FORS
FLEET OPERATOR
RECOGNITION SCHEME

Fleet Operator Recognition Scheme Vehicle Safety Guide

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Contents

Revision history

Date	Requirement	Section	Summary of changes
07/11/2019	Silver S6	In-cab audible warning system	Clarification that proximity sensors that activate with leftturn indicator or turn off at speed are compliant with FORS Silver requirement S6
27/10/2021	NA	FORS Associate equipment providers	Update of providers
01/07/2022	NA	Various	Update to align with FORS Standard version 6
24/11/2023	S6	FORS Silver vehicle requirements	Update to include moving off information and blind spot information systems
24/11/2023	NA	FORS Associate equipment providers	Removed table

There are no material changes to vehicle safety equipment requirements between the FORS Standard version 5.1i and version 6.

Disclaimer

Please note that all information provided is correct at the time of publication. This guide should be used as a reference document to support operators to fit the correct types of equipment to meet the FORS Standard.

The guide makes reference to FORS Associates who offer relevant offers and discounts to FORS operators but other equipment providers are available. It remains the responsibility of the operator to choose the best equipment for their operation to meet the requirements of the Standard. This document has been created solely to increase awareness on the type and availability of products. For further information on any product, please contact the manufacturer or supplier directly.

Terminology

Shall – to indicate an element that is mandatory to demonstrate the requirement has been met

Should – to indicate an element that is recommended as emerging practice

May – to indicate an element that is optional or an emerging best practice

Blind spots – areas around a vehicle which are neither directly nor indirectly visible by the driver

Blind spot minimisation – the complete elimination or reduction as far as practical and possible of blind spots using a combination of direct and indirect vision aids

Direct vision – direct vision is what the driver can see through windows rather than using mirrors or cameras

Devices for indirect vision – devices to observe the traffic area adjacent to the vehicle which cannot be observed by direct vision. These can be conventional mirrors, camera monitors or other devices able to present information about the indirect field of vision to the driver

FORS Associate – an associate is a person, organisation, company or business that provides an exclusive offer/discount on products and services aligned to the requirements of the FORS Standard

FORS operator – an individual or organisation that operates one or more vehicles as part of their business or work activity and is accredited to the FORS Standard

Heavy good vehicle (HGV) – a goods vehicle over 3.5 tonnes gross vehicle weight

Indirect vision – what a driver can see through mirrors and cameras rather than the vehicle windows

Side under-run protection – lateral guards which can be fitted between vehicle axles to minimise the severity of side under-run collisions, also known as sideguards

Vehicle manoeuvring warnings for VRUs – enhanced audible warnings to alert other road users to a left turning, right turning or reversing vehicle

Vehicle near-side – the side of the vehicle nearest to the kerb in the forward parked/ driving condition

Vehicle off-side – the side of the vehicle furthest from the kerb in the forward parked/ driving condition

Vehicle safety equipment – equipment which assists the driver in seeing or detecting other road users or obstacles and also reduces the incidence and severity of collisions, particularly with vulnerable road users (VRUs). This type of equipment can be fitted by vehicle manufacturers, dealers or retrofitted

Vulnerable road user (VRU) – road users that require extra care such as cyclists, pedestrians, powered twowheeler (P2W) riders, horse riders

Warning signage – prominent signage used to warn vulnerable road users (VRUs) not to get too close to vehicles when stationary (not parked) or in motion

1. Introduction

Purpose of this guide

This guide is designed to help you meet the vehicle safety equipment requirements of the FORS Standard version 6. It provides guidance on each requirement including the equipment that can be used, advice on the specification that this equipment should meet and who can provide this equipment.

