
The NTA Guide to Safe and Legal Towing

Edited by David Ryder



Contents

THE NTA GUIDE TO SAFE AND LEGAL TOWING	1
CONTENTS	2
1. PREPARING THE TRAILER	5
MATCHING THE TRAILER WITH THE TOWING VEHICLE	5
TRAILER LOADING	6
CHECKING WEIGHT DISTRIBUTION	6
HORSES AND LIVESTOCK	7
TRAILER CHECKS BEFORE EACH JOURNEY	8
ATTACHING THE TRAILER TO THE VEHICLE	8
2. DRIVING	11
GENERAL	11
SPEED LIMITS	11
DRIVE WITHIN YOUR OUTFIT'S CAPABILITIES	11
REVERSING	11
STEP-BY-STEP REVERSING	12
3. THE USE OF STABILISERS	14
FOLLOW THE GOLDEN RULES OF TOWING:	14
STABILISER CHECKS AND SERVICING:	15
4. TACHOGRAPHS	16
5. LIGHTS	17
REQUIREMENTS	17
OBSCURING THE NUMBER PLATE	18
6. BRAKES	19
REQUIREMENTS	19
7. SERVICING	20
(A) FREQUENCY OF SERVICING	20
(B) OVERRUN COUPLING - INSPECTION & SERVICING:	20
(F) FAULT FINDING - COUPLINGS & BRAKES	21



8. WHEELS **24**

9. TYRES **26**

TYRE SIDEWALL MARKINGS :	26
TYRE CONDITION	27
TYRE LOAD INDEX:	27
SPEED SYMBOL:	27
LOAD & PRESSURE RATINGS :	28

10. EYESHAFTS, TOWING JAWS AND HOOKS **28**

LEGISLATION	28
1) EYESHAFTS	29
2) TOWING JAWS AND HOOKS :	29

11. SERVICING THE REST OF THE TRAILER **31**

A) JOCKEY WHEEL AND CLAMP:	31
B) CHASSIS:	31
C) WHEELS AND TYRES :	31
D) AXLES AND SUSPENSION :	32
E) ELECTRICAL SYSTEM AND LIGHTS:	33
F) BODYWORK AND FITTINGS:	33
11A. BOAT TRAILERS: ADDITIONAL OPERATING ADVICE	34

12. TOWBARS AND TOWING HITCHES **35**

VEHICLE CATEGORIES	35
EUROPEAN TYPE APPROVAL 94/20/EC	35
DESIGN, TESTING AND CERTIFICATION	36
“D” VALUE	36
TOWING WITH HEAVY GOODS VEHICLES	36

13. THE LAW **37**

DIMENSIONS; WEIGHTS; MANUFACTURERS’ PLATES; MARKINGS; LICENCES.	37
MAXIMUM DIMENSIONS:	37
MARKING OF REAR OVERHANG:	37
“LONG VEHICLE” MARKER PLATE	37
RECOMMENDED MAXIMUM HEIGHT	38
WEIGHTS	38
IDENTIFICATION PLATES:	38

DRIVING LICENCES: **39**

SUMMARY	39
---------	----



DETAIL OF THE REGULATION	39
VEHICLE CATEGORIES	40
THE MAIN CATEGORIES OF LGV LICENCES	41
QUALIFYING REQUIREMENTS	42
14. GLOSSARY OF TERMS USED IN THIS BOOKLET	44
ACKNOWLEDGEMENTS	45



1. Preparing the trailer

Matching the Trailer with the Towing Vehicle

It is important that the vehicle you use to pull your trailer is adequate for the job. You need to check:

- That the engine is large enough to tow the trailer and load
- That the brakes are powerful enough to stop the vehicle and trailer safely.
- The Gross Trailer Weight does not exceed the Towing Capacity of the towing vehicle.

The addition of a loaded trailer to a vehicle will inevitably have a very serious effect on the vehicle's performance. Starting, particularly on hills, can be much more laboured; stopping can take longer distances; cornering and negotiating sharp bends requires extra care. Consider all these things very carefully when choosing and loading (and towing) your trailer. The paragraphs which follow, refer to the data that is relevant to your choice. (See also Section 13, "The Law".)

The most important check is the vehicle manufacturer's recommended towing limit, which should be in the vehicle manufacturer's handbook and on the VIN plate on the chassis.

A good rule of thumb, for safety and stability, when towing a caravan, is the 85% figure recommended for caravans by the Caravan Club. This suggests that you should not tow a caravan that weighs more than 85% of the towing vehicle's kerb weight. (as long as 85% does not exceed the vehicle manufacturer's recommended towing limit. (The kerb weight is defined as the weight of the vehicle plus a full tank of petrol and 75kg (for the driver and luggage).)

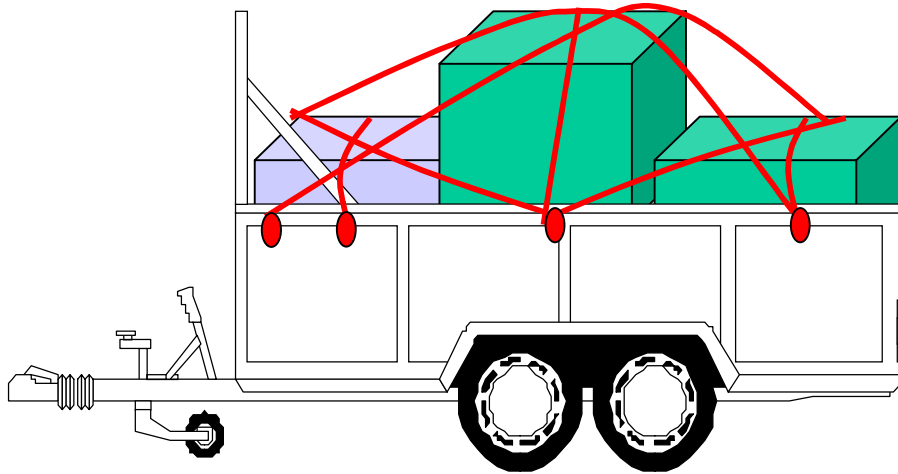
Police forces use the manufacturer's recommended towing limit as their guide.

Under no circumstances should the vehicle's gross train weight be exceeded.

You should also refer to limitations on overall length. Details are to be found in the section of this document that deals with trailer dimensions.

Trailer Loading

Loads must be securely tied down or restrained. There must be no load projections outside the trailer that might cause danger to other road users.



Wherever possible, loads should be evenly distributed across the trailer and positioned in such a way as to keep the nose weight within the recommended limits. (Refer to the manufacturer's recommendation and/or the noseweight limit of your vehicle. See also "Attaching the Trailer" in Section 1)

If uneven loads have to be carried, ensure that individual wheels/axles are not overloaded. It may be necessary to reduce the overall load to achieve this.

NOTE: Good towing practice should always take into account the inevitable effects on vehicle handling, braking and general stability of towing a trailer behind the vehicle.

Checking weight distribution

The most significant risks associated with poor loading are:

- Loss of steering control caused by loading behind the centre of gravity: this is very likely to cause snaking. (See note on horses and livestock below.)
- Loss of overall control and potential damage to the towing vehicle caused by excessive loading in front of the centre of gravity. This causes the car's steering to be less effective, giving under steer and, with front wheel drive vehicles, causing loss of traction. Excessive nose weight is likely to place unacceptable stresses on the towbar and on its mounting points on the vehicle.
- Loss of stability caused by loading too heavily on one side or the other.
- Dangerous loss of stability when loads are loose and move around. Danger of loads parting from the trailer.
- Load shooting forward when the outfit brakes. This is particularly acute if the load consists of planks, bars, etc, laid in line, front to back.



-
- There is a very significant danger of light items being lifted out of a trailer by the slipstream. All items should be secured.

Loading practice should, therefore, take into account:

- Secure restraint
- Recommended nose weight
- Weight distribution and balance

Horses and livestock

When horses are being towed, they have a tendency to rest most of their weight on their hind legs. Because of this, horseboxes usually have their twin axles set behind centre. (There are strict guidelines for the carriage of livestock, conditions of floors, partitions, tethering points, etc.)

Trailer checks before each journey

The trailer operator or the driver of the towing vehicle, if different, has the responsibility for the safe operation of the trailer and needs to carry out the following checks:

- If the trailer is laden is the load correctly distributed i.e. Not too much or too little nose weight?
- Is the load within the trailer's official payload? - i.e. Not overloaded.
- Is the actual gross weight being towed within the towing vehicle manufacturer's recommended maximum towing limit (whether braked or unbraked.)?
- Is the load correctly secured?
- Are all the lights undamaged and working correctly?
- Are the 7 core cable and plug undamaged?
- Is the correct number plate fitted? (both registration number and style)
- Is the breakaway cable or secondary coupling undamaged and correctly connected, to a suitable point on the tow bar or towing vehicle?
- Are the tyre pressures correct and all tyres free from cuts, bulges and with adequate tread, (including the spare)? Tyres must have a continuous tread depth of at least 1.60 mm on cars, light vans and trailers, across the centre three-quarters of the width (1mm for other vehicles)
- Are you satisfied that the wheel nuts/bolts are tightened to the correct torque?
- If required are the mudguards in satisfactory condition and secure?
- Is the trailer correctly coupled to the towball or pin?
- Is the coupling height correct? I.e. Not excessively nose down or nose up.
 - Follow the golden rules of towing:
 - Make sure the trailer is level when coupled to the towing vehicle
 - Make sure the nose weight is between 50 and 100kg (unless trailer is very light.)
 - Make sure the tyre pressures are correct.
- Are the jockey wheel and any corner steadies or prop stands fully wound up and secure?

