

Guide to tyre management and maintenance on light commercial vehicles



Foreword

Schools, clubs and associations rely on minibuses to support their activities. Vans are the workhorses of many businesses, large and small. The growth in online shopping and changes to inner city delivery patterns are driving rapid growth in this vehicle population.



However, too often these vehicles are not looked after as well as they need to be. Maintenance can be neglected – through lack of knowledge or interest – and that can lead to, at best, breakdowns but, at worst, accidents that can lead to loss of life or life changing injuries. Tyres are a vital element of vehicle roadworthiness but roadside inspections reveal widespread disregard of tyre condition on light commercial vehicles.

Tyre manufacturers exercise great care in producing safe, reliable and compliant products. However, as with anything, tyres will only do their job well if they are looked after properly once on the vehicle. This guide shows this doesn't have to be hard or onerous – but following its recommendations is one of the key steps in helping keep these vehicles safe and legal.

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Contents

1. Introduction	4
2. Tyre Management System	5
3. Tyre Choice and Fitting	6
4. Tyres In Service	10
5. Tyre Repairs	16
6. Tyre Storage	17
7. Wheels	17
8. Training	17
9. Walkaround Checks	19
10. Acknowledgements	20
11. Useful Contacts	20



1. Introduction

This guide contains essential information necessary to the safe and efficient management of tyres fitted to light commercial vehicles: vans, pick-ups and minibuses. It is addressed to vehicle operators in the UK and reflects UK regulations and operating conditions. The guidance may not be applicable in countries outside the UK.

Tyres are a safety critical element of every vehicle on the road. They are also one of the most highly regulated automotive components. Despite this, they are often abused and their condition neglected. Tyre manufacturers exercise great care in producing safe, reliable and compliant products. However, the driver and the vehicle operator are legally responsible for the tyre's in-service condition. Method and rigour are required to ensure that tyres in use are fit for purpose at all times.

2. Tyre Management System

A robust tyre management system is essential to maintaining roadworthiness and should ensure:

- That tyres in service are appropriate to the vehicle and operating conditions;
- That all tyre pressures are checked at least monthly at ambient temperature with a calibrated gauge;
- That responsibility for regularly checking, reporting and maintaining tyre pressure to policy is explicitly defined between the vehicle lessor, lessee, maintenance garage, operator, etc., as applicable;
- That tyre pressures are maintained in accordance with the vehicle manufacturer's recommendations;
- That vehicle tyres are regularly and closely examined for damage and wear with mechanisms in place to address any identified issues;
- That tyre age is monitored and tyres fitted in single configuration to vehicles fitted with more than 8 passenger seats are no more than 10 years old;
- That specific attention is given to the condition of tyres on little-used trailers, mobile plant, etc.
- That processes exist to distribute best practice in tyre management throughout the fleet;
- That staff dealing with tyre management are properly trained and empowered to act with sufficient authority;

- That any technician dealing with tyre inspections or repairs is appropriately trained and qualified;
- That drivers are suitably trained and equipped to recognise and report tyre issues;
- That drivers carry out and record a thorough walk round check of the vehicle and/or trailer before undertaking their journey/duty;
- That any on-site tyres are stored correctly.

Should you identify any discrepancies or shortcomings between the contents of this guide and your internal procedures you should address them as soon as possible.



3. Tyre Choice and Fitting

APPLICABLE REGULATIONS

Tyres are subject to extensive European and International regulations. Compliance is verified at type approval. It is illegal to sell tyres in the UK without the required type approval marking ("E-mark") on the sidewall.

UK Construction and Use Regulation 27 requires that tyres fitted on the same axle are of the same size and construction (radial, cross-ply, etc) and that the load index and speed symbol must at least match the axle plated weight and the maximum legally permissible speed for the vehicle.

RECOGNISED GUIDANCE

BS AU 50-2.7b: 2017 Code of practice for the selection and care of tyres and wheels for commercial vehicles.

