Dobli	?	?	✓	✓	✓	✓	?				
Photo ID (P814....)	8124	8125	8126	8127	8128	8129	8130	8131	8132	8133	8134

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position C	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m
Direct view - front window										✓	✓
Direct view - side window						✓	✓	✓			
Class II											
Class IV	✓	✓	?								
Class V											
Fresnel			?	✓	✓	✓	✓	✓	✓	?	
BDS	?	?	?	?	?						
Dobli	✓	✓	✓	✓	?						
Photo ID (P814....)	8135	8136	8137	8138	8139	8140	8141	8142	8143	8144	8145

Test Vehicle	V2 - Renault Magnum
Passing vehicle:	Pedal cyclist
Mirrors	2003/97/EC
Driver	95th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m
Direct view - front window									✓	✓	✓
Direct view - side window											
Class II	✓	✓	✓	✓	✓	?					
Class IV	✓	✓	✓	✓	✓						
Class V					?	✓	✓				
Fresnel						?	✓				
BDS			?	?	?	?					
Dobli					?	?	✓				
Photo ID (P814....)	7973	7974	7975	7976	7977	7978	7979	7980	7981	7982	7983

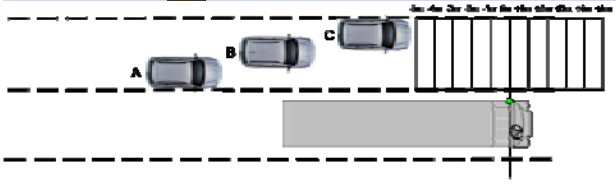
Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window									✓	✓	✓
Direct view - side window						?	?				
Class II											
Class IV	✓	✓	✓	✓	?						
Class V					?	?	?				
Fresnel				?	✓	✓	✓	✓			
BDS	?	✓	✓	✓	✓	✓	?				
Dobli	?	?	✓	✓	✓	✓	?				
Photo ID (P814....)	7984	7985	7986	7987	7988	7989	7990	7991	7992	7993	----

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position C	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m
Direct view - front window									?	✓	✓
Direct view - side window							✓	✓			
Class II											
Class IV	✓	?	?								
Class V											
Fresnel			?	✓	✓	✓	✓	✓	✓	?	
BDS	?	?	?	?	?						
Dobli	?	✓	✓	✓	?						
Photo ID (P814....)	7994	7995	7996	7997	7998	7999	8000	8001	8002	8003	8004

Key

*	Estimated coverage based on other measurements
✓	Clearly visible
?	Visible but could be missed with a quick glance

Bike length: 1.4m
Cyclist Height: 1.7m



Test Vehicle	V2 - Renault Magnum
Passing vehicle:	Pedestrian
Mirrors	71/127/EEC
Driver	5th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m
Direct view - front window								?	✓	✓	✓
Direct view - side window											
Class II	✓	✓	✓	✓	?						
Class IV	✓	✓	✓	✓							
Class V					?	✓					
Fresnel						?					
BDS				?	?	?					
Dobli					?	?					
Photo ID (P814....)	7684	7685	7686	7687	7688	7689	7690	7691	7692	7693	7694

Test Vehicle	V2 - Renault Magnum
Passing vehicle:	Pedestrian
Mirrors	71/127/EEC
Driver	95th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m
Direct view - front window								✓	✓	✓	✓
Direct view - side window											
Class II	✓	✓	✓	✓	✓						
Class IV	✓	✓	✓	✓							
Class V						✓	?				
Fresnel					?	?	?				
BDS				?	?	?					
Dobli					?	✓					
Photo ID (P814....)	7786	7787	7788	7789	7790	7791	7792	7793/94	7795	7796	7797

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window								?	✓	✓	✓
Direct view - side window						?	?				
Class II											
Class IV	✓	?									
Class V											
Fresnel				✓	✓	✓	✓	?			
BDS	✓	✓	✓	✓	✓						
Dobli	?	✓	✓	✓	✓						
Photo ID (P814....)	7696	7697	7698	7699	7700	7701	7702	7703	7704	7705	7706

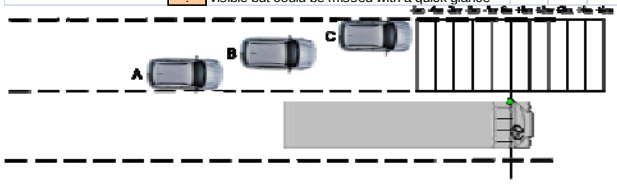
Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window								?	✓	✓	✓
Direct view - side window								✓	✓		
Class II											
Class IV	✓	?	?								
Class V											
Fresnel				✓	✓	✓	✓	✓			
BDS	?	?	✓	✓	✓	?					
Dobli	✓	✓	✓	✓	✓						
Photo ID (P814....)	7798	7799	7800	7801	7802	7803	7804	7805	7806	7807	7808

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position C	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m
Direct view - front window									✓	✓	✓
Direct view - side window					?	✓	✓				
Class II											
Class IV											
Class V											
Fresnel			✓	✓	✓	✓	✓	✓	✓		
BDS	?	?	?	?							
Dobli	✓	✓	✓	?							
Photo ID (P814....)	7707	7708	7709	7710	7711	7712	7713	7714	7715	7716	7717

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position C	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m
Direct view - front window									?	✓	✓
Direct view - side window					?	✓	✓	?			
Class II											
Class IV											
Class V											
Fresnel		?	?	✓	✓	✓	✓	✓	✓		
BDS	?	?	?	?							
Dobli	✓	✓	✓	?							
Photo ID (P814....)	7809	7810	7811	7812	7813	7814	7815	7816	7817	7818	7819