NB. Check the correct operation of damper and brakes as soon as possible after commencement of journey.

Attaching the trailer to the vehicle

Become methodical about hitching up and unhitching so that you do not forget anything. If your towcar's mirrors do not give a good view past the trailer you should fit towing mirrors.

- a) Apply the trailer handbrake, remove any towball and electrical socket dust covers and security devices then wind the jockey wheel to the required height. Check the towball is lightly oiled. (Not greased) (If not being used with a head stabiliser.)
- b) Get a helper to stand with their hands showing you where the hitch is (place a broom against it if you are alone) and reverse slowly back. Your helper indicates if you are off line.
- c) Raise the front of the trailer by means of the jockey wheel assembly to the required height, roll trailer up to the rear of the towing vehicle.



-
-
- d) If the trailer has tandem axles, raise sufficiently to raise the front wheels clear of the ground to aid manoeuvrability.
 - e) Do not attempt to lift the front of the trailer. Lower the trailer by means of the jockey wheel assembly onto the towball of the vehicle.
 - f) Over the last foot or so, your helper should use their hands to show you the actual distance between towball and coupling head.
 - g) If you have to stop a few inches short, judge how far back you are going by comparing the front wheels' movement to something on the ground.
 - h) Wind the jockey wheel down to lower the coupling head onto the towball.
 - i) Some coupling heads have a locking handle which stays up then automatically locks onto the ball, others have to be held up and may have an indicator to show when the ball is in place.
 - j) Once the coupling head appears locked on, lower the jockey wheel a few turns to lift the back of the vehicle to prove the coupling head is on properly, then fully raise the wheel before unclamping it and, finally, securely locking it fully raised. Check that the wheel in the position you have locked it is not interfering with the operation of the coupling overrun mechanism.
 - k) Attach safety breakaway cable(s) to the rear of vehicle. This cable will apply the hand brake if for any reason the trailer becomes detached whilst towing. (Clip the breakaway cable onto the special rings some towbars have or loop it around the bar, making sure it cannot foul the coupling head. Do not loop it round the towball neck unless you can find no alternative.) Check that the breakaway and lighting cables have enough slack for cornering but will not touch the ground.
 - l) Plug in the lighting plug, and check all lights and indicators. The electrical plug only fits one way, so line up its cut-out with the lug on the bottom edge of the socket. Some cars have two sockets – use the one with the black cover flap because the one with the white flap is for caravan supplementary electrical systems.
 - m) It is your responsibility as the driver to ensure all lights work. Turn on the car lights and check the trailer's lights. With the ignition on, make sure the correct indicators are working – car and trailer indicators not matching is a common fault – then get someone to see if the trailer brake lights work. (If you are alone, use a short stick between the pedal and the seat to hold down the brake pedal.)
 - n) Adjust both external mirrors so that a view down both sides of the trailer can be obtained. (If this cannot be achieved extension mirrors should be fitted).
 - o) When loading a trailer ensure the weight is distributed appropriately. Nose weight is a very important factor in making your vehicle and trailer combination stable during towing. Inadequate nose weight can cause snaking problems. Too much nose weight causes other problems. (See also Section 4.)

- p) Noseweight should be at least 50kg when the outfit is stationary. Refer to the recommendations of you vehicle and trailer manufacturers.
- q) It is your responsibility, as the driver, to ensure that your vehicle or trailer is not overloaded.
- r) If the trailer has an eye coupling, after attaching the trailer, make sure that the safety locking catch on the towing pin is properly applied and that the safety pin or clip is fitted. (If this is not fitted, the trailer could become unhitched).
- s) Lift up and lock the jockey wheel assembly. (If this is not done, the jockey wheel will become damaged).



2. Driving

GENERAL

Speed limits

1. Always keep to the legal speed limit for the road you are using. Speed limits for cars towing caravans or trailers.
2. 30mph limit applies on all roads with street lighting unless signs show otherwise.
3. 50mph applies on single carriageways unless signs show otherwise.
4. 60mph applies on dual carriageways and motorways
5. It should be remembered that you must not travel in the right-hand lane of a motorway, with three lanes or more, if you are driving a vehicle drawing a trailer.

Drive within your outfit's capabilities

6. Always drive at a speed that is well within your capabilities, and to the road and weather conditions that prevail at the time.
7. If your trailer begins to snake or swerve, ease off the accelerator and reduce speed gently. (This can happen if you are driving too fast or the load in the trailer is wrongly positioned).
8. Do not brake sharply on a bend, (this could cause a possible jack-knife situation). Reduce speed before the bend and take the appropriate gear for the speed you are doing. Then gently accelerate out of the bend.

REVERSING

1. Before reversing, get out of the vehicle and check that all is clear to the rear before making the manoeuvre.
2. Be on the look out for children and pedestrians. If possible, get someone to watch while the manoeuvre is made.

WARNING!! Never reverse a trailer without checking behind because of the huge blind spot. Ideally, have someone see you back, especially in crowded places. Reversing a trailer is a skill that can be mastered with a little perseverance by anyone who has learned the basic theory. Find somewhere with plenty of space and keep trying until you get it right. It helps to have someone who knows how to do it to tell you where you are going wrong.

Step-by-step reversing

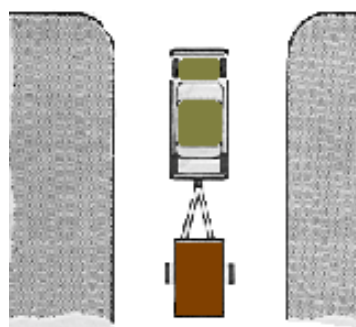
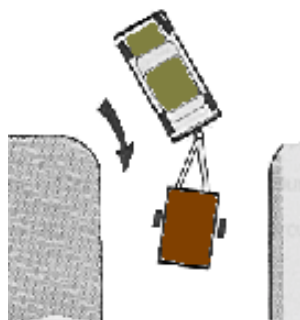
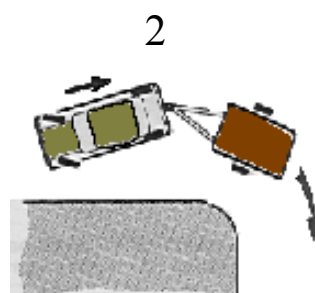
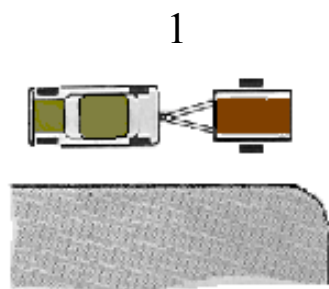
This example describes how to reverse to the right because that is easier than reversing to the left.

If you are not sure which way your wheels are pointing at any time lean out and look at them.

Many pre-1989 trailers have a lever that prevents the brakes from operating during reversing. All trailers built after March 31st 1989 have auto-reverse brakes.

1. Start with the outfit as straight as possible and about a trailer's length from the place into which you are reversing. You need plenty of room to swing the towcar round.
2. Watching the trailer out of the driver's window, reverse slowly and start turning the steering to the left. It is easier to add more steering than to correct too much.
3. As soon as the trailer starts to turn, you begin straightening up whilst still reversing. If you leave it too late, the trailer will 'jack-knife'. (This means that it gets to such an acute angle to the towcar that it can no longer be manoeuvred in reverse. This condition can damage towcars with long rear overhangs.)
4. Eventually you start steering the other way, while still reversing, to bring the towcar's nose round so that the car "follows" the trailer – but keep an eye on where the trailer is going in case it needs correction.
5. Reverse in a straight line using the door mirrors. Reverse slowly and carefully. When more of the trailer starts to appear in one mirror, steer towards that mirror to start the trailer going the other way. Such corrections only require small steering movements.
6. Do not get your mind stuck in reverse! If the trailer goes out of line, it may be easier to pull forward to correct it. On tight turns or if it jack-knifes, to pull forward is your only option.