Recommendations published by the European Tyre and Rim Technical Organisation (ETRTO) cover many aspects of tyre specification, use and management.

BASIC PRINCIPLES

Briefly, the requirements of a tyre are:

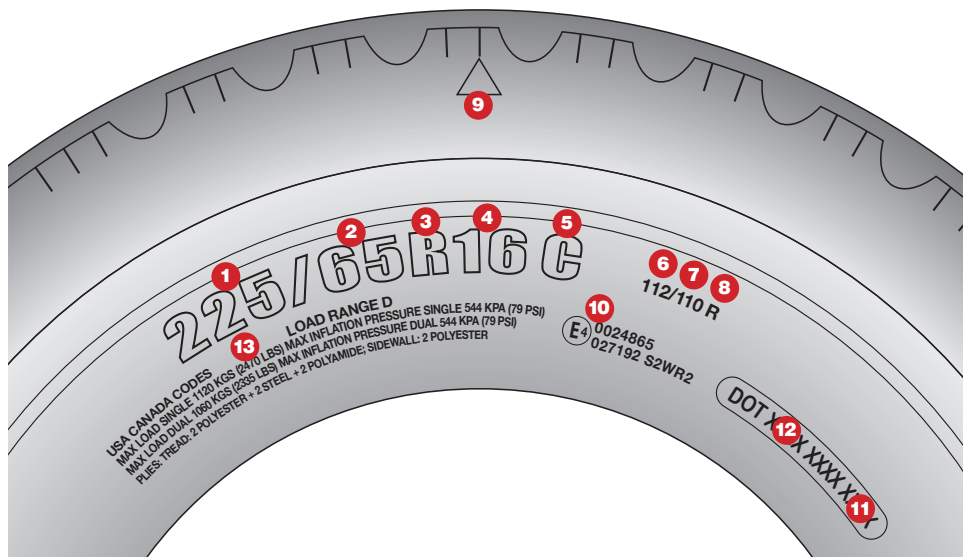
- To support the maximum authorised load at the vehicle's legal maximum speed;
- To grip the road for control of the vehicle in all conditions;
- To give the best possible ride and longevity subject to the two criteria above.

A tyre is defined by the following characteristics:

- Size designation comprising section width, aspect ratio and rim diameter;
- Construction — normally radial but less frequently cross ply or bias belted;
- Type of tread pattern according to seasonal application;
- Load index and speed symbol (service description).

The operator must ensure that tyres are responsibly sourced and endorsed for UK and European use. Any tyre chosen as a replacement should normally be of the same size, construction, and service description as the original equipment. Particular care must be taken to ensure that the tyre load capacity is equal to or greater than the axle plated weight.





PRINCIPAL TYRE MARKINGS

- | | | |
|----------------------------|------------------------------------|--|
| 1 Tyre Section width | 7 Load Index (dual mounted) | 12 DOT manufacturing site code |
| 2 Aspect ratio | 8 Speed symbol | 13 Data not applicable to European markets |
| 3 Construction (R=radial) | 9 Location of tread wear indicator | |
| 4 Rim diameter (inches) | 10 Approval numbers | |
| 5 Commercial vehicle use | 11 Manufacturing date code | |
| 6 Load Index (single tyre) | | |

TYRE CHOICE

Twinned tyres: On rear/ drive axles care should be taken to ensure that only tyres of the same type, size, service description and wear are twinned together. The difference between the remaining tread pattern depths on twinned tyres should not generally be greater than 2mm. Equally, twinning different brands of tyre is not recommended as casing characteristics may differ, possibly causing accelerated wear to one tyre.

Winter use: Historically, tyres offering improved winter mobility have been marked “M + S”. This reflected the manufacturer’s assessment of the tyre’s performance on snow. More recently the snow grip pictogram (Alpine or 3PMSF symbol) has been introduced. This identifies that the tyre meets an objective performance standard contributing to improved winter mobility.