Key

*	Estimated coverage based on other measurements
✓	Clearly visible
?	Visible but could be missed with a quick glance



Pedestrian Height: 1.8m

Test Vehicle	V2 - Renault Magnum
Passing vehicle:	Pedestrian
Mirrors	2003/97/EC
Driver	5th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m
Direct view - front window								✓	✓	✓	✓
Direct view - side window											
Class II	✓	✓	✓	✓	?						
Class IV	✓	✓	✓	✓							
Class V					✓	✓					
Fresnel						?					
BDS				?	?	?					
Dobli					?	✓					
Photo ID (P814....)	8146	8147	8148	8149	8150	8151	8152	8153	8154	8155	8156

Test Vehicle	V2 - Renault Magnum
Passing vehicle:	Pedestrian
Mirrors	2003/97/EC
Driver	95th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m
Direct view - front window								✓	✓	✓	✓
Direct view - side window											
Class II	✓	✓	✓	✓	✓						
Class IV	✓	✓	✓	✓	?						
Class V					?	✓					
Fresnel						✓					
BDS			?	?	?						
Dobli						✓					
Photo ID (P814....)	8005	8006	8007	8008	8009	8010	8011	8012	8013	8014	8015

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window								✓	✓	✓	✓
Direct view - side window						?	?				
Class II											
Class IV	✓	✓	✓	?							
Class V					?	?					
Fresnel				✓	✓	✓	✓	✓			
BDS	✓	✓	✓	✓	✓	?					
Dobli	✓	✓	✓	✓	✓	?					
Photo ID (P814....)	8157	8158	8159	8160	8161	8162	8163	8164	8165	8166	8167

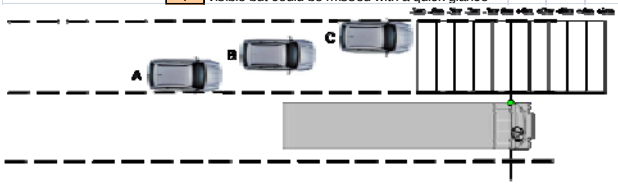
Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window								✓	✓	✓	✓
Direct view - side window									?	?	
Class II											
Class IV	✓	✓	✓	✓							
Class V						?	?				
Fresnel					✓	✓	✓	?			
BDS	✓	✓	✓	✓	✓						
Dobli	?	✓	✓	✓	✓	?					
Photo ID (P814....)	8016	8017	8018	8019	8020	8021	8022	8023	8024	8025	8026

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position C	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m
Direct view - front window										✓	✓
Direct view - side window						✓	✓	?			
Class II											
Class IV	✓	✓									
Class V											
Fresnel			✓	✓	✓	✓	✓	✓	✓	?	
BDS	?	?	?	?							
Dobli	✓	✓	✓	?							
Photo ID (P814....)	8168	6169/70	8171	8172	8173	8174	8175	8176	8177	8178	8179

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position C	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m
Direct view - front window									?	✓	✓
Direct view - side window					?	✓	✓	?			
Class II											
Class IV	✓	?									
Class V											
Fresnel			✓	✓	✓	✓	✓	✓	✓		
BDS	?	?	?	?							
Dobli	?	✓	✓	?							
Photo ID (P814....)	8027	8028	8029	8030	8031	8032	8033	8034	8035	8036	8037

Key

*	Estimated coverage based on other measurements
✓	Clearly visible
?	Visible but could be missed with a quick glance



Pedestrian Height: 1.8m

Test Vehicle	V3 - DAF XF 105
Passing vehicle	Large passenger car (Ford Mondeo)
Mirrors	71/127/EEC
Driver	5th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m
Direct view - front window											
Direct view - side window											
Class II	✓	✓	✓	✓	✓	✓	✓	?			
Class IV	✓	✓	✓	✓	✓	✓	✓	✓	?		
Class V						✓	✓	✓	✓	✓	?
Class VI											
Fresnel						✓	✓	✓	✓	✓	✓
Photo ID (P212....)	9817	9818	9819	9820	9821	9822	9823	9824	9825	9826	9827

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window											
Direct view - side window											
Class II											
Class IV	✓	✓	✓	✓	✓	✓	✓	?			
Class V											
Class VI											
Fresnel					?	✓	✓	✓	✓	✓	✓
Photo ID (P212....)	9828	9829	9830	9831	9832	9833	9834	9835	9836	9837	9838

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m
Direct view - front window											
Direct view - side window											
Class II											
Class IV	✓	✓	✓	✓	?	?					
Class V											
Class VI											
Fresnel				?	✓	✓	✓	✓	✓	✓	✓
Photo ID (P212....)	9839	9840	9841	9842	9843	9844	9845	9846	9847	9848	9849

Test Vehicle	V3 - DAF XF 105
Passing vehicle	Large passenger car (Ford Mondeo)
Mirrors	71/127/EEC
Driver	50th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m
Direct view - front window											
Direct view - side window											
Class II	✓	✓	✓	✓	✓	✓	✓	?			
Class IV	✓	✓	✓	✓	✓	✓	✓	?	?		
Class V						✓	✓	✓	✓	✓	?
Class VI											
Fresnel						✓	✓	✓	✓	✓	✓
Photo ID (P211....)	9522	9523	9524	9525	9527	9528	9529	9530	9531	9532	9533

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window											
Direct view - side window											
Class II											
Class IV	✓	✓	✓	✓	✓	✓	✓	?			
Class V											
Class VI											
Fresnel					?	✓	✓	✓	✓	✓	✓
Photo ID (P212....)	9534	9535	9536	9537	9538	9539	9540	9541	9542	9543	9544