3

4

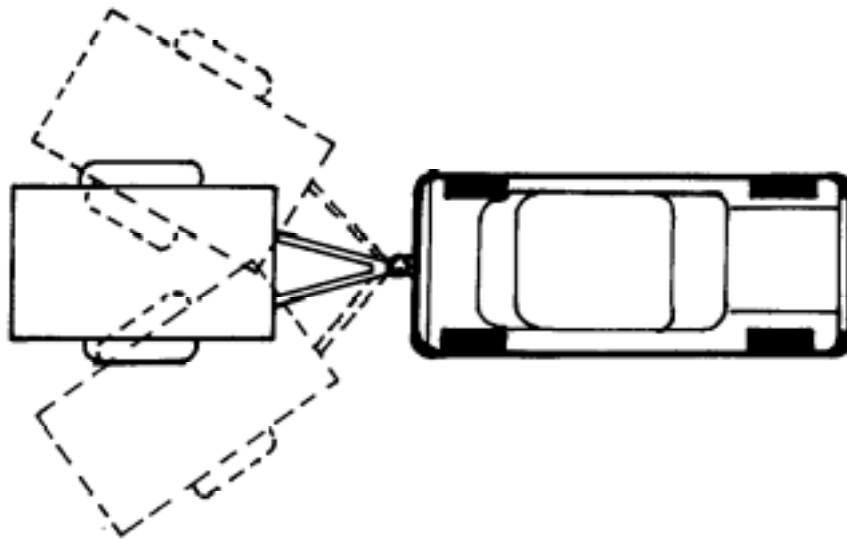
3. The use of stabilisers

Stabilisers are not intended to be a substitute for sound practice in loading and towing. They are valuable, particularly with caravans and horse trailers, and other high-sided trailers. They will not, however, overcome problems created by poor loading or poor driving.

Follow the golden rules of towing:

- Set up the trailer so that is level when coupled to the towing vehicle.
- Make sure the nose weight is between 50 and 100kg (unless trailer is very light.)
- Make sure the tyre pressures are correct.

The main purpose of a stabiliser is to stop a trailer or caravan from becoming unstable and "snaking" from side to side. They come in various forms and designs. The most popular types are the trailing arm leaf spring and the coupling head stabiliser.



"Snaking" is when the axles of the caravan/trailer move out of line from the towing vehicle. When this happens, the trailer/caravan tries to move back into line and it goes too far. This action starts the cycle of "snaking" from side to side. Unless the snaking is stopped, it will increase and will cause the driver to lose control.

Snaking can be caused by a number of factors such as:

- Incorrectly placed loads (excessive loading to the rear of the axle(s))
- Very light or negative nose weight
- Side winds (when a large commercial vehicle or coach overtakes and causes the air to buffet the caravan/trailer, moving the axles out of alignment)
- Special purpose built trailers having awkward internal fixtures that may be not balanced, causing instability.

To stop snaking there are a few simple rules.



-
- Keep the vehicle steering in a straight line
 - Change down a gear and take both feet off the pedals
 - If the snaking starts whilst going down hill, change down a gear and very gently apply the brakes
 - Do not try to accelerate out - this could end in disaster unless the vehicle is exceptionally powerful.
 - Do not brake hard - this may cause the trailer to jack knife.
 - Do not try to steer out - it is very difficult to read the snaking action and it can make it worse.

Stabiliser Checks and Servicing:

(Each manufacturer will have their own servicing and checks guide, which should be contained within the handbook or fitting instructions.)

Stabilisers must be checked at the start of each journey

- Check that the friction is apparent (if possible)
- Check that the stabiliser fits into its locating place properly

Stabilisers must be overhauled thoroughly at least once a year or after 20K miles towing. (whichever is sooner)

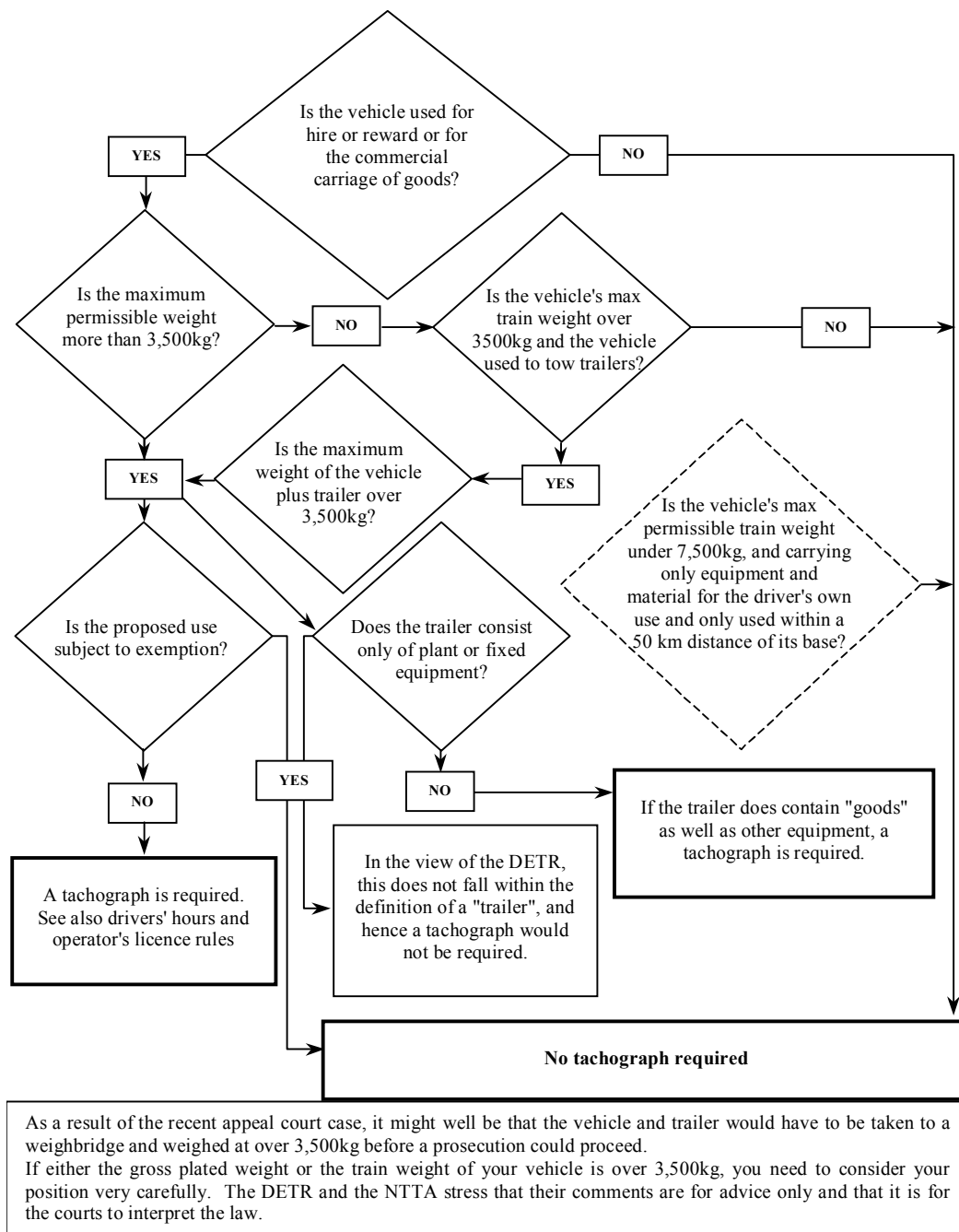
The stabiliser must be dismantled and any pads or friction disks must be inspected for cracking or excessive wear. NB: Beware of servicing older stabilisers because the friction pads or disks may contain asbestos. These should be handled and disposed of carefully.

Problem	Cause	Remedy
Groaning noise when manoeuvring slowly	Friction material migrated onto adjoining metal parts	Dismantle and clean metal parts
Leaf spring jumps out of chassis shoe	Tension on disks too high	Check and reduce operating tension
	Incorrect position of chassis shoe. Leaf catching 'A' frame	Check for full articulation and move chassis shoe

4. Tachographs

The flow chart below is designed to tell whether a vehicle/trailer combination needs a tachograph.

This is an important issue and one in which the police are taking a keen interest. Drivers who legitimately do not have a tachograph should carry a copy of this information if they think the police might possibly expect them to have one in their cab.