Rolling resistance: Tyres account for 20-30% of the fuel consumption and CO2 emissions of a light commercial vehicle. In order to reduce their environmental impact many new vehicles are fitted with low rolling resistance tyres. To maintain this performance replacement tyres should be of the same rolling resistance class as the original equipment.

FITTING

Tyres should only be fitted by suitably qualified personnel using appropriate equipment and following correct procedures. Correct tyre fitting will ensure that the tyre is mounted concentrically on the rim and that the bead area has not been distorted, stretched, or damaged. Care must also be taken when removing a tyre from the rim not to damage the bead area or casing plies in any way.

Directional and Asymmetric tyres

Directional tread patterns are designed to provide enhanced performance in particular applications. They are prevalent on all-season and winter tyres for cars and vans. The correct direction of rotation is indicated by an arrow and words on the tyre sidewall.

An asymmetric tyre has a tread pattern which differs on its inner side to that of the outer side and offers handling and cornering advantages over other tread patterns. Tyre sidewalls are marked "outside" and "inside" or other similar wording indicating the correct fitment.

It is important to ensure that directional and asymmetric tyres are fitted in accordance with the instructions on the tyre sidewall.

Valves

The commonly-available "Schrader" type rubber snap-in valve can only reliably withstand 4.5 bar (65psi). It is not unusual for inflation pressures on larger light commercial vehicles and trailers to exceed this value. High pressure valves must be used in these applications if in-service problems are to be avoided. High pressure valves can be either the reinforced snap-in type or the clamp-in type.



Snap-in
Max 4.5 bar



**Reinforced
snap-in**
Max 7 bar



**Van type
clamp-in**
Max 14 bar



4. Tyres in Service

APPLICABLE REGULATIONS

Construction and Use Regulation 27 requires that a tyre shall be suitable to its application and correctly inflated. The regulation also specifies limits to acceptable damage and the minimum requirements regarding tread depth.

The MOT Inspection Manual contains detailed criteria regarding minimum requirements for tyres.

For vehicles up to 3.5 Tonnes DGW or with up to 8 passenger seats the legal minimum tread depth is 1.6mm. The tread depth in the principal grooves must not be less than the legal minimum at any point across a continuous central band covering 75% of the width of the tread around the circumference of the tyre.

For vehicles over 3.5 Tonnes DGW or those with more than 8 passenger seats the legal minimum tread depth is 1mm. The tread depth in the principal grooves must not be less than the legal minimum at any point across a continuous band covering at least 75% of the width of the tread around the circumference of the tyre. The tread pattern must also be visible across the remainder of the tread. For this purpose, the tread width is the part of the tyre which when correctly inflated can contact the road under normal conditions of use.

RECOGNISED GUIDANCE

Detailed guidance regarding in-service issues is contained in the recommendations published by ETRTO.



IRREGULAR TREAD WEAR




Tyre wear should be checked frequently because once a wear pattern becomes firmly established it becomes difficult to stop, even if the underlying cause is corrected.

Tyres on steering axles, particularly on the nearside, often wear more on one shoulder than the other. This can be due to the road camber, the continuous cornering and roundabouts on UK roads, misalignment or sometimes, under inflation. Equally, twinned drive axle tyres frequently wear faster on the inner edge of the inner tyres. Turning the tyre on the rim, if carried out at the correct

time, can considerably extend tyre life and provide cost savings. However, this is not permitted on vehicles with a DGW of 3500 kg or less if fitted with directional tyres. Where allowed, a tyre should be turned on the rim early enough to equalise the wear.

SIDEWALL ABRASION

To ensure legal compliance the size and service description markings must be legible on at least one side of the tyre. Tyres with severe kerbing damage must be removed from service: it is illegal for the reinforcement plies to be exposed.