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m
Direct view - front window											✓
Direct view - side window										?	?
Class II											
Class IV	✓	✓	✓	✓	✓	?	?				
Class V											
Class VI											
Fresnel					?	✓	✓	✓	✓	✓	✓
Photo ID (P212....)	9545	9546	9547	9548	9549	9550	9551	9552	9553	9554	9555

Test Vehicle	V3 - DAF XF 105
Passing vehicle	Large passenger car (Ford Mondeo)
Mirrors	71/127/EEC
Driver	95th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m
Direct view - front window											✓
Direct view - side window											
Class II	✓	✓	✓	✓	✓	?	?	?			
Class IV	✓	✓	✓	✓	✓	✓	✓	?			
Class V					?	✓	✓	✓	✓	✓	?
Class VI											
Fresnel					?	✓	✓	✓	✓	✓	✓
Photo ID (P211....)	9052	9053	9054	9055	9056	9057	9058	9059	9060	9061	9062

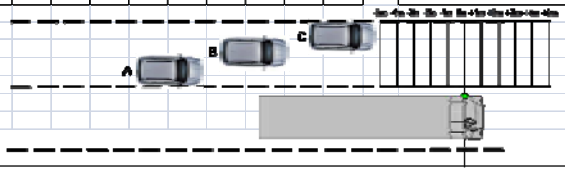
Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window											✓
Direct view - side window											?
Class II											
Class IV	✓	✓	✓	✓	✓	✓	?				
Class V											
Class VI											
Fresnel					?	✓	✓	✓	✓	✓	✓
Photo ID (P211....)	9063	9064	9065	9066	9067	9068	9069	9070	9071	9072	9073

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m
Direct view - front window											✓
Direct view - side window									✓	✓	✓
Class II											
Class IV	✓	✓	✓	✓	✓	?					
Class V											
Class VI											
Fresnel				?	✓	✓	✓	✓	✓	✓	✓
Photo ID (P211....)	9074	9075	9076	9077	9078	9079	9080	9081	9082	9083	9084

Key

*	Estimated coverage based on other measurements
✓	Clearly visible
?	Visible but could be missed with a quick glance
	Class VI not required under Directive 71/127/EEC

Vehicle length : 4.7m
Vehicle width : 1.9m
Vehicle height: 1.4m



Test Vehicle	V3 - DAF XF 105
Passing vehicle	Large passenger car (Ford Mondeo)
Mirrors	2003/97/EC
Driver	5th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m
Direct view - front window											
Direct view - side window											
Class II	✓	✓	✓	✓	✓	✓	✓	?			
Class IV	✓	✓	✓	✓	✓	✓	✓	✓	?		
Class V					✓	✓	✓	✓	✓	✓	?
Class VI								?	✓	✓	✓
Fresnel						✓	✓	✓	✓	✓	✓
Photo ID (P212....)	9578	9579	9580	9581	9582	9583	9584	9585	9586	9587	9588

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window											
Direct view - side window											
Class II	✓	✓	✓	✓	✓	?					
Class IV	✓	✓	✓	✓	✓	✓	✓	✓	?		
Class V					?	?	?	?	?	?	?
Class VI								?	✓	✓	✓
Fresnel					?	✓	✓	✓	✓	✓	✓
Photo ID (P212....)	9589	9590	9591	9592	9593	9594	9595	9596	9597	9598	9599

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m
Direct view - front window											
Direct view - side window											
Class II	?	?									
Class IV	✓	✓	✓	✓	✓	✓	✓	✓	?		
Class V											
Class VI									?	?	?
Fresnel				?	✓	✓	✓	✓	✓	✓	✓
Photo ID (P212....)	9600	9601	9602	9603	9604	9605	9606	9607	9608	9609	9610

Test Vehicle	V3 - DAF XF 105
Passing vehicle	Large passenger car (Ford Mondeo)
Mirrors	2003/97/EC
Driver	50th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m
Direct view - front window											
Direct view - side window											
Class II	✓	✓	✓	✓	✓	✓	✓	?			
Class IV	✓	✓	✓	✓	✓	✓	✓	✓	?		
Class V					?	✓	✓	✓	✓	✓	?
Class VI								?	✓	✓	✓
Fresnel						✓	✓	✓	✓	✓	✓
Photo ID (P211....)	9185	9186	9187	9188	9189	9190	9191	9192	9193	9194	9195

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window											?
Direct view - side window											
Class II	✓	✓	✓	✓	✓	?					
Class IV	✓	✓	✓	✓	✓	✓	✓	✓	?		
Class V					?	?	?	?	?		
Class VI								?	✓	✓	✓
Fresnel					?	✓	✓	✓	✓	✓	✓
Photo ID (P211....)	9197	9198	9199	9200	9201	9202	9203	9204	9205	9206	9207

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m
Direct view - front window											
Direct view - side window										?	?
Class II	?	?									
Class IV	✓	✓	✓	✓	✓	✓	✓	✓	?		
Class V											
Class VI									?	?	?
Fresnel				?	✓	✓	✓	✓	✓	✓	✓
Photo ID (P211....)	9208	9209	9210	9211	9212	9213	9214	9215	9216	9217	9218

Test Vehicle	V3 - DAF XF 105
Passing vehicle	Large passenger car (Ford Mondeo)
Mirrors	2003/97/EC
Driver	95th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m
Direct view - front window											✓
Direct view - side window											
Class II	✓	✓	✓	✓	✓	✓	✓	?			
Class IV	✓	✓	✓	✓	✓	✓	✓	✓	?		
Class V					?	✓	✓	✓	✓	✓	?
Class VI								?	✓	✓	✓
Fresnel					?	✓	✓	✓	✓	✓	✓
Photo ID (P211....)	8935	8936	8937	8938	8939	8940	8941	8942	8943	8944	8945