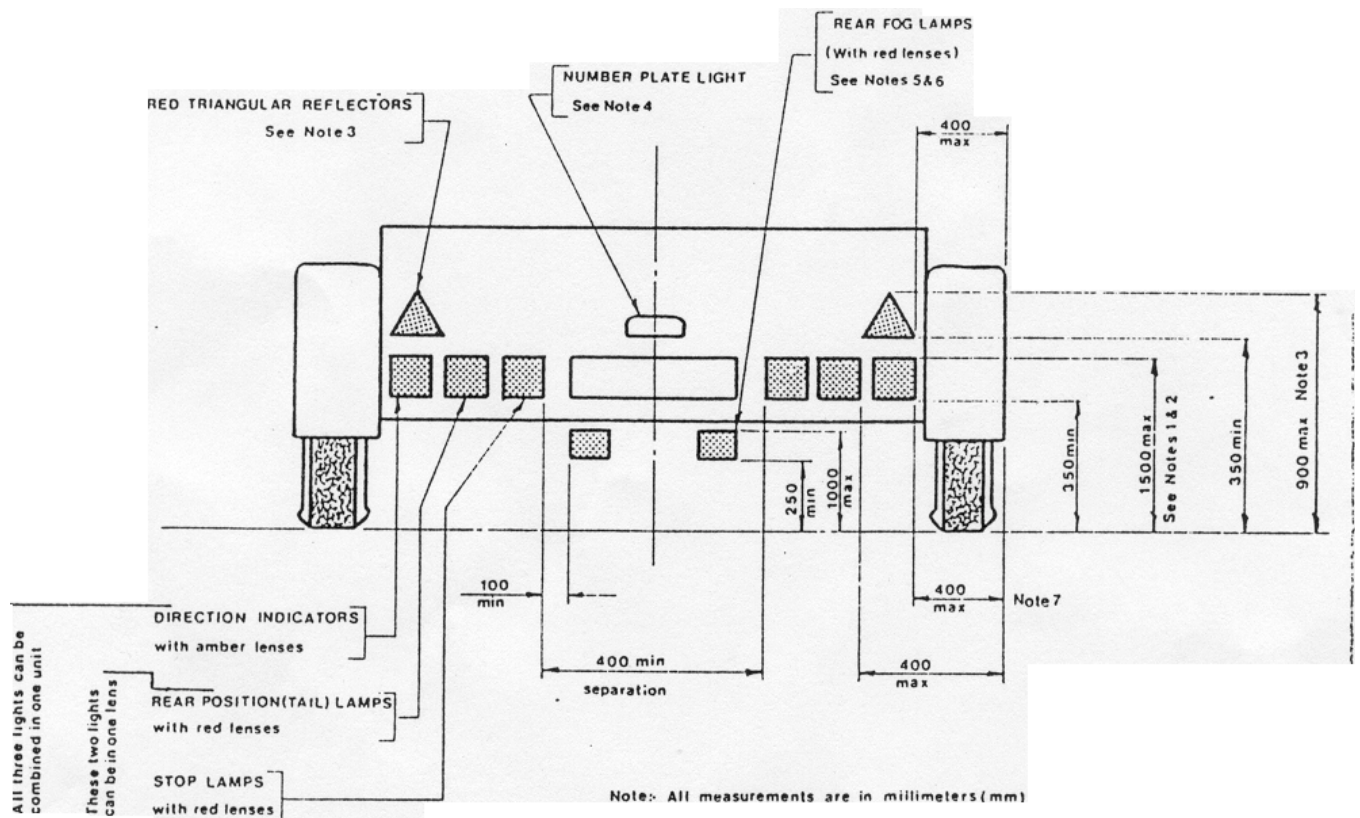
5. Lights

Requirements

Trailers must have on the back two red sidelights, two red stop lamps, an illuminated number plate and two triangular red reflectors plus amber indicators designed to flash between 60 and 120 times per minute. If they are more than 1.3m wide, they must also have at least one red fog lamp.

All trailers built after Sept 30th 1990 require front reflectors.

They must have front reflectors and, if they are more than 1.6 metres wide, front position lights.



- If, in the case of direction indicators, it is not possible to meet the maximum height requirements, this dimension can be increased to 2300mm.
- If, in the case of the rear position (tail) lamps and stop lamps, it is not possible to meet the maximum height requirements, this dimension can be increased to 2100mm.
- On trailers manufactured after 1 October 1985, the maximum height of the red triangular reflectors can be increased to 1200mm if necessary.
- Trailers manufactured after 1 October 1985 require numberplates, illuminated by an 'E' or 'e' marked lamp. If a clear window in the rear position lamp is approved, this can be used instead of a separate numberplate lamp but must be fitted to the manufacturer's instructions with regard to distance from the numberplate.

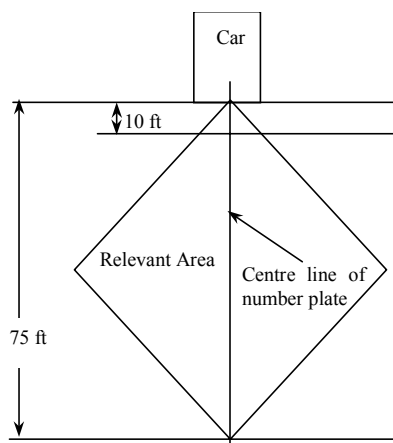
- e) At least one rear fog light is mandatory on trailers over 1.3 m wide. Two lamps are preferred but, if only one is fitted, it must be to the offside or on the centre line of the trailer.
- f) No maximum distance from the outer edge of the trailer is stated for a fog lamp(s) but there must be a minimum distance of 100mm from the stop lamp.
- g) The distance of the direction indicator from the side of the trailer may not exceed the actual distance of the rear lamp by more than 50mm.
- h) Trailers manufactured after 1 October 1985 which are more than 1600mm wide, (except boat trailers) require front position lamps (clear lens).

Certain trailers must have side position lights which show white to the front and red to the back. In addition, trailers over certain lengths must have amber side reflectors.

Obscuring the number plate

The ability for a numberplate to be read is covered by Statutory. Instrument 1971 No 450 - The Road Vehicles (Registration & Licensing) Regulations 1971. Part III - Exhibition of Licences and Registration Marks states the following:

1. The provisions of this regulation shall apply to vehicles, other than works trucks and agricultural machines, first registered on or after 1 October 1938.
2. The registration mark of the vehicle shall be fixed and displayed on both the front and the back of the vehicle, so that in normal daylight the letters and figures are easily legible from every part of the 'relevant area', the diagonal of the square governing the 'relevant area' being 75 feet.



3. For the purposes of this regulation, the expression 'relevant area' in relation to a registration mark on a vehicle means the area contained in a square described on the ground, either in front of or behind the vehicle, where one corner of the square is below the middle of the registration mark and the diagonal of the square from that corner is parallel to the longitudinal axis of the vehicle, but excluding any part of the square within 10 feet of the vehicle - see diagram.

It is an offence to allow the numberplate to be obscured. This is now a fixed penalty offence, and therefore more likely to be policed. Obviously, this is of some concern to towbar fitters and to drivers of vehicles with towbar attachments.



6. Brakes

Requirements

- a. Braked trailers manufactured pre Oct. 1982 may be fitted with a spring damped coupling as a replacement item.
- b. Braked trailers manufactured after Oct. 1982 must be fitted with a coupling that incorporates a hydraulic damper.
- c. Braked trailers manufactured after Oct. 1982 require brakes that comply with EC Directives. If brakes are required, all wheels must be braked. (if manufactured in or after 1968)
- d. Any braked trailers manufactured after April 1989 must be fitted with a hydraulically damped coupling and auto reverse brakes to give braking efficiencies required by EEC Directive 71/320 (ECE13).
- e. The size of the ball coupling on braked and unbraked trailers must be 50mm to ISO and BSI Standards. The use of old 2-inch unit is not recommended.
- f. Unbraked trailers manufactured after 1 Jan 1997 must be fitted with a secondary coupling that will provide some residual steering in the event of an unplanned uncoupling. This device should also prevent the ball coupling hitting the ground in similar circumstances. It must be connected to the towing vehicle when the trailer is being towed.
- g. Braked trailers must be fitted with a parking brake that operates on at least two road wheels on the same axle. At all times it must be capable of being maintained in operation by direct mechanical action without the use of hydraulic, electric or pneumatic systems – i.e. Operated by rod or cable action. The efficiency of the handbrake must also comply with EEC Directive 71/320/EEC; i.e. It must be capable of holding a stationary trailer on a gradient of at least 16% (1 in 6.25)
- h. An emergency breakaway cable must be fitted to the parking brake linkage and the other end clipped or fixed round some fixture on the towing vehicle so that, in the event of the trailer becoming detached from the towing vehicle, the cable will apply the parking brake automatically, before snapping itself. It is not recommended to loop the cable round the towball. (But do so if there is no alternative attachment point.)
It is a separate offence not to use the breakaway cable provided.
- i. A secondary coupling as per “f” must be fitted to a braked trailer manufactured before 1982 that has a manual handbrake arrangement¹. (A secondary coupling can also be fitted to a braked trailer with hydraulic damping, manufactured after 1982. In such cases, great care should be taken to ensure that the secondary coupling is appropriate in terms of the weight of the trailer (esp. If it is over 1000kg.). Also the operation of the breakaway cable is likely to be prejudiced.)

¹ Some early Rice horse box trailers had an arrangement, similar to a breakaway cable, which applied the handbrake in an emergency.

7. Servicing

- (a) Frequency of servicing.
- (b) The overrun coupling - inspection and service.
- (c) The brake drum, hub and backplate assembly - inspection and service.
- (d) Adjustment and setting up of an overrun braking system.
- (e) Fault finding - couplings & brakes

(a) FREQUENCY OF SERVICING

This very much depends on type and frequency of usage, but an outline guide could be as follows:

Daily or before each journey - certain checks are essential for safety and are the responsibility of the trailer operator.

After the first 600 miles (10,000 km) - essential for new trailers or if new brake linings and/or bowden cables are fitted (see Section 7 below)

Every 3000 miles (5000 km) - three monthly for commercial/industrial trailers intensive usage, either by mileage towed or type of application and including boat trailers that are immersed in water.