The specific FORS Standard requirements for vehicle safety equipment are:

- Bronze V6 – Vehicle safety equipment
- Silver S6 – Vehicle safety equipment
- Gold G3 – Sustainable operations

This guide is structured as follows:

- Section 2 outlines where the safety equipment shall be installed on a right-hand drive vehicle
- Section 3 outlines the FORS Bronze vehicle requirements, the equipment that shall be fitted, and which vehicles it applies to
- Section 4 outlines the FORS Silver vehicle requirements, the equipment that shall be fitted, and what vehicles it applies to
- Section 5 outlines the FORS Gold vehicle requirements relating to S6
- Section 6 outlines which FORS Associates can supply the equipment for each requirement
- Section 7 outlines further information about equipment specification and installation

What vehicles are subject to the requirements?

The FORS Standard requirements (Bronze V6, Silver S6 and Gold G3) stipulate that:

- Blind spot warning signage and safety equipment at Bronze V6 apply to larger vehicles. Blind spot warning signage applies to all HGVs and vehicles designed to carry more than16 passengers. Side under-run protection and close-proximity mirrors apply to all HGVs, unless defined as exempt in the Safer Lorry Scheme Traffic Regulation Order
- Enhanced vulnerable road user safety equipment at Silver S6 applies to all HGVs
- Camera systems and in-cab display screens for blind spot vision aids at Gold G3 apply to all HGVs irrespective of age

Who should read this guide?

This guide is aimed at:

- Individuals within fleet operating organisations who are directly involved or have a professional interest in the decision-making process for vehicle safety equipment
- Those responsible for ensuring that their fleet meets the requirements of the FORS Standard
- Individuals in client organisations responsible for setting up and carrying out compliance checking processes
- Safety equipment manufacturers / providers so they can see the specification their equipment will need to meet

What are the benefits of fitting vehicle safety equipment?

The main benefits of fitting vehicle safety equipment include:

- Improving drivers' ability to see or detect vulnerable road users (VRUs), other road users and obstacles
- Warning VRUs of dangers of being in close proximity to vehicles
- Warning VRUs and other road users of a vehicle's manoeuvre
- Reducing the incidence and potential severity of collisions
- Potential to assist collision investigations and counter fraudulent insurance claims

Driver training

Drivers must be made aware of the importance of each piece of equipment and the purpose for which it has been installed.

They should be trained in the correct use of the equipment, and recognise that activation and deactivation of the system – where it might be applicable, appropriate or necessary - is an integral part of their job. Bronze requirement V2 of the FORS Standard stipulates that FORS operators shall have a daily walkaround check and defect reporting procedure in place for all vehicles, trailers and specialist equipment. In particular, this shall cover the serviceability of vehicle safety equipment.

2. Vehicle safety equipment requirements

This section will help identify which safety equipment shall be installed to help you meet the FORS vehicle safety requirements. It outlines where the safety equipment shall be fitted and gives a pictorial representation of a right-hand drive vehicle which complies with the FORS vehicle safety equipment requirements.

<table>
<tr><th colspan="4">Bronze</th></tr>
<tr><th colspan="4">V6 – Vehicle safety equipment</th></tr>
<tr><th colspan="2">Close proximity mirrors</th><th>Side under-run protection</th><th>Blind spot warning signage</th></tr>
<tr><td>Class V mirror</td><td>Class VI mirror</td><td>Side under-run</td><td>Warning signage and markings</td></tr>
<tr><td colspan="2">Shall be fitted to all HGVs:
• Where they can bemounted with no part of the mirror being two metres from the ground, regardless of the adjustment position
• In such a way that they areappropriately adjusted and fully visible from the driving position
Close-proximity mirror field of view may be achieved using a camera monitoring system.</td><td>Shall be fitted to all HGVs, to both sides of the vehicle:
• Unless defined as exempt in the Safer Lorry Scheme Traffic Regulation Order
• Unless the shape and characteristics of the vehicle mean that it meets the requirements for side underrun protection</td><td>Shall be fitted to all HGVs and vehicles designed to carry more than 16 passengers:
• Prominently to the rear of the vehicle
• To visually warn other road users of the near-side close proximity blind spot hazard
• So as not to cause offence to other road users
• So they are clearly visible to other road users
For a tractor trailer and drawbar combination vehicle, blind spot warning signage shall be fitted to the rear of the trailer.</td></tr>
</table>