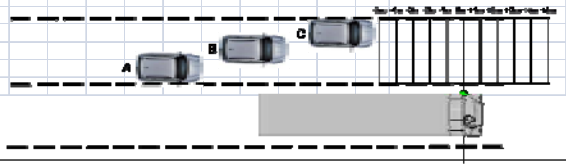
Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window											✓
Direct view - side window										?	?
Class II	✓	✓	✓	✓	?	?					
Class IV	✓	✓	✓	✓	✓	✓	✓	✓	?		
Class V					?	?	?	?	?	?	
Class VI								?	✓	✓	✓
Fresnel					?	✓	✓	✓	✓	✓	✓
Photo ID (P211....)	8947	8948	8949	8950	8951	8952	8953	8954	8955	8956	8957

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m	3.2m
Direct view - front window											✓
Direct view - side window									?	✓	✓
Class II	?	?									
Class IV	✓	✓	✓	✓	✓	✓	✓	?	?		
Class V											
Class VI									?	?	?
Fresnel				?	✓	✓	✓	✓	✓	✓	✓
Photo ID (P211....)	8959	8960	8961	8962	8963	8964	8965	8966	8967	8968	8969

Key

✓	Clearly visible
?	Visible but could be missed with a quick glance
	Class VI not required under Directive 71/127/EEC

Vehicle length : 4.7m
Vehicle width : 1.9m
Vehicle height: 1.4m



Test Vehicle	V3 - DAF XF 105
Passing vehicle	Small passenger car (Nissan Micra)
Mirrors	71/127/EEC
Driver	5th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m
Direct view - front window											
Direct view - side window											
Class II	✓	✓	✓	✓	✓	✓	?				
Class IV	✓	✓	✓	✓	✓	✓	✓	?			
Class V						✓	✓	✓	✓	?	
Class VI											
Fresnel						?	✓	✓	✓	✓	✓
Photo ID (P212....)	9784	9785	9786	9787	9788	9789	9790	9791	9792	9793	9794

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window											
Direct view - side window											
Class II											
Class IV	✓	✓	✓	✓	✓	?	?				
Class V								?	✓	✓	✓
Class VI											
Fresnel					?	✓	✓	✓	✓	✓	✓
Photo ID (P212....)	9795	9796	9797	9798	9799	9800	9801	9802	9803	9804	9805

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m
Direct view - front window											
Direct view - side window											
Class II											
Class IV	✓	✓	✓	✓	?	?					
Class V											
Class VI											
Fresnel				?	✓	✓	✓	✓	✓	✓	✓
Photo ID (P212....)	9806	9807	9808	9809	9810	9811	9812	9813	9814	9815	9816

Test Vehicle	V3 - DAF XF 105
Passing vehicle	Small passenger car (Nissan Micra)
Mirrors	71/127/EEC
Driver	50th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m
Direct view - front window											?
Direct view - side window											
Class II	✓	✓	✓	✓	✓	?					
Class IV	✓	✓	✓	✓	✓	✓	?	?			
Class V						✓	✓	✓	✓	?	
Class VI											
Fresnel						✓	✓	✓	✓	✓	?
Photo ID (P211....)	9490	9491	9492	9493	9494	9495	9496	-	9497	9498	9499

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window											?
Direct view - side window											
Class II											
Class IV	✓	✓	✓	✓	✓	✓	?				
Class V								?	✓	✓	✓
Class VI											
Fresnel					?	✓	✓	✓	✓	✓	✓
Photo ID (P211....)	9500	9501	9502	9503	9504	9505	9506	9507	9508	9509	9510

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m
Direct view - front window											
Direct view - side window										?	?
Class II											
Class IV	✓	✓	✓	✓	?	?					
Class V											
Class VI											
Fresnel					?	✓	✓	✓	✓	✓	✓
Photo ID (P211....)	9511	9512	9513	9514	9515	9516	9517	9518	9519	9520	9521

Test Vehicle	V3 - DAF XF 105
Passing vehicle	Small passenger car (Nissan Micra)
Mirrors	71/127/EEC
Driver	95th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m
Direct view - front window											✓
Direct view - side window											
Class II	✓	✓	✓	✓	✓	?					
Class IV	✓	✓	✓	✓	✓	✓	?	?			
Class V						✓	✓	✓	✓	?	
Class VI											
Fresnel						✓	✓	✓	✓	✓	✓
Photo ID (P211....)	9008	9009	9010	9011	9012	9013	9014	9015	9016	9017	9018

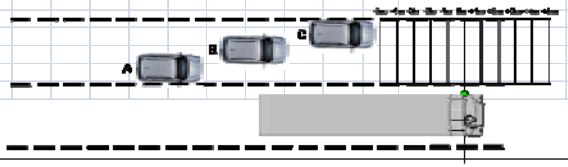
Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window											✓
Direct view - side window											
Class II											
Class IV	✓	✓	✓	✓	✓	✓	?				
Class V											
Class VI											
Fresnel					?	✓	✓	✓	✓	✓	✓
Photo ID (P211....)	9030	9031	9032	9033	9034	9035	9036	9037	9038	9039	9040

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m
Direct view - front window											✓
Direct view - side window										?	?
Class II											
Class IV	✓	✓	✓	✓	?	?					
Class V											
Class VI											
Fresnel				?	✓	✓	✓	✓	✓	✓	✓
Photo ID (P211....)	9041	9042	9043	9044	9045	9046	9047	9048	9049	9050	9051