(See Sections 11 and 13 below)

Every 6000 miles (10000kms) - annually for caravans and leisure trailers.

Six monthly for commercial/industrial trailers - based on "average" use.

(b) OVERRUN COUPLING - INSPECTION & SERVICING:

- a) Overrun capacity - check that it is correct for the gross weight of the trailer.
- b) Coupling mounting bolts - check for tightness.
- c) Coupling head bolts - check for tightness.
- d) Coupling head - using a 50mm test towball (to meet BSAU 113c it must be between 49.61mm and 50.00mm) check that it locates and locks correctly in the coupling head and that any wear/location indicators are functioning. Lubricate the mechanism and lightly grease inside the coupling socket.
N.B. If fitted with a 50mm coupling head type stabiliser, DO NOT GREASE.
- e) Eye fittings - If fitted, check for signs of irregular wear – see Section 10.
- f) Draw tube - check, by moving the shaft up and down, that the bearings that support the draw tube are not worn. The amount of end float between the shaft and the brake lever that is acceptable varies between manufacturers and should be checked in their service instructions.
- g) Drawtube gaiter - check for splits and tears. Replace if damaged.



-
- h) Damper - with the handbrake off and wheels chocked, push the coupling in. If it does not move or goes in with no resistance and does not push itself back out, it must be worn and should be replaced. It should move in steadily with uniform resistance.
 - i) N.B. it is essential that the correct specification of replacement damper is used and that manufacturers' fitting instructions are followed.
 - j) Handbrake - check the action for correct movement. If it is a ratchet type, are the condition and action of the teeth and pawl OK? Lubricate the pivots, including any grease nipples underneath.
 - k) Grease nipples - apply a grease gun to nipples on top of the housing, ensuring that a liberal amount of grease is applied.
 - l) Breakaway cable - check for kinks, fraying, operation of the clip and that the cable is securely attached to the "burst" ring. If replacement is required, ensure that a genuine part is used.
It is desirable that the cable passes through a hole or guide in the front of the chassis to ensure straight line pull in the event of a breakaway.
 - m) If the coupling is fitted with a self-correcting reverse cut out lever, check that it returns satisfactorily after being applied.

The above are general outline procedures and reference should always be made to the specific coupling manufacturer's maintenance instructions.

(f) FAULT FINDING - COUPLINGS & BRAKES

FAULT	POSSIBLE CAUSE	REMEDY
Brakes overheat	Wheel brakes over adjusted	Adjust correctly
	Wheel brake dirty/rusty	Clean and re-set
Brakes overheat	Handbrake not releasing or left on	Check mechanism and adjust
	Bowden cable(s) kinked	Check and replace
	Drawtube dirty and/or bent	Clean or replace
	Overrun lever/brake lever Sticking and/or bent	Grease or replace

N.B. after any instance of the brakes overheating it is ESSENTIAL that the wheel bearings and grease are thoroughly checked over and replaced if necessary.



FAULT	POSSIBLE CAUSE	REMEDY
Braking effort weak	Wheel brakes not adjusted	Adjust correctly
	Brake linings glazed or contaminated	Clean or replace and re-set
	Incorrect clearances in system	Check and re-set
Reversing difficult	Drawtube dirty and/or bent	Clean or replace
	Braking system set too tight	Check and re-set
Handbrake weak	Braking system set incorrectly	Check and re-set to eliminate excessive travel
		Check and re-set
Uneven or jerky braking	Too much play in braking system	Check and re-set
	Worn damper in overrun	Replace
	Faulty components in wheel brake	Check and replace
	Ovality in drum	Check and have skimmed, or replace
Banging from overrun when braking	Wheel brakes unevenly adjusted	Check and re-set
	Bowden cable kinked	Check and replace
	Brake linings contaminated	Check and replace
	Excessive nose weight	Check and adjust load
Difficulty coupling and uncoupling	Damper resistance completely gone	Replace. Then adjust brakes.
	Coupling head mechanism dirty or damaged	Check and clean or replace
Excessive play between coupling head and towball	Towball dirty	Clean and, if necessary, grease
	Towball damaged	Check and replace
	Coupling head worn	Replace
Wear in back of eye and rear of pin	Towball worn	Replace
	Jaw too wide	Check and replace eye
Wear on inside and outside of front of eye	Jaw too tight	Replace with wider jaw
	Jaw crimped by excessive noseweight	Replace jaw and reduce noseweight
Pin seized in jaw		
Stress fractures on couplings or trailer drawbar	Incorrect eye/jaw combination	Check and replace with compatible components
	Excessive overhang on towing vehicle	Check and discuss with operator. Possibly fit Shocklink
	Mis-match of towing heights	Modify towball or trailer coupling position or fit height adjustable equipment

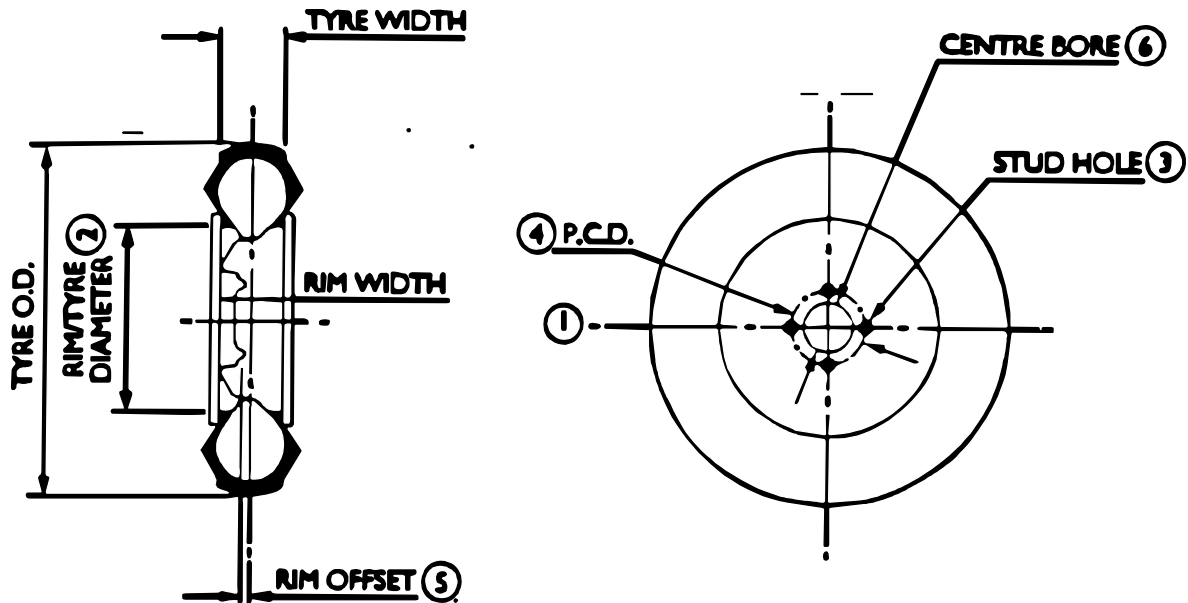
One service problem that has emerged in recent years is the phenomenon of the brake linings sticking fast to the inner surface of the drum. In extreme circumstances if towing the trailer is attempted, the affected hub will not turn and the tyre may be dragged along the ground.



Much investigation has been undertaken by the brake suppliers, but without any concrete conclusions. Although it is believed that the changes in the composition of the lining material in 1989, i.e. The removal of the asbestos content and its replacement with cintered metal, have an influence. Unfortunately it has proved very difficult to exactly reproduce the problems consistently under test conditions, but it is thought that under a combination of some or all conditions, the linings literally bond themselves to the drum, the cintered metal in many cases forming a rust bond. A summary of the conditions and possible remedies is as follows:

- A) Leaving the handbrake on when the trailer is parked for extended periods, particularly in damp conditions e.g. Parked up when damp, parked on long grass. It is essential that when a trailer is to be parked under these circumstances, that the handbrake is left off and the wheels adequately chocked.
- B) Trailers that are infrequently used often suffer most. This could not only be due to the handbrake as above, but also to the fact that the brakes never really are used and properly bedded in. It is vital that such trailers are regularly serviced on a time interval basis - see c) above.
- C) Boat trailers - immersion of the brakes in water, particularly salt water can have serious detrimental effects on the brakes and cause severe bonding problems. Additional servicing is essential - see BOAT TRAILERS: ADDITIONAL OPERATING ADVICE (11a)
- D) In the event of one or more brakes sticking on in this fashion, the only remedy is to strip down, clean and reassemble the hub/brake. It may be possible to break the bond by tapping the drum with a hammer after backing off the adjuster. This will enable the trailer to be moved, if stuck in an inconvenient place, but it is essential that the brakes be stripped down as soon as is practicable afterwards.
- E) If all else fails or you experience repeated problems with a particular trailer, consult the Service Department of either the axle or brake manufacturer.

8. Wheels



There are many different types of wheels fitted to trailers, many of them specifically for trailer use. The practice of using car wheels, rather like that of using car brakes, has largely died out.