Type of wear	Cause	Correction
Centre wear 	Over inflation or incorrect matching of tyres and rims.	When cold, adjust pressure to the recommended level.
Shoulder wear - both sides 	Under-inflation or incorrect matching of tyres and rims.	When cold, adjust pressure to the recommended level.
One-sided wear 	<ol style="list-style-type: none">1. Excessive toe2. Excessive camber3. Bent axle4. Non – uniform tyre and wheel assembly5. Severe operating conditions.	Identify and correct mechanical defect.

WHEEL ALIGNMENT

It is important that a vehicle's wheels are correctly aligned. Poor alignment will affect:

- Tyre wear
- Vehicle handling
- Fuel economy

TOE-OUT:
inside
shoulders



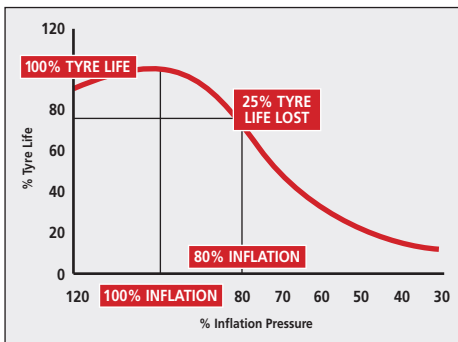
TOE-IN:
outside
shoulders



CORRECT INFLATION

The maintenance of correct tyre pressures is extremely important, not only from the performance and safety aspects but also from the tyre life point of view. Furthermore, correct tyre pressures produce the best ride and handling of the vehicle.

Under-inflation can seriously reduce tyre service life and increase fuel consumption.

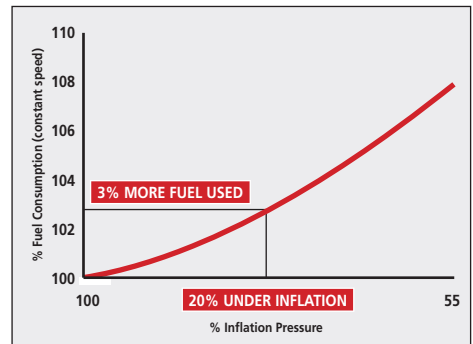


Vehicle operators should follow the vehicle manufacturer's recommended tyre pressures unless recommended otherwise by the tyre manufacturer taking account of the particular vehicle type and application.

Tyre pressures should be checked when the tyre is at ambient temperature. Tyre inflation equipment should be regularly calibrated in line with the manufacturer's guidelines.

VALVE CAPS

In low pressure applications the valve dust cap provides protection against the ingress of dirt leading to air loss. In high pressure applications the pressure cap is the primary air seal and must always be fitted. (In these applications the valve allows the tyre to be inflated and deflated; it should not be relied upon as a seal). In both cases appropriate valve caps should always be used and replaced as necessary.





Tyre pressure maintenance is widely neglected on the inner tyres of twin wheels. This is a major cause of accelerated wear and premature tyre failure. Ensuring that the inner and outer valves are fitted 180°

opposite to each other and fitting a good quality valve extension to the inner wheel will facilitate regular tyre pressure maintenance.

RESPONSES TO UNDER-INFLATION

0 - 10% under-inflation	Examine for external damage before re-inflation Re-inflate as soon as possible
10 - 20% under-inflation	Examine for external damage before re-inflation Re-inflate immediately Monitor for continuing deflation
20% + under-inflation	Remove tyre from rim and inspect for possible internal damage Take extra care on re-inflation: increased risk of sidewall “zipper” failure Monitor for continuing deflation

RETRO-FIT TYRE PRESSURE MONITORING SYSTEMS (TPMS)

A wide range of products are available at increasingly competitive prices. Proven benefits include a significant reduction in tyre-related breakdowns, longer tyre life and improved fuel consumption. Some systems will link to vehicle telematics allowing the communication to the operating centre of alerts highlighting issues to be addressed.