Key

✓	Clearly visible
?	Visible but could be missed with a quick glance
	Class VI not required under Directive 71/127/EEC

Vehicle length : 3.7m
Vehicle width : 1.6m
Vehicle height: 1.4m



Test Vehicle	V3 - DAF XF 105
Passing vehicle	Small passenger car (Nissan Micra)
Mirrors	2003/97/EC
Driver	5th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m
Direct view - front window											
Direct view - side window											
Class II	✓	✓	✓	✓	✓	✓	?				
Class IV	✓	✓	✓	✓	✓	✓	✓	✓			
Class V				?	✓	✓	✓	✓	✓	✓	
Class VI								✓	✓	✓	✓
Fresnel						?	✓	✓	✓	✓	✓
Photo ID (P212....)	9612	9613	9614	9615	9616	9617	9618	9619	9620	9621	9622

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window											
Direct view - side window											
Class II	✓	✓	?	?	?						
Class IV	✓	✓	✓	✓	✓	✓	✓	?	?		
Class V					?	?	?	?	?	?	
Class VI								?	✓	✓	✓
Fresnel					?	✓	✓	✓	✓	✓	✓
Photo ID (P212....)	9623	9624	9625	9626	9627	9628	9629	9630	9631	9632	9633

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m
Direct view - front window											
Direct view - side window											
Class II											
Class IV	✓	✓	✓	✓	✓	✓	?	?			
Class V											
Class VI								?	?	?	?
Fresnel				?	✓	✓	✓	✓	✓	✓	✓
Photo ID (P212....)	9634	9635	9636	9637	9638	9639	9640	9641	9642	9643	9644

Test Vehicle	V3 - DAF XF 105
Passing vehicle	Small passenger car (Nissan Micra)
Mirrors	2003/97/EC
Driver	50th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m
Direct view - front window											?
Direct view - side window											
Class II	✓	✓	✓	✓	✓	✓	?				
Class IV	✓	✓	✓	✓	✓	✓	✓	✓			
Class V					?	✓	✓	✓	✓	✓	
Class VI								?	✓	✓	✓
Fresnel						✓	✓	✓	✓	✓	?
Photo ID (P211....)	9152	9153	9154	9155	9156	9157	9158	9159	9160	9161	9162

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window											?
Direct view - side window											
Class II	✓	✓	✓	?							
Class IV	✓	✓	✓	✓	✓	✓	✓	?	?		
Class V					?	?	?	?	?		
Class VI								?	✓	✓	✓
Fresnel					?	✓	✓	✓	✓	✓	✓
Photo ID (P211....)	9163	9164	9165	9166	9167	9168	9169	9170	9171	9172	9173

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m
Direct view - front window											?
Direct view - side window										?	?
Class II											
Class IV	✓	✓	✓	✓	✓	✓	✓	?			
Class V											
Class VI								?	?	?	?
Fresnel					?	✓	✓	✓	✓	✓	✓
Photo ID (P211....)	9174	9175	9176	9177	9178	9179	9180	9181	9182	9183	9184

Test Vehicle	V3 - DAF XF 105
Passing vehicle	Small passenger car (Nissan Micra)
Mirrors	2003/97/EC
Driver	95th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m	1.3m
Direct view - front window											✓
Direct view - side window											
Class II	✓	✓	✓	✓	✓	✓	?				
Class IV	✓	✓	✓	✓	✓	✓	✓	✓			
Class V					?	✓	✓	✓	✓		
Class VI								?	✓	✓	✓
Fresnel						✓	✓	✓	✓	✓	✓
Photo ID (P211....)	8971	8972	8973	8974	8975	8976	8977	8978	8979	8980	8981

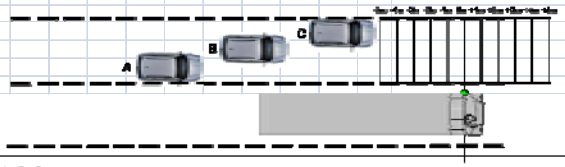
Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window											✓
Direct view - side window										?	
Class II	✓	✓	✓	?							
Class IV	✓	✓	✓	✓	✓	✓	✓	?			
Class V					?	?	?	?	?		
Class VI								?	✓	✓	✓
Fresnel					?	✓	✓	✓	✓	✓	✓
Photo ID (P211....)	8983	8984	8985	8986	8988	8989	8990	8991	8992	8993	8994

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m	3.4m
Direct view - front window											✓
Direct view - side window										?	?
Class II	?										
Class IV	✓	✓	✓	✓	✓	✓	✓	?			
Class V					?	?	?	?			
Class VI									?	?	?
Fresnel				?	✓	✓	✓	✓	✓	✓	✓
Photo ID (P211....)	8996	8997	8998	8999	9000	9001	9002	9003	9004	9005	9006

Key

✓	Clearly visible
?	Visible but could be missed with a quick glance
	Class VI not required under Directive 71/127/EEC

Vehicle length :	3.7m
Vehicle width :	1.6m
Vehicle height	1.4m



Test Vehicle	V3 - DAF XF 105
Passing vehicle	Pedal cyclist
Mirrors	71/127/EEC
Driver	5th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m
Direct view - front window										✓	✓
Direct view - side window											
Class II	✓	✓	✓	✓	?						
Class IV	✓	✓	✓	✓	✓	?					
Class V						✓	✓				
Class VI											
Fresnel						?	✓	?			
Photo ID (P212....)	9714	9715	9716	9717	9718	9719	9720	9721	9722	9723	9724

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window										✓	✓
Direct view - side window								?			
Class II											
Class IV	✓	✓	✓	?							
Class V											
Class VI											
Fresnel					?	✓	✓	✓	✓		
Photo ID (P212....)	9725	9726	9727	9728	9729	9730	9731	9732	9733	9734	9735