Wheels, like tyres, have a maximum weight capacity determined by the manufacturer.

Where a wheel/tyre unit maximum weight capacity is declared, if either of the two parts has a different loading capacity, the declared figure will be the lower of the two. Reference should always be made to the supplier if there is any doubt.

The technical terms around a wheel are frequently misused and "rim" and "wheel" are often misused. The main factors to bear in mind, particularly when ordering replacements are as follows:

- 1) Rim
The rim serves as the seat for the tyre.
- 2) Wheel Disc
The wheel disc connects the rim with the hub.
- 3) Wheel
The wheel is the entire assembly, consisting of the rim and disc.
- 4) Rim width
The width inside the wheel flanges and is normally expressed in inches e.g. 4.50.
- 5) Rim diameter
The diameter of the wheel just inside the rim, where the inner edge of the tyre bead sits and normally expressed in inches e.g. 13"
- 6) Offset



The distance between the seating surface of the wheel/hub and the vertical centre line of the wheel/tyre unit. This can be positive offset, as shown above, where the vertical centre line is behind the seating point, when the wheel is fitted to the hub. Negative offset is the opposite and is sometimes known as inset.

- 7) Centre disc
There are also centre disc wheels that have neither positive nor negative offset; i.e. The vertical centre line is in exactly the same plane as the seating point.
- 8) Centre bore
The hole in the centre of the wheel disc, designed to accommodate the bearing boss and grease or dust cap. Size expressed in millimetres.
- 9) Stud or bolt holes
The holes by which either the studs or bolts fasten the wheel to the hub. Normally 4 or 5 in number, the size is determined by the size of the stud or bolt, either metric or imperial. The usual way of expressing the configuration incorporates both these factors, e.g.
4 x M12 = 4 off 12mm studs or bolts.
5 x M14 = 5 off 14mm studs or bolts.
4 x ½" = 4 off ½" studs.

The seating of the stud hole is also important and must correspond with the seating on the stud or wheel bolt. These are either conical (Straight side walls inside the seating) or spherical (curved side walls inside the seating) but there are some continental wheels with flat cylindrical holes.

- 10) Pitch circle diameter (P.C.D.)
The diameter of the circle around which the studs are arranged. Measurement given in metric or imperial e.g. 100mm, 112mm, 5.5", 4". The measurement of a 4 stud fixing is simply the distance between the centres of two opposite stud holes.

A five stud fixing is calculated by taking the measurement from the centre of a stud hole to the edge of the centre bore x 2 + the diameter of the centre bore.

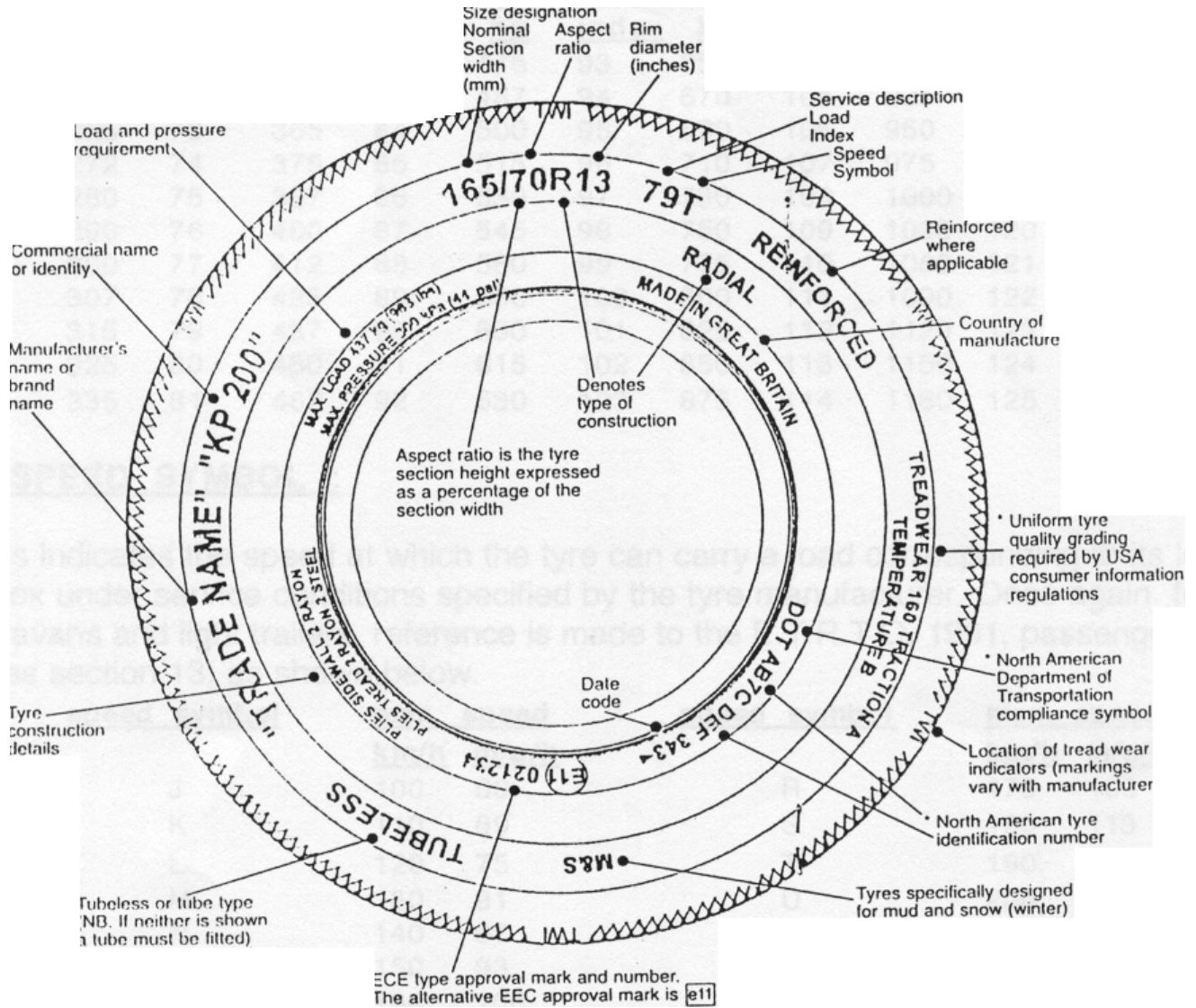
- 11) Studding patterns
The correct way to express a studding pattern, either of a wheel or of a hub is an amalgam of 9) and 10),
E.g. 4 x M12 on 100mm
4 x ½" on 5.5" (or 139.7mm)
5 x M12 on 112mm

- 12) Two piece wheels
Although rarely used as original equipment in today's light trailer market, a number of older trailers may be fitted with two piece wheels, particularly those using 600 x 9 tyres. It is vitally important that the nuts holding the two sections together are NOT loosened whilst the tyre is still inflated.

9. Tyres

Tyre sidewall markings :

The illustration below provides an explanation of the markings currently found on a tyre sidewall.



* do not apply in the U.K.

Retreads - must also show either 'RETREAD' or 'REMOULD' on the sidewall, together with 'BSAU 144' in place of ECE Type Approval Mark.

Aspect ratio - ratio between the height of the sidewall and the width of the tread, expressed as a percentage. In the example above, the figure is 70%.

Nominal section width - on radial tyres this is expressed in millimetres, on cross ply tyres, inches are used.



Tyre condition

Car and trailer tyres must have at least 1.6mm of tread over the central 75% of their width for their entire circumference, although a tyre with under 3mm offers little grip in the wet. Tyres must be free from deep cuts and bulges (which indicate they are breaking up) and it is illegal to use cross-ply and radial tyres on the same axle. (Make sure that the tyres you fit to your trailer are of the correct rating.)

Tyre load index:

This is a numerical code associated with the maximum load a tyre can carry at the speed indicated by its Speed Symbol under service conditions specified by the tyre manufacturer. For caravans and light trailers conditions are specified by the European Tyre & Rim Technical organisation (E.T.R.T.O.) 1991, passenger car tyres section 13, as shown below.

Load inde	Load kg	Load inde	Load kg	Load inde	Load kg	Load inde	Load kg	Load inde	Load kg	Load inde	Load kg
x		x		x		x		x		x	
60	250	71	345	82	475	93	650	104	900	115	1215
61	257	72	355	83	487	94	670	105	925	116	1250
62	265	73	365	84	500	95	690	106	950	117	1285
63	272	74	375	85	515	96	710	107	975	118	1320
64	280	75	387	86	530	97	730	108	1000	119	1380
65	290	76	400	87	545	98	750	109	1030	120	1400
66	300	77	412	88	560	99	775	110	1060	121	1450
67	307	78	425	89	580	100	800	111	1090	122	1500
68	315	79	437	90	600	101	825	112	1120	123	1550
69	325	80	450	91	615	102	850	113	1150	124	1600
70	335	81	462	92	630	103	875	114	1180	125	1650

Speed symbol:

This indicates the speed at which the tyre can carry a load corresponding to its load index under service conditions specified by the tyre manufacturer. Once again, for caravans and light trailers, reference is made to the E.T.R.T.O. 1991, passenger car tyres section 13, as shown below.