<table>
<tr><th colspan="5">Silver*</th></tr>
<tr><th colspan="5">S6 – Vehicle safety equipment</th></tr>
<tr><th colspan="2">Audible warning systems – Vehicle manoeuvring warning for VRUs</th><th colspan="3">Blind spot vision aids</th></tr>
<tr><td>Reversing system</td><td>Left-turn system</td><td>Camera system</td><td>In-cab display screen</td><td>In-cab audible warning system – Close proximity sensor and driver audible alert</td></tr>
<tr><td colspan="2">An audible system that warns other road users of a left-turn and reversing vehicle manoeuvre shall be fitted. The system:
• Shall activate when the leftturn indicator is engaged and reverse gear is selected
• Should be fitted with a manual switch to mute the sound when required, such as operating between 23:30 and 07:00 in urban areas
• May be supplemented with a visual warning to vulnerable road users</td><td colspan="3">Shall be fitted to all HGVs and shall include:
• A camera system that monitors the near-side vehicle blind spot
• An in-cab display screen to provide the driver with a view of the near-sideblind spot
• A close proximity sensor and driver audible alert system to alert the driver of other road users in the near-side blind spot
Where the driver has full view of the near-side blind spot area by direct vision, such as a left-hand drive vehicle, the camera system and in-cab display screen are not required.
Rigid goods vehicles over 7.5 tonnes gross vehicle weight shall be fitted with a camera system that monitors the rear vehicle blind spot. A camera system may also be fitted to the rear of trailers.
A tolerance in the number of vehicles fitted with camera system may be accepted for vehicles registered before 1 January 2015 where there is not a contractual or permit requirement. If this tolerance is permitted, older vehicles not fitted with camera systems shall be fitted with an alternative blind spot vision aid such as Fresnel Lens.</td></tr>
</table>

Gold**
G3 – Sustainable operations
Where a tolerance has been accepted at Silver requirement S6 to allow for older vehicles in the fleet replacement cycle, all HGVs at Gold requirement G3 (irrespective of age) shall be fitted with: • A camera system that monitors the near-side vehicle blind spot • An in-cab display screen to provide the driver with a view of the near-side blind spot However, fitment of blind spot vision aids for vehicles registered before 1 January 2015 may be planned and evidenced in line with the operator's fleet replacement cycle. This must be fully justified at audit.

* FORS Silver operators shall maintain the FORS Bronze vehicle safety requirement V6

** FORS Gold operators shall maintain the FORS Bronze and Silver vehicle safety requirements V6 and S6

3. FORS Bronze vehicle requirements

V6 - Vehicle safety equipment

Requirement

To fit larger vehicles with safety equipment that helps protect vulnerable road users.

Equipment and guidance

Blind spot warning signage

HGVs and vehicles designed to carry more than 16 passengers shall be fitted with bind spot warning signage.

Signage shall be fitted prominently to the rear of the vehicle, warning the vulnerable road user of the potential danger and advising people to take appropriate action.

For a tractor trailer and drawbar combination vehicle, blind spot warning signage shall be fitted to the rear of the trailer. Although not a FORS requirement, warning signage may be fitted to the rear of tractor units.

FORS guidance is that the signage should warn of the hazard and advise other road users to take appropriate action, for example 'Blind spot – Take Care'.

There are three types of signage: 'warning', 'instructional' and 'offensive'. FORS guidance is that all existing 'Cyclists Stay Back' warning signs should be replaced with the FORS approved signage, which has been designed in conjunction with the cycling community. 'Cyclists Stay Back' signage fitted to vehicles will result in a Minor Action Point at FORS audit.

Offensive signage fitted to vehicles will result in a Major Action Point at FORS audit. Failure to remove such signage will result in suspension from FORS until it is removed or replaced.