TYRE CARE WHEN TOWING

Tyres on trailers are often specified to operate at high inflation pressures in order to maximise their load carrying capacity. Correct inflation in accordance with the trailer manufacturer's recommendations is of the utmost importance if in-service issues are to be avoided. Trailers often suffer long periods of neglect between use: tyre condition should be thoroughly checked before bringing a trailer back into service.

Towing imposes additional loads on the rear axle of the towing vehicle: vehicle tyres should be inflated in accordance with the vehicle manufacturer's recommendations. Care should also be taken in loading trailers so as to avoid applying excessive nose-weight to the towing vehicle.

Further guidance regarding towing is available on [Gov.uk](https://www.gov.uk)



Other Tyre Conditions: CUTS & TEARS

Cuts & tears could permit water to reach the bracing plies, causing corrosion that may weaken the structure of the tyre if the exposure is prolonged. Repair in accordance with BS AU 159g:2013 should be pursued as soon as possible.

BULGES

Sidewall undulations can result from normal manufacturing processes or a satisfactory repair. However, a bulge can indicate internal separation or partial failure of the tyre structure. A bulge due to a repair will be solid, feeling firm to hand pressure and will not deflect as would a bulge associated with casing separation. If in doubt a qualified tyre technician should be consulted.

OIL, PETROL, DIESEL

Many industrial chemicals and solvents, including oils, petrol and diesel, can damage tyres. These contaminants should be removed using plenty of water and a mild detergent. Severe contamination may render the tyre unusable.

OBJECT TRAPPED BETWEEN TWINNED TYRES

Any object trapped between twinned tyres should be removed. It may be necessary to deflate the tyres or dismount the outside wheel in order to do so. Both tyres may have been damaged and should be thoroughly inspected by a competent tyre technician before re-entering service.

AGEING

Tyres can deteriorate with age: this may show as cracking or crazing on the sidewall or in the grooves of the tread pattern. Similar damage can be caused by overheating resulting from under inflation or overloading. In severe cases, either cause can lead to separation of the inner components of the tyre.

Tyre ageing is not a function of the passage of time alone but rather the cumulative exposure to adverse environmental and operational factors. Prolonged exposure to ozone or ultra-violet light can affect the natural and synthetic rubbers used in tyres. Tyre manufacturers incorporate additives to reduce this phenomenon. The flexing of the tyre in normal use helps the diffusion of these additives to the surface of the tyre where they act against the adverse effects of exposure to ozone and ultra-violet light. This diffusion process is greatly reduced in tyres fitted to vehicles that are used infrequently. Consequently, such tyres are more susceptible to degradation caused by adverse

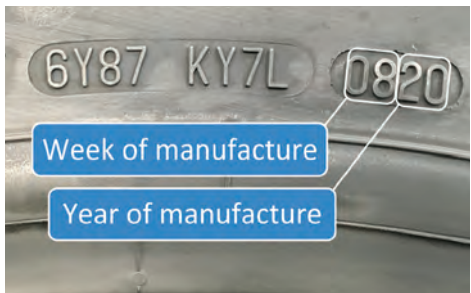
environmental factors than tyres on vehicles that are used frequently. Spare wheels are a case in point.

If a tyre is showing signs of ageing its condition should be assessed by a competent tyre technician. Some tyre manufacturers recommend that tyres over 10 years old should be withdrawn from service.

AGEING: REGULATIONS APPLICABLE TO MINIBUSES

An amendment to Construction and Use Regulation 27 does not permit the use of tyres in excess of 10 years of age on any wheel in a single configuration on a vehicle with more than 8 passenger seats. It is also a requirement for all tyres on these vehicles to display a date code.

The date of manufacture of a new tyre can be determined from the DOT code marked on one of the sidewalls. The final four digits show the calendar week and the year of manufacture. The tyre in the photograph was manufactured in week 08 of 2020.



5. Tyre Repairs

It is vital that any repair is undertaken by a trained operative. All tyre repairs should follow the recommendations contained within BS AU 159g:2013.