Speed symbol	Max speed Km/h	Max speed M/p/h	Speed symbol	Max speed Km/h	Max speed M/p/h
J	100	60	R	170	106
K	110	69	S	180	113
L	120	75	T	190	118
M	130	81	U	200	124
N	140	87	H	210	130
P	150	93	V	240	150
Q	160	100			

E.T.R.T.O. 1991 - Section 13 - Caravans & Trailers:

An increase of 10% over the load capacity quoted in the tables is permitted when tyres are fitted to caravans and light trailers with a maximum operating speed up to 100 km/h. (60 m.p.h.). The basic inflation pressure should be increased by 3 p.s.i. / 0.2 bar.



This 10% bonus loading is widely used in the U.K. light trailer industry, but should only be used on trailers that are to be sold within the U.K. The caravan industry in the U.K. tends to ignore this bonus loading and use loadings at 130 km/h / 81 m.p.h.

Load & pressure ratings :

A table covering popular trailer sizes is given below.

Tyre size	Max speed 100 km/h/60 mph		Max speed 130 km/h/81 mph	
	Axle Load kg	P.S.I./Bar	Axle Load kg	P.S.I./Bar
400 x 8 (4ply)	540	60/4.2	-	-
400 x 8 (6 ply)	680	75/6.2	-	-
500 x 10 (6 ply)	860	50/3.5	-	-
5.20 x 10	616	32/2.2	-	-
145 x10	693	35/2,4	630	32/2.2
145 x 10 (R/F)	781	42/2.9	710	39/2.7
140/70 x 12	1060	62/4.3	-	-
155/70 x 12	1800	90/6.2	1636	87/6.0
145 x 13	825	53/3.7	750	32/2.2
155 x 13	935	35/2.4	850	32/2.2
155 x 13 (R/F)	1045	42/2.9	950	39/2.7
165 x 13	10445	36/2.5	950	33/2.3
165 x 13 (R/F)	1166	45/3.1	1060	42/2.9
175 x 13	1166	36/2.5	1060	33/2.3
175 x 13 (R/F)	1276	45/3.1	1160	42/2.9
175 x 13 (6ply)	1407	54/3.75	1340	54/3.75
183 x 13 (6ply)	1500	54/3.75	1460	54/3.75
185/70 x 13 (Avon 950)	1900	87/6.0	1800	87/6.0
175 x 14 (6ply)	1491	54/3.75	1420	54/3.75
175 x 14 (8ply)	1628	65/4.5	1550	65/4.5
185 x 14 (6ply)	1628	54/3.75	1550	54/3.75
185 x 14 (8ply)	1785	65/4.5	1700	65/4.5
195 x 14 (6ply)	1785	54/3.75	1700	54/3.75
195 x 14 (8ply)	1995	65/4.5	1900	65/4.5
600 x 16 (6ply)	1533	52/3.6	-	-
650 x 16 (6ply)	1890	62/4.3	-	-
750 x 16 (6ply)	2100	51/3.5	-	-

N.B - it is dangerous to inflate a tyre beyond maximum pressure.

10. Eyeshafts, towing jaws and hooks

Legislation



No specific legislation applies but the use of products complying with BS A.U. 24a 1989, which specifies the pin/hook and eye dimensions, together with throat clearances of the jaw to ensure adequate articulation, is strongly recommended.

1) Eveshafts

The eyes normally used in the U.K. have an internal diameter of 30, 40, or 50mm and are used with either a towing jaw, a combination jaw/towball or occasionally a hook. There is also the 76mm Nato eye used by the Armed Forces, usually with a military style pintle hook.



The British eyeshafts have a round or toroidal section eye and are used with a parallel type pin with sufficient clearance in the eye to permit the correct sequence of towing on the pin and braking on the jaw. If the pin is too large or the clearance between the jaw and pin too great, then both towing and braking loads will be put onto the pin.

A 40mm DIN eye, commonly used in Europe, has a hardened steel bush fitted to the internal bore and is designed to be used with a special pin that has a bulbous or reinforced section, around which the eye can pivot. Because of this it is **ESSENTIAL** that a 40mm DIN eye is **NOT** used with a British style parallel pin, as the sharp edges of the bush will cause accelerated wear of the pin, with possible serious results. The incorrect combination can also often prevent full articulation of the eye within the jaw, leading to rapid coupling wear and possible chassis damage.

If a trailer of less than 3500kg gross weight is to be towed by an H.G.V. it is recommended that an eye is used in preference to a 50mm ball coupling. In this way the overrun coupling is better able to withstand the additional forces imposed on it by the harder suspension and possible extra overhang behind the rear wheels on the towing vehicle.

2) Towing jaws and hooks :

British standards require that there should be sufficient room behind the pin of any towing jaw to allow a bar of 31.75mm (1.1/4") to be passed through. This ensures adequate articulation of the eyeshaft in both vertical and horizontal planes. It is also important that this

gap is not too great, thus allowing the back of the eye to hit the front of the pin before the front of the eye contacts the throat of the jaw.

A jaw opening that does not comply with the standards and therefore restricts articulation upwards and downwards, is likely to bring about stress fractures on either the coupling or the trailer chassis drawbar. This may be particularly pronounced if the towing vehicle has a long overhang behind the rear wheels and, in such cases, the fitting of more robust, higher capacity equipment than the gross trailer weight might suggest, is often recommended.

The above standards also apply to the jaw on a combination jaw and towball unit. This type of product provides the flexibility of being able to tow trailers fitted with either an eye or 50mm coupling head, without having to change the fittings on the tow vehicle. Where the ballpin is separate, it is also preferable to use a unit that is fitted with a primary locking device to stop the pin/ballpin working loose or rattling unduly. A secondary device such as an "R" clip is also often used, but if this is the only means of securing the ballpin it is insufficient, due to the stresses imposed by the alternating lifting/dropping forces brought about by road conditions and/or poor load distribution.

A hook has no separate pin, but a safety catch should be fitted to prevent inadvertent detachment of the eye. Where a hook has no "chin" or limiting pins on its outer face the towing eye may swing round and underneath the hook if the trailer has been reversed into a jack-knife position. In such a situation, as the towing vehicle moves forward, the eyeshaft and/or drawtube can be severely bent.



11. Servicing the rest of the trailer

The following items should be included in any 3 monthly (3000 miles) and 12 monthly (6000 miles) service.



A) Jockey wheel and clamp:

You should use your own judgement to check whether the jockey wheel and clamp fitted are adequate for the size and gross weight of the trailer. If they are too light, you will notice difficulty in using them and they may bend or become damaged. A jockey wheel should work easily and cope comfortably with the loads placed on it.

Check for smooth operation winding up and down. If suspect then replace the assembly.

Check wheel/tyre unit and spindle for smooth running and/or impact damage. Replace if necessary.

Check the operation of the clamp and clamp handle. If the handle is damaged or bent, replace it.

If the clamp mounted on the A-frame, is it secure and not twisted?

Lubricate all moving parts, including threads.

B) Chassis:

Check for damage, distortion and excessive rust - if painted.

If galvanised, is the covering intact?

Refer to original manufacturer if any sections require replacement.

C) Wheels and tyres :

Are the tyres fitted the correct size and ply rating for the gross weight of the trailer?

Recommended load ratings for popular trailer tyres are shown on SECTION 8.
Are all tyres the same size and ply rating?

Tread - the same laws apply to trailers as apply to vehicles, so ensure that there is sufficient tread to last until the next service, i.e. Minimum 1.6 mm for the centre three quarters of the tread for the whole circumference.

Check for any cuts, bulges or any other damage. Care should be taken i.e. Wear gloves, in case any screw heads, pieces of glass or tyre steel ply wires are protruding from the tyre carcass.

Check for any uneven tyre wear that might indicate damage to the suspension, incorrect tyre pressures or wheels being incorrectly balanced – just as important on trailers as on cars.

Check tyre pressures. Recommended pressures for popular trailer tyres are shown in Section 9.

Inspect the wheels for damage.

Are the wheels the correct size and all the same?

Are the stud holes unworn and round, not oval, indicating that the trailer has been run with loose wheel bolts/nuts?

Full details relating to wheels are shown in section 8.

Check tightness of the wheel bolts/nuts using a torque wrench - see Section 8.
Are they the same shape and angle as the seating on the wheel?

D) Axles and suspension :

Rubber suspension - no formal maintenance requirements, except visual checks on the swing arm to see –

- a) If it has been damaged by a severe impact and the wheel alignment is affected.
- b) If it is not riding at the correct angle due to overloading.

N.B. in the case of severe damage, some manufacturers operate a repair service, otherwise a replacement axle will be necessary.

Leaf springs - lubrication is not required, but visually check leaf springs, straps and hangers for damage, wear or breakage and replace if necessary. Tightness of U-bolt nuts and shackle pin nuts should also be checked.