Warning signage shall be prominent, clean and clearly visible to the road user.

Warning signage shall be A4 or equivalent size unless this is not practical in which case an appropriately sized warning sign may be used instead. Signage of A4 (210mm x 297mm) and also landscape (420mm x 148mm) dimensions can be ordered via the FORS website. Artwork can also be downloaded and given to a printer of your choice.

Where it is impractical to display this signage on the rear of the vehicle (e.g. obstruction caused by beaver-tail or similar), the signage should be placed in a prominent position clearly visible to cyclists and other road users.

Vehicles of 3.5 tonnes gross vehicle weight and under (such as vans) do not need to be equipped with warning signage unless the operator is contractually obliged to do so. However, if the vans already display the warning signage and markings then there is no need to remove them.

Illuminated panels or LED warning signs may also be fitted at the rear of the vehicle to alert cyclists to the blind spot on a heavy goods vehicle. Panels can flash in conjunction with the directional indicators, and only operate when the vehicle is stationary (not parked) or manoeuvring below 15 mph.

As LED warning signs are illuminated they can be read at night. Some types of LED warning signage are reprogrammable and will allow you to change the warning message as required.

Side under-run protection

FORS operators shall ensure that all HGVs are fitted with side under-run protection, and that it is fitted on both sides of the vehicle. Side under-run protection shall be fitted:

- Unless defined as exempt in the Safer Lorry Scheme Traffic Regulation Order
- Unless the shape and characteristics of the vehicle mean that it meets the requirements for side under-run protection

Side under-run protection can be...

Figure 2: Side under-run protection

...achieved by the fitment of sideguards, ancillary devices (fuel tank, locker box etc.) and/or vehicle design.

Sideguards should be specified when procuring a vehicle and are commonly fitted during the bodybuilding stage.

Sideguards shall also be retrofitted to some existing vehicles where they are not fitted. Commercial vehicle bodybuilders are able to supply and install sideguards to new, existing and exempt vehicles.

Alternatively, some bodybuilders will supply the side-guard components along with the instructions for fitment enabling an appropriately skilled person in your organisation to fit the sideguards.

Figure 3: Example of fuel tank achieving the same objective as sideguards

Once fitted, you shall ensure that sideguards are kept in a serviceable condition. A vehicle exempt from sideguards under the Safer Lorry Scheme Traffic Regulation Order but which has them fitted can still fail its annual test if the sideguard or bracket is insecure; has exposed surfaces which are not smooth (e.g. it has jagged edges or bolt heads that are not domed shape); or increases the overall width of the vehicle.

For further information:

Safer Lorry Scheme – List of vehicles exempted from the scheme

Sideguards that are lower than the regulated height from the road and/or are fitted with a covering panel are recommended to further reduce the risk of under-run collisions. Warning signage should be displayed on the panel. These sideguards will warn vulnerable road users when adjacent to the vehicle near-side and offer greater protection than the minimum legal requirement in the event of a collision.

Class V and VI close-proximity mirrors

FORS operators shall ensure that all forward control HGVs are fitted with Class V and VI mirrors.

Forward control vehicles are defined as having the steering wheel in the first quarter of the vehicle's length (vehicle only, not vehicle and trailer) and having 50 per cent or more of the engine located rearward of the furthest reaching part of the windscreen.

Class V and Class VI close-proximity mirrors shall be fitted:

- Where they can mounted with no part of the mirror being two metres from the ground, regardless of the adjustment position
- In such a way that they are appropriately adjusted and fully visible from the driving position

Some vehicles may be exempt from this requirement where the two-metre height from the ground requirement cannot be achieved, for example on low cabs.

The improved driver's field of view achieved with fitment of Class V and Class VI mirrors shall conform to DVSA MOT test requirements and the relevant UK regulation.