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m
Direct view - front window										?	✓
Direct view - side window							?	✓			
Class II											
Class IV	✓	?									
Class V											
Class VI											
Fresnel				?	✓	✓	✓	✓	✓	✓	?
Photo ID (P212....)	9736	9737	9738	9739	9740	9741	9742	9743	9744	9745	9746

Test Vehicle	V3 - DAF XF 105
Passing vehicle	Pedal cyclist
Mirrors	71/127/EEC
Driver	50th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m
Direct view - front window									?	✓	✓
Direct view - side window											
Class II	✓	✓	✓	✓	?						
Class IV	✓	✓	✓	✓	✓	?					
Class V					?	✓	✓				
Class VI											
Fresnel						?	✓	?			
Photo ID (P211....)	9423	9424	9425	9426	9427	9428	9429	9430	9431	9432	9433

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window										✓	✓
Direct view - side window								?			
Class II											
Class IV	✓	✓	✓	✓	?						
Class V											
Class VI											
Fresnel					?	✓	✓	✓	✓	?	
Photo ID (P211....)	9434	9435	9436	9437	9438	9439	9440	9441	9442	9443	9444

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m
Direct view - front window										✓	✓
Direct view - side window							✓	✓	?		
Class II											
Class IV	✓	✓	✓	?							
Class V											
Class VI											
Fresnel				?	✓	✓	✓	✓	✓	✓	
Photo ID (P211....)	9445	9446	9447	9448	9449	9450	9451	9452	9453	9454	9455

Test Vehicle	V3 - DAF XF 105
Passing vehicle	Pedal cyclist
Mirrors	71/127/EEC
Driver	95th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m
Direct view - front window									✓	✓	✓
Direct view - side window											
Class II	✓	✓	✓	✓	?						
Class IV	✓	✓	✓	✓	✓	?					
Class V						✓	✓				
Class VI											
Fresnel						?	✓	✓			
Photo ID (P211....)	9085	9086	9087	9088	9089	9090	9091	9092	9093	9094	9095

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window									?	✓	✓
Direct view - side window							?	✓			
Class II											
Class IV	✓	✓	✓	✓	?						
Class V											
Class VI											
Fresnel					?	✓	✓	✓	✓	✓	
Photo ID (P211....)	9096	9097	9098	9099	9100	9101	9102	9103	9104	9105	9106

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m
Direct view - front window										✓	✓
Direct view - side window							✓	✓	?		
Class II											
Class IV	✓	✓	✓								
Class V											
Class VI											
Fresnel				?	✓	✓	✓	✓	✓	✓	
Photo ID (P211....)	9107	9108	9109	9110	9111	9112	9113	9114	9115	9116	9117

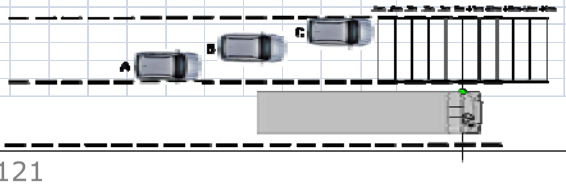
Key

✓ Clearly visible

? Visible but could be missed with a quick glance

Class VI not required under Directive 71/127/EEC

Bike length: 1.4m
Cyclist Height: 1.7m



Test Vehicle	V3 - DAF XF 105
Passing vehicle	Pedal cyclist
Mirrors	2003/97/EC
Driver	5th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m
Direct view - front window										✓	✓
Direct view - side window											
Class II	✓	✓	✓	✓	✓						
Class IV	✓	✓	✓	✓	✓	✓					
Class V					?	✓	✓	?			
Class VI								✓	?		
Fresnel						?	✓	?			
Photo ID (P212....)	9645	9646	9647	9648	9650	9651	9652	9653	9654	9655	9656

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window										✓	✓
Direct view - side window								?			
Class II	✓	✓	✓	✓	✓	?					
Class IV					?	?					
Class V											
Class VI									?	?	
Fresnel					?	✓	✓	✓	✓		
Photo ID (P212....)	9657	9658	9659	9660	9661	9662	9663	9664	9665	9666	9667

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m
Direct view - front window										?	✓
Direct view - side window							?	✓			
Class II											
Class IV	✓	✓	✓	✓	?	?					
Class V											
Class VI											
Fresnel				?	✓	✓	✓	✓	✓	✓	?
Photo ID (P212....)	9668	9669	9670	9671	9672	9673	9674	9675	9676	9677	9678

Test Vehicle	V3 - DAF XF 105
Passing vehicle	Pedal cyclist
Mirrors	2003/97/EC
Driver	50th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m
Direct view - front window									?	✓	✓
Direct view - side window											
Class II	✓	✓	✓	✓	✓						
Class IV	✓	✓	✓	✓	✓	✓					
Class V					?	✓	✓	?			
Class VI								✓	?		
Fresnel						?	✓	?			
Photo ID (P211....)	9219	9220	9221	9222	9223	9224	9225	9226	9227	9228	9229

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window										✓	✓
Direct view - side window								?			
Class II	?										
Class IV	✓	✓	✓	✓	✓	✓					
Class V					?	?					
Class VI									?	?	
Fresnel					?	✓	✓	✓	✓	?	
Photo ID (P211....)	9230	9231	9232	9233	9234	9235	9236	9237	9238	9239	9240