Prior to affecting a repair, the following important points should be borne in mind:

- External plugging (string repair) is for short-term temporary repairs only, eg to get the vehicle into a position where it can be jacked safely. A string repair is not suitable to return the vehicle into normal service.
- Temporary repairs should not be applied to sidewall damage.
- A permanent repair requires the removal of the tyre from the rim in order to allow an internal examination by a competent tyre technician and the application of suitable repair materials from the inside of the tyre.
- The insertion of a tube to affect a 'repair' to a minor penetration is not recommended.
- Liquid tyre sealants are not considered to be a permanent repair in accordance with BS AU 159g:2013.
- Tyre filler should only be used for localised cosmetic repairs where there is no penetration or ply damage. Tyres with damage that extends to the reinforcement cords should be assessed by a qualified repair technician and, where appropriate, only repaired in accordance with BS AU 159g:2013.

MAJOR REPAIRS

Tyres with major repairs conforming to the British Standard must be marked by the repair agent, radially in line with each repair at a point just above the area covered by the rim flange. The marking must be permanently legible with the number of the British Standard, i.e. BS AU 159g:2013, and with the repairer's name or identification mark. The minimum height of the characters must be 4mm.

It is recommended that tyres that have been subject to a major repair as defined in BS AU 159g:2013 should be fitted to a rear axle position only.





6. Tyre Storage

Detailed guidance regarding the storage of tyres is contained in the [ETRTO recommendations](#).

Tyres should be kept in a cool, dry, and moderately ventilated environment away from any possible contact with oil or hydrocarbon solvents or lubricants. They should be kept away from sources of heat such as pipes or radiators and be protected from exposure to sunlight and strong artificial lighting. Avoid storage near any electrical equipment which may produce sparks, such as arc welding equipment.

Tyres should be stored in a relaxed condition free from tension, compression or other deformation, ideally arranged vertically.

7. Wheels

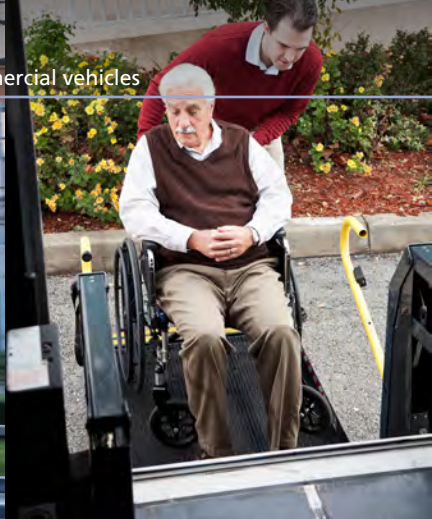
All the issues relating to the care and maintenance of wheels and correct wheel nut re-torquing are covered comprehensively in the IRTE / Logistics UK guide [Wheel security](#) and BS AU 50-2.7b:2017.

8. Training

Operators must ensure that they provide sufficient training to enable their staff to competently carry out the duties they are assigned. A range of appropriate training courses will be necessary according to the roles or duties concerned.

DRIVER TRAINING

It is a duty of the driver of a Light Goods Vehicle to ensure that the tyres on the vehicle they will be driving are fit for purpose and safe to use. Each driver must carry out a thorough vehicle walk around check before undertaking their journey / duty. The driver must be competent enough to identify if a tyre fulfils legal requirements. Driver induction training should include a module detailing tyre inspection and defect recognition and reporting procedures. This training should be refreshed at least every 5 years.



VEHICLE MAINTENANCE STAFF

Any person who undertakes vehicle maintenance must be competently trained to identify tyre irregularities and staff must be able to prevent premature tyre failures by identifying wear patterns and changes in vehicle characteristics. They should have received formal training such as City & Guilds / NVQ / IMI / Irtec in vehicle maintenance.