Devices for indirect vision such as blind spot camera and monitor systems can be used instead of Class V and Class VI mirrors, but the image shall cover the same field of view. Camera and monitor systems used to replace Class V and Class VI mirrors shall be R46 (UNECE Regulation 46) approved products and comply with pre-defined installation guidelines.

For further information:

UNECE Regulation 46 – UN Vehicle Regulations – Devices for indirect vision

Class V mirrors

Class V mirrors help to minimise the blind spot immediately to the side and front corner of the vehicle passenger door.

Class V mirrors are a legal requirement on non-exempt vehicles and shall be retrofitted, when required, on existing HGVs in order to meet the FORS requirement. A Class V mirror may also be retrofitted to the driver's side.

Figure 4: Class V mirrors

Class VI mirrors

Class VI mirrors shall be fitted to the front of all HGVs to minimise the blind spot immediately in front of the drivers cab.

Class VI mirrors are a legal requirement on all new vehicles over 7.5 tonnes gross vehicle weight and must be retrofitted on existing vehicles.

Figure 5: Class VI mirrors

Class V and Class VI close-proximity mirror field of view may be achieved using a camera monitoring system.

Evidence that vehicles are fitted with safety equipment shall include a FORS Audit Declaration supported by:

- A vehicle safety equipment report and/or a permit scheme record or register
- A selection of photographs of safety equipment fitted
- Invoices from safety equipment suppliers

Any false declaration at the time of application or at the time of audit may result in suspension, termination.

4. FORS Silver vehicle requirements

S6 – Vehicle safety equipment

Requirement

To fit HGVs with enhanced safety equipment to help protect vulnerable road users.

Equipment and guidance

Enhanced vulnerable road user safety equipment shall include:

- An audible warning system that alerts other road users of left-turn and reversing manoeuvres
- Blind spot vision aids that provide the driver with a full view of the near-side vehicle blind spot and alert the driver of other road users in the near-side blind spot

Audible warning system – Vehicle manoeuvring warning for VRUs

Vehicle manoeuvring warning systems alert VRUs and other road users to a vehicle's intended manoeuvre. Warnings for a vehicle's left turn are particularly important as the near-side blind spot on right-hand drive vehicles presents one of the greatest areas of risk to cyclists.

Vehicles operating abroad:

Vehicles operating in countries that drive on the right-hand side of the road should be fitted with a vehicle manoeuvring warning system that warns other road users of a right-turn vehicle manoeuvre.

Vehicle manoeuvring warning systems for VRUs shall present the following features:

- Left turn system

Vehicle manoeuvring warning for VRUs

Shall comply as appropriate with The Road Vehicles (Construction and Use) Regulations – 96/1078

May include additional directional indicators that comply with UNECE Regulation 48

- The system shall be fitted to the nearside of right-hand drive vehicle

- The system shall activate when the left-turn indicator is engaged

- The system should sound a voice message indicating that the vehicle is turning left

Figure 6: Vehicle manoeuvring warning for left-turning

- Reversing system

- The system shall be fitted to the rear of the vehicle

- The system shall activate when the vehicle is reversing

- The system should either sound a buzzer, bleeper or audible voice message to indicate that the vehicle is reversing

Vehicle manoeuvring warning systems for VRUs should be fitted with a manual switch to mute the sound when required, such as operating between 23:30 and 07:00 in urban areas. The system may be supplemented with a visual warning to vulnerable road users.

Blind spot vision aids

Fleet operators shall ensure that blind spot vision aids are fitted to all HGVs. Blind spot vision aids shall include:

- A camera system that monitors the near-side vehicle blind spot

- An in-cab display screen to provide the driver with a view of the near-side blind spot

- An in-cab audible warning system to alert the driver of other road users in the near-side blind spot

In addition, rigid goods vehicles over 7.5 tonnes gross vehicle weight shall be fitted with a camera system that monitors the rear vehicle blind spot.

Camera systems may also be fitted to trailers to monitor the rear blind spot.