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m
Direct view - front window										✓	✓
Direct view - side window							✓	✓	?		
Class II											
Class IV	✓	✓	✓	✓	✓	?					
Class V											
Class VI											
Fresnel					?	✓	✓	✓	✓	✓	✓
Photo ID (P211....)	9241	9242	9243	9244	9245	9246	9247	9248	9249	9250	9251

Test Vehicle	V3 - DAF XF 105
Passing vehicle	Pedal cyclist
Mirrors	2003/97/EC
Driver	95th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m
Direct view - front window									✓	✓	✓
Direct view - side window											
Class II	✓	✓	✓	✓	✓						
Class IV	✓	✓	✓	✓	✓	✓					
Class V					?	✓	✓	?			
Class VI								✓	✓		
Fresnel						?	✓	✓			
Photo ID (P211....)	8901	8902	8903	8904	8905	8906	8907	8908	8909	8910	8911

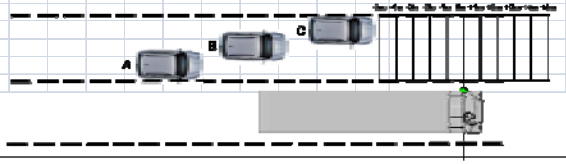
Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window									?	✓	✓
Direct view - side window							?	✓			
Class II											
Class IV	✓	✓	✓	✓	✓	?					
Class V						?					
Class VI									?	?	
Fresnel					?	✓	✓	✓	✓		
Photo ID (P211....)	8912	8913	8914	8915	8916	8917	8918	8919	8920	8921	8922

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m
Direct view - front window										?	✓
Direct view - side window							✓	✓	?		
Class II											
Class IV	✓	✓	✓	✓	?	?					
Class V											
Class VI											
Fresnel				?	✓	✓	✓	✓	✓	✓	?
Photo ID (P211....)	8923	8924	8925	8926	8927	8928	8929	8930	8931	8932	8933

Key

✓	Clearly visible
?	Visible but could be missed with a quick glance
	Class VI not required under Directive 71/127/EEC

Bike length: 1.4m
Cyclist Height: 1.7m



Test Vehicle	V3 - DAF XF 105
Passing vehicle	Pedestrian
Mirrors	71/127/EEC
Driver	5th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m
Direct view - front window									?	✓	✓
Direct view - side window											
Class Ⅱ	✓	✓	✓	?							
Class IV	✓	✓	✓	✓	✓	?					
Class V					?	✓	?				
Class VI											
Fresnel						✓	✓				
Photo ID (P212....)	9747	9748	9749	9750	9751	9752	9753	9754	9755	9756	9757
Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window									✓	✓	✓
Direct view - side window							?				
Class Ⅱ											
Class IV	✓	✓	✓	?							
Class V											
Class VI											
Fresnel					✓	✓	✓	✓	?		
Photo ID (P212....)	9758	9759	9760	9761	9762	9763	9764	9765	9766	9767	9768
Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m
Direct view - front window										✓	✓
Direct view - side window							✓	?			
Class Ⅱ											
Class IV	✓	?									
Class V											
Class VI											
Fresnel				?	✓	✓	✓	✓	✓	?	
Photo ID (P212....)	9769	9770	9771	9772	9773	9774	9775	9776	9777	9778	9779

Test Vehicle	V3 - DAF XF 105
Passing vehicle	Pedestrian
Mirrors	71/127/EEC
Driver	50th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m
Direct view - front window									✓	✓	✓
Direct view - side window											
Class Ⅱ	✓	✓	✓	?							
Class IV	✓	✓	✓	✓	✓	?					
Class V					?	✓	?				
Class VI											
Fresnel						✓	✓				
Photo ID (P211....)	9456	9457	9458	9459	9460	9461	9462	9463	9464	9465	9466
Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window									✓	✓	✓
Direct view - side window							?				
Class Ⅱ											
Class IV	✓	✓	✓	✓							
Class V											
Class VI											
Fresnel				✓	✓	✓	✓	?			
Photo ID (P211....)	9467	9468	9469	9470	9471	9472	9473	9474	9475	9476	9477
Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m
Direct view - front window										✓	✓
Direct view - side window							✓	✓			
Class Ⅱ											
Class IV	✓	✓	✓								
Class V											
Class VI											
Fresnel				?	✓	✓	✓	✓	✓	?	
Photo ID (P211....)	9478	9479	9480	9481	9482	9483	9484	9485	9486	9487	9488

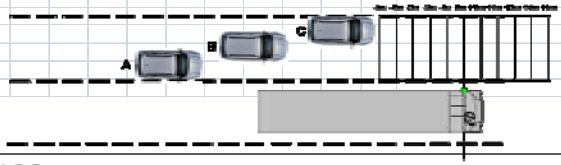
Test Vehicle	V3 - DAF XF 105
Passing vehicle	Pedestrian
Mirrors	71/127/EEC
Driver	95th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m
Direct view - front window								?	✓	✓	✓
Direct view - side window											
Class Ⅱ	✓	?	?								
Class IV	✓	✓	✓	✓	?						
Class V					?	✓	?				
Class VI											
Fresnel						✓	✓				
Photo ID (P211....)	9118	9119	9120	9121	9122	9123	9124	9125	9126	9127	9128
Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window									✓	✓	✓
Direct view - side window						?	✓	?			
Class Ⅱ											
Class IV	✓	✓	✓	✓							
Class V											
Class VI											
Fresnel					✓	✓	✓	✓	?		
Photo ID (P211....)	9129	9130	9131	9132	9133	9134	9135	9136	9137	9138	9139
Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m
Direct view - front window									✓	✓	✓
Direct view - side window							✓	?			
Class Ⅱ											
Class IV	✓	✓	?								
Class V											
Class VI											
Fresnel				?	✓	✓	✓	✓	✓	?	
Photo ID (P211....)	9140	9141	9142	9143	9144	9145	9146	9147	9148	9149	9150