Staff must also be aware of the vehicle or tyre manufacturer's tyre pressure maintenance guidelines and any other relevant policy relating to wheels and tyres. Maintenance facilities should have policies and guidelines on clear display and have sufficient clean tools and work areas to enable effective inspection and repairs to be carried out.

TYRE TECHNICIANS

It is increasingly common practice for LCV operators to use tyre manufacturers or appointed agents to maintain their fleet tyres under a maintenance contract. There are obvious benefits to roadworthiness, compliance, safety, efficiency and not least, financial performance.

If operators choose to maintain their own tyres, they must ensure that the tyre technician has adequate recognised training, accreditation and experience relevant to their particular fleet. Many tyre manufacturers offer training packages from basic awareness to thorough accredited technician status award.

9. Walkaround checks for van and minibus drivers

Daily checks

- Check the vehicle tyres at the start of every shift or journey.
- Check trailer tyres each time you hitch up.
- Report any concerns immediately to your employer or seek advice from a tyre specialist as soon as possible.

A few simple checks and some timely interventions could save money and lives. Drivers found to be driving on illegal tyres face personal fines of up to £2,500 and three penalty points for each illegal tyre, regardless of who owns or operates the vehicle.

☐ **Wear**

Check tread depth against the wear indicators moulded into the pattern. Check for uneven wear across the tread and excessive sidewall scuffing. The reinforcing cords must not be exposed.



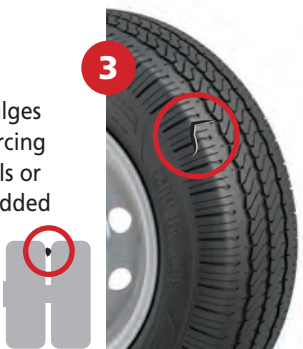
☐ **Inflation**

Check for excessive sidewall deflection. If the vehicle is fitted with a Tyre Pressure Monitoring System use it to check for low pressure.



☐ **Damage**

Check for cuts, bulges and visible reinforcing cords; also for nails or other items embedded in the tyre or objects wedged between twin tyres.



☐ **Wheels**

Check for buckling or other damage. Check for missing or insecure wheel nuts.



Remember, as the driver you may be fined if the vehicle is found to be defective.

10. Acknowledgements

This guide is the result of collaboration between the British Tyre Manufacturers' Association and the Imported Tyre Manufacturers' Association with the support of the Driver and Vehicle

Standards Agency. Thanks are also due to the Confederation of Passenger Transport, Logistics UK and the Road Haulage Association for their useful contributions.

11. Useful Contacts

ORGANISATION	CONTACT	PHONE
Driver and Vehicle Standards Agency	enquiries@dvs.gov.uk	0300 123 9000
British Tyre Manufacturers' Association	Info@btmauk.com	01787 226995
Confederation of Passenger Transport	operations@cpt-uk.org	020 7240 3131
Imported Tyre Manufacturers Association	www.itma-europe.com	08453 700145
Logistics UK	enquiry@logistics.org.uk	0371 711 2222
National Tyre Distributors Association	info@ntda.co.uk	01296 482128
Road Haulage Association	www.rha.uk.net	01274 863100
Society of Operations Engineers/IRTE	soe@soe.org.uk	020 7630 1111
Bridgestone Europe NV/SA (UK Branch)	BsuK.technical@bridgestone.eu	01926 488580
Continental Tyre Group Ltd	administrator.technical@conti.de	01788 566240
Goodyear Tyres (UK) Ltd	tyre.techuk@goodyear.com	08453 453453
GiTi Tire (UK) Ltd	technical@eu.giti.com	01565 831910
Hankook Tyre (UK) Ltd	enquiries@hankooktyres.co.uk	01327 304100
Michelin Tyre plc	business.michelin.co.uk	0845 366 1598

Several of the professional bodies listed above offer training courses relevant to tyre management. In addition, many tyre manufacturers offer specialist training courses covering numerous aspects of tyre use and management.