Camera system and in-cab display screen

Camera systems consist of externally fitted cameras and an in-cab monitor to provide more visual information than conventional mirrors can. These can cover blind spots and, and in some cases, full 360° view around the vehicle.

In order to minimise the near-side blind spot, cameras shall be placed so as to cover the blind spots and area of greatest risk on the near-side of the vehicle.

Camera systems should also:

- Monitor front and off-side blind spots

- Be able to digitally record incidents and assist in driver training and development

Camera and monitor systems are widely available from a range of suppliers. Systems differ in complexity depending on quality of image and recording and monitoring options.

FORS operators can opt for a complete camera system which utilises either one monitor and switches view to the rear of the vehicle when reverse gear is engaged or one which shows a split display.

When deciding which system to use, be aware that the following features can vary:

- Quality of the image
- Performance in situations with limited lighting
- Performance during hours of darkness
- Performance in various weather conditions
- Maintenance regime for the system
- Driver capability to safely view the images in the urban traffic environment

The table below will help you identify minimum and recommended specification when choosing your camera and monitor system.

Section 7 provides further guidance on equipment specification and installation.

		Minimum specification	Recommended specification	Notes
Camera	Ingress Protection (IP) Rating	IP68	IP69K	Advisable to install to the recommended level if vehicle is steam washed
	Lens	¼" CMOS		CMOS – Complementary metal oxide semiconductor Like the retina area of the eye. Converts the light into signal
	Infrared (IR) Distance	8 metres		Cameras should have good night vision capability. An effective level of IR LEDs is required for night vision. The minimum distance for the driver to see would be 8 metres
	View Angle	120°	130°	
	Operation Temperature	20°C to 70°C	-30°C to 80°	
	Resolution	720p Ahd	720pAhd	TVL – TV Lines AHD – Analogue High Definition
Monitors	Size	Minimum 7"	9"	Screen will show a split screen reversing/nearside as a default
	Inputs	2 switchable		Inputs switchable on manoeuvre – turning left and reversing

In-cab audible warning system – Close proximity sensor and driver audible alert – moving off information system and blind spot information system (such as DVS BSIS and MOIS) will also be an acceptable option.

The system shall be fitted to alert the driver of other road users in the nearside blind spot.

The system consists of close proximity sensors which detect objects in a vehicle's blind spot and alert the driver via in-cab audible stimuli. Some systems have been designed to alert the driver when it has assessed the vehicle to be on a collision path with another road user.

Figure 7: Close proximity sensor

Proximity sensors shall be placed at the near-side of all HGVs, with consideration of the area of greatest risk at an appropriate height to pick up cyclists and pedestrians.

Proximity sensors should operate regardless of whether the direction indicators are activated and may switch off at speeds above 20mph.

Sensors should be kept clean at all times in order to keep them in good operational order.

Both the side sensor and reversing sensor systems should have a self-test mode to enable the driver to check that the systems are working correctly.

Additionally, although not a FORS requirement, rigid vehicles and trailers may also have rear sensors fitted which should activate when the vehicle is reversing.

Sensors should be kept clean at all times in order to keep them in good operational order.

Both the side sensor and reversing sensor systems should have a self-test mode to enable the driver to check that the systems are working correctly.

Types of close proximity sensors include:

- Ultrasonic detection system (side and front)
- Radar detection system (side and front)

When choosing your equipment, be aware that features such as false alarms rate and detection zone size can vary. Simpler systems cannot discriminate between VRUs and street furniture, but newer designs have this capability. The table below summarises minimum and recommended specification for close proximity sensors.

Section 7 provides further guidance on equipment specification and installation.

Left-hand drive vehicles:

Where the driver has full view of the near-side blind spot area by direct vision, such as a left-hand drive vehicle, the camera system and in-cab display are not required. However, vehicle manoeuvring warning for VRUs, close-proximity sensors and driver audible alerts are still required.