Key

✓	Clearly visible
?	Visible but could be missed with a quick glance
	Class VI not required under Directive 71/127/EEC

Pedestrian Height: 1.8m



Test Vehicle	V3 - DAF XF 105
Passing vehicle	Pedestrian
Mirrors	2003/97/EC
Driver	5th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m
Direct view - front window									?	✓	✓
Direct view - side window											
Class II	✓	✓	✓	✓	✓						
Class IV	✓	✓	✓	✓	✓	✓					
Class V					✓	✓	✓				
Class VI							?	✓	?		
Fresnel						✓	✓				
Photo ID (P212....)	9679	9680	9681	9682	9683	9684	9685	9686	9687	9689	9690

Test Vehicle	V3 - DAF XF 105
Passing vehicle	Pedestrian
Mirrors	2003/97/EC
Driver	50th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m
Direct view - front window									✓	✓	✓
Direct view - side window											
Class II	✓	✓	✓	✓	✓						
Class IV	✓	✓	✓	✓	✓	✓					
Class V					✓	✓	✓				
Class VI							?	✓	?		
Fresnel						✓	✓				
Photo ID (P211....)	9252	9253	9254	9255	9256	9257	9258	9259	9260	9261	9262

Test Vehicle	V3 - DAF XF 105
Passing vehicle	Pedestrian
Mirrors	2003/97/EC
Driver	95th %

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position A	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m	0.5m
Direct view - front window								?	✓	✓	✓
Direct view - side window											
Class II	✓	✓	✓	✓	?						
Class IV	✓	✓	✓	✓	✓	?					
Class V					✓	✓	✓				
Class VI								✓	?		
Fresnel							✓	✓			
Photo ID (P211....)	8866	8867	8868	8869	8870	8871	8872	8873	8874	8875	8876

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window									✓	✓	✓
Direct view - side window							?				
Class II											
Class IV	✓	✓	✓	✓	✓	?					
Class V					?						
Class VI								?	?		
Fresnel					✓	✓	✓	✓	?		
Photo ID (P212....)	9691	9692	9693	9694	9695	9696	9697	9698	9699	9700	9701

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window									✓	✓	✓
Direct view - side window							?				
Class II											
Class IV	✓	✓	✓	✓	✓	?					
Class V					?						
Class VI								?	?		
Fresnel					✓	✓	✓	✓	?		
Photo ID (P211....)	9263	9264	9265	9266	9267	9268	9269	9270	9271	9272	9273

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window										✓	✓
Direct view - side window							✓	✓			
Class II											
Class IV	✓	✓	✓	✓	?						
Class V											
Class VI											
Fresnel				?	✓	✓	✓	✓	✓	?	
Photo ID (P211....)	9274	9275	9276	9277	9278	9279	9280	9281	9282	9283	9284

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position B	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m	2.4m
Direct view - front window									✓	✓	✓
Direct view - side window					?	✓	?				
Class II											
Class IV	✓	✓	✓	✓	?						
Class V											
Class VI											
Fresnel				?	✓	✓	✓	✓	?		
Photo ID (P211....)	8878	8879	8880	8881	8882	8883	8884	8885	8886	8887	8888

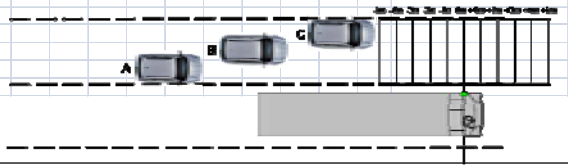
Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m
Direct view - front window										✓	✓
Direct view - side window							✓	?			
Class II											
Class IV	✓	✓	✓	✓	?						
Class V											
Class VI											
Fresnel				✓	✓	✓	✓	✓	✓	?	
Photo ID (P212....)	9702	9703	9704	9705	9706	9707	9708	9709	9710	9711	9712

Logitudinal Position	-5m	-4m	-3m	-2m	-1m	0m	+1m	+2m	+3m	+4m	+5m
Lateral Position	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m	4.2m
Direct view - front window										✓	✓
Direct view - side window							✓	✓			
Class II											
Class IV	✓	✓	✓	✓	?						
Class V											
Class VI											
Fresnel				?	✓	✓	✓	✓	✓	?	
Photo ID (P211....)	8890	8891	8892	8893	8894	8895	8896	8897	8898	8899	8900

Key

✓	Clearly visible
?	Visible but could be missed with a quick glance
	Class VI not required under Directive 71/127/EEC

Pedestrian Height: 1.8m



Follow up study to the heavy goods vehicle blind spot modelling and reconstruction trial

Heavy Goods Vehicles (HGVs) manufactured since January 2006 must be fitted with rear-view mirrors that conform to the requirements of Directive 2003/97/EC. Until recently vehicles manufactured before 2006 have been required to meet the older and less stringent requirements of Directive 71/127/EEC. Since the 31st March 2009, Directive 2007/38/EC requires all N2 and N3 class vehicles manufactured since 1st January 2000 to be equipped, on the passenger side, with wide-angle and close-proximity mirrors which fulfil the requirements for Directive 2003/97/EC.

This report describes the findings of study by TRL to investigate the direct and indirect field of vision from three HGVs and to identify areas alongside each vehicle where a passenger car or a vulnerable road user could be hidden in a blind spot. Three supplementary devices (a BDS mirror, a Dobli mirror and a Fresnel lens) were then added to the vehicles and measurements taken to identify the ground plane field of vision offered by each device, and to identify how effective each device was at eliminating the potential blind spots.

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