		Minimum specification	Recommended specification	Notes
Camera	Detection range	0.7m to 1.5m	0.3m to 3m	Depending on the type of cab, VRUs can be between 0.3m and 3m away from the side of a vehicle without being visible to the driver.
	IP Rating	IP67 for sensor IP65 for control box if mounted internally and IP68 if mounted externally	IP68 for sensor IP69K for control box	Advisable to install to the recommended level if vehicle is steam washed
	Operation Temperature	-20°C to 70°C	• -30°C to 80°	

Some specialist vehicles such as emergency services, armed services and those carrying dangerous goods require a specialist equipment or installation.

Fresnel lens

To allow for older vehicles in the fleet replacement cycle, a tolerance in the number of vehicles fitted with camera systems may be accepted for vehicles registered before 1 January 2015 where there is not a contractual or permit requirement. This tolerance shall be fully justified at audit with evidence of vehicle age and confirmation that there is no contractual or permit requirement for fitment of camera systems.

When the tolerance is permitted, older vehicles not fitted with camera systems shall be fitted with an alternative near-side blind spot vision aid such as a Fresnel Lens.

A Fresnel lens consists of a clear thin plastic lens that is press-fitted to the front left vehicle window and helps the driver to see what is in the vehicle's blind spot. The fitment of Fresnel lenses helps to reduce blind spots and contributes to decreasing the number of side-swiping incidents.

Fresnel lenses should meet the following general criteria:

- Be CE marked. Further information about CE marking is provided in Section 6
- Able to attach to side window glass by capillary attraction
- Flexible and not able to shatter or cause injury in the range of temperature -20ºc to
- 45ºc and humidity 10% to 100%
- Size minimum A4
- Be UV stable

5. FORS Gold vehicle requirements

G3 Sustainable operations

Requirement

To progress further to reduce the environmental, safety and congestion impacts on the road network.

Equipment and guidance

FORS Gold operators shall maintain the FORS Bronze and Silver vehicle safety requirements V6 and S6.

Under G3, there are a number of requirements relating to sustainable operations including road safety.

In relation to requirement S6, all HGVs at requirement G3 (irrespective of age) shall be fitted with blind spot vision aids that include:

- A camera system that monitors the near-side vehicle blind spot
- An in-cab display screen to provide the driver with a view of the near-side blind spot

However, fitment of blind spot vision aids for vehicles registered before 1 January 2015 may be planned and evidenced in line with the operator's fleet replacement cycle. This must be fully justified at audit through a fleet replacement plan. Evidence shall include a schedule detailing when vehicles will be replaced and details of the changes to vehicle specifications to ensure that the safety equipment is included where necessary. The fleet replacement plan will be checked at the next re-approval audit to ensure actions have been implemented in accordance with the schedule. Vehicles not yet fitted with camera systems shall be fitted with an alternative blind spot vision aid.

6. FORS Associate safety equipment providers

Visit the FORS website for more details about offers and discounts and contact details for Associates that provide safety equipment.

FORS Associates are suppliers that provide services aligned to the requirements of the FORS Standard and often offer exclusive offers or discounts to FORS operators.

7. Further information on safety equipment specification and installation

The following advice will help you to make sure that anything that is installed will be as reliable and functional as the vehicle it is installed to.

CE and E Marking

There is a vast amount of electronics present in modern vehicles, controlling everything from the cabin temperature to more safety critical devices such as anti-lock braking systems.

To make sure that the device will not interfere with the vehicle or any other device installed, the fleet operator should make sure that the device is CE marked.

An extra level of protection of assurance would be E marking which is an added assurance that the device has met a threshold of interference level. Devices that have the potential to distract the driver are included in the safety-relevant category.

IP Ratings

IP stands for Ingress Protection. This rating ensures that the device will be protected for the type of application and environment it is asked to work in.

A two-digit number established by the International Electro Technical Commission is used to provide an Ingress Protection rating to a piece of electronic equipment or to an enclosure for electronic equipment.

The protection class after the international standard of EN60529 are indicated by short symbols that consist of the two code letters IP and a code numeral for the protection it provides.

For example: IP65

The two digits represent different forms of environmental influence:

- The first digit represents protection against ingress of solid objects
- The second digit represents protection against ingress of liquids

The larger the value of each digit, the greater the protection. As an example, a camera rated IP69k would be better protected against environmental factors, such a pressure washer, than another similar product rated as IP67.

IP.	First digit: Ingress of solid objects	Second digit: Ingress of liquids
0	No protection	No protection
1	Protected against solid objects over 50mm e.g. hands, large tools	Protected against vertically falling drops of water or condensation
2	Protected against solid objects over 12.5mm e.g. hands, large tools	Protected against falling drops of water, if the case is disposed up to 15 from vertical
3	Protected against solid objects over 2.5mm e.g. wire, small tools	Protected against sprays of water from any direction, even if the case is disposed up to 60from vertical
4	Protected against solid objects over 1.0mm e.g. wires	Protected against splash water from any direction
5	Limited protection against dust ingress (no harmful deposit)	Protected against low pressure water jets from any direction. Limited ingress permitted
6	Totally protected against dust ingress	Protected against high pressure water jets from any direction. Limited ingress permitted
7	N/A	Protected against short periods of immersion in water
8	N/A	Protected against long, durable periods of immersion in water
9	N/A	Protected against close-range high pressure, high temperature spray downs

Camera

Image quality – the minimum suggested resolution for an analogue system is 420TVL (Television Lines). A lower resolution camera will not provide the clarity at distance. The recommended resolution level is the High Definition Standard (AHD) which will be 720p.

Field view – the field view is the width of the angle of view displayed on the screen. Having a wide view, especially for a rear-view camera is essential. The minimum field of view required is 120°; the recommended field of view is 130°.

Ingress Protection – having the ability to withstand moisture and dust is probably one of the important requirements of a camera. The minimum for cameras is IP67 and the recommended, especially for a vehicle to be steam washed, is IP69k.

System supply voltage – 10 to 32V DC. This means it can be installed on any vehicle and can handle supply voltage fluctuations.

Night vision – the cameras should have good night vision capability for the driver to view their blind spots efficiently. An effective level of IR LEDs is required for night vision. The minimum distance for the driver to see would be eight metres Temperature range – the camera will have the ability to operate between be 20°C to +70°C.

Monitor

Size – the minimum recommended size of the monitor is seven inches.

Default view – the default view for the driver to see should be a split view of the rear and near-side of the vehicle.

Override view – when the vehicle is turning left or reversing, the screen should switch to a large screen version of the respective camera view and the return to the default view, once the manoeuvre has been completed.

Position – the monitor should be clear to view but not obstruct driver's view of the road.

Close proximity sensor and driver audible alert systems

When deciding which system to use, be aware that the following features can vary:

- The rate of false alarms
- The size of the detection zone
- Maintenance regime for the system

Whether the system is standalone or relies on additional equipment over which the operator does not have control (e.g. tags fitted to bicycles).

Warranty

Having an extensive warranty will guarantee the quality of the components that make up the installation. Therefore, to be as resilient as the vehicle, a minimum of two years' warranty is recommended with a three-year warranty being best practice.

Specialist Vehicles

Some specialist vehicles such as emergency service vehicles, Petroleum Regulation Vehicles and military vehicles, may require a specialist installation or specialist equipment.

Installation

Fleet operators should take appropriate steps to make sure that the electrical devices are installed to an acceptable standard.

All cabling installed must be of the correct standard. When the cabling is routed outside the passenger compartment, it must be protected by an appropriate method of protection. The external connections must be water resistant or made water resistant by the installer.

Acknowledgement

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The Association of Vehicle Installers offers training and accreditation programme to install equipment into vehicles. For more information, please visit theavi.org.uk or email info@theavi.org.uk.

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