E) Electrical system and lights:

Check that 7 pin plug and cable are undamaged and connected securely. Is there enough cable to allow manoeuvring?

Check that the 7-core cable is securely attached throughout its length and that all connections are secure.

Check that all lights are operating correctly, all lenses are unbroken and well-fitting and that all bulbs and other fittings are secure.

Check that all reflectors are correctly fitted and undamaged. Rear red reflectors must be triangular.

F) Bodywork and fittings:

Check bodywork for signs of damage.

Check operation of all locks and hinges. Lubricate as necessary.

Check that all prop stands and clamps, if fitted, are undamaged and operating correctly. Lubricate if required.

Check that corner steadies, if fitted, are undamaged and operate correctly. Clean and lightly grease the threads and other moving parts.

Check that mudguards are undamaged and fastened securely, with no sharp edges.

If a winch is fitted, check that it is mounted securely and working correctly. Is the steel cable or fabric strap frayed?

Check that the number plate is of the correct type and securely fitted.

Check that all rope hooks and lashing points are securely fixed.

Tipper trailers - check that mechanism operates correctly and lubricate as necessary. Check that safety-warning notices are in place under the tipper body.

Horse boxes or livestock carriers - check condition and security of the floor and all partitions, gates and ramps. Check the tie up points.

Boat trailers – check the security and condition of any boat rollers. Lubricate as necessary. See Section 11a for additional information on servicing.

Box van trailers - check for signs of water ingress. Reseal if necessary.

11a. Boat trailers: additional operating advice

It is recommended that hubs and brakes are not immersed in water, particularly salt water, but if they are, then the following advice can be offered:

- 1) DO NOT immerse when the hub is hot i.e. Straight after a long journey, but wait until the assembly has cooled, otherwise a vacuum will be created, making the ingress of water even worse.
- 2) Keep immersion times to the very minimum and DO NOT leave the trailer standing in the water after the boat has been launched.
- 3) After immersion in salt water, the hub assembly and indeed the whole trailer should be thoroughly hosed down with fresh water.
- 4) Do not park the trailer for prolonged periods with the handbrake fully on, particularly when the hub is wet. If necessary, chock the wheels.
- 5) It is recommended that the trailer is serviced more regularly than otherwise would be the case and certainly at least every 3 months irrespective of mileage. This must include a brake strip down and re greasing of bearings.
- 6) Hubs with unitised bearings cannot be greased and whilst they are more resistant to the ingress of water, particularly if allowed to cool before immersion, they are NOT waterproof. Repeated immersion in water will eventually lead to their failure.
- 7) Bowden cables generally are not provided with a lubrication medium i.e. A grease nipple, as the introduction of grease will inhibit the movement of the inner cable within the specially designed and coated outer casing. There is also a very real danger of excess grease contaminating the brake linings thus rendering them ineffective. Practical experience shows that a periodic soaking in thin oil e.g. WD 40, particularly over the winter months goes a long way towards avoiding seizure problems.

Following the above advice and recommendations will do much to reduce the devastating effects of water, particularly salt water, but cannot guarantee that problems will not occur.



12. Towbars and towing hitches

Vehicle categories

Category M: Motor driven vehicles, used for the carriage of passengers with:
At least four wheels or

With three wheels and a maximum weight over 1 tonne

[articulated vehicles of two non-separable, articulated units shall be considered as single vehicles)

M1 Passenger vehicles with up to eight seats in addition to the driver's seat.

M2 Passenger vehicles with more than eight seats in addition to the driver's seat, and a maximum weight of 5 tonnes.

M3 Passenger vehicles with more than eight seats in addition to the driver's seat, and a maximum weight over 5 tonnes.

Category N: Power-driven vehicles having at least four wheels or having three wheels when the maximum weight exceeds 1 tonne, and used for the carriage of goods.

N1 Goods vehicles with a maximum weight of 3,5 tonnes.

N2 Goods vehicles with a maximum weight over 3,5 tonnes but not over 12 tonnes.

N3 Goods vehicles with a maximum weight over 12 tonnes.

Category O: Trailers (including semi-trailers)

O1 Single-axled trailers, other than semi-trailers, with a maximum weight of up to 0,75 tonne.

O2 Trailers with a maximum weight of up to 3,5 tonnes, not in Category 01.

O3 Trailers with a maximum weight over 3,5 tonnes, but not over 10 tonnes.

O4 Trailers with a maximum weight over 10 tonnes.

European type approval 94/20/EC

In the U.K, with effect from 1st August 1998 all Passenger Carrying Vehicles up to 3500kgs Gross Vehicle Weight (M1 Vehicles) can only be fitted with European Type Approved towbars if the vehicle has received European Whole Vehicle Type Approval.

Non M1 vehicles, light commercial vehicles and private imports from outside the EEC do not need Approved Towbars; however, most car and some Light Commercial Vehicles such as vans commonly use the Type Approved Towbar.

Accessories



Most towbar manufacturers have allowed, in the towbar test and approval application, for the inclusion of various accessories, often by including a spacer in the towbar kit, which is removed when the accessory is fitted. This information should be clearly stated in the fitting instructions. If there is any doubt, you should contact the towbar manufacturer.

This would apply to all accessories that move the towbar rearwards from the towbar.

Design, Testing and Certification

The towbar manufacturer requires the following vehicle data to design a towbar:

- a) Manufacturer's specified fixing points.
- b) Gross vehicle weight or mass (GVW or GVM)
- c) Gross Trailer Weight or Mass (GTW or GTM) that the model of vehicle can tow.

This information is included in the Vehicle's Handbook.

From this data the towbar manufacturer constructs a test load, called D Value, which will be used to test the towbar. As well as providing the test load, the towbar manufacturer is obliged to include a D value in kn on the towbar identification plate.

"D" Value

The "D" value is calculated as follows:

$$\frac{GVW + GTW}{1000} \times 9.81 \text{ (gravity)} = \text{kn}$$

Where GVW is Gross Vehicle Weight, and GTW Gross Trailer Weight.

The maximum D value for an M1 vehicle is 17.7kn that represents a GVW of 3500 kgs towing GTW of 3500kgs.

It is possible to design a towbar that fits the whole range of models of one particular vehicle. Because Towing Capacity is related to GVM then each model may have a different value for D. To prevent overload of the Towing Vehicle refer to the Vehicle Manufacturers' Handbook to confirm the GTW for your particular model.

Towing with Heavy Goods Vehicles

The snatch loads imparted to the tow hitch by a commercial vehicle tend to be much higher than those of passenger cars, especially with a GVW up to 180000 kgs. These snatch loads will impart severe strain on the Trailers drawbar which may eventually damage the drawbar. It is therefore recommended that when towing with a Commercial Vehicle a shock absorbing towbar is fitted.

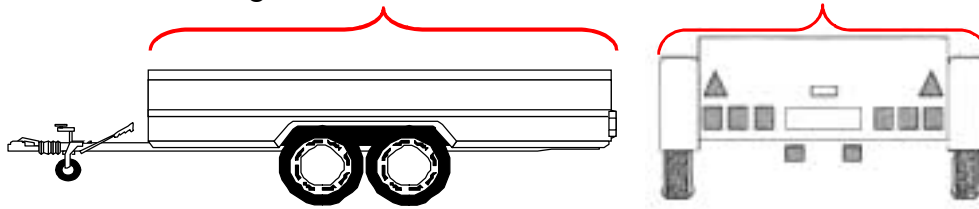


13. The law

Dimensions; weights; manufacturers' plates; markings; licences.

Maximum Dimensions:

<u>Length</u> (excluding the coupling and drawbar)	7 metres
But: towed by a vehicle over 3500kg GVW	12 metres if at least 4 wheels
<u>Width</u> Maximum	2.3m
But: towed by a vehicle over 3500kg GVW	2.55m
<u>Length of towing vehicle and trailer combined</u>	18 metres
<u>Maximum overhang of load from rear of trailer</u>	3.05 metres



Marking of rear overhang:

Between 1 metre and 2 metres, ensure the end is clearly visible by attaching a piece of cloth or similar.

Between 2 metres and 3.05 metres, a marker board as defined in the Regulations must be fitted and illuminated at night.

If the overhang is more than 3.05 metres, an attendant must be carried and the police must be notified 2 days before commencing the journey.

“Long Vehicle” Marker Plate

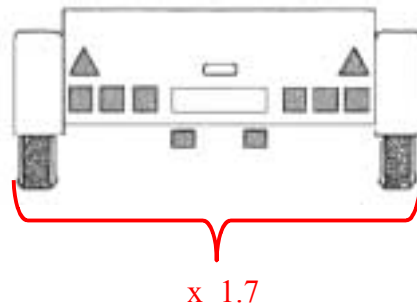
Not required for light trailers.

These are a legal requirement only for trailers over 3500kg or where the towing vehicle is over 7500kg gross weight. When they are required, different plates are required depending on the length of the vehicle. Details can be found in the Road Vehicle Lighting Regulations, Schedule 18.

Loads must not project more than 305mm either side of the trailer, up to a maximum width of 2.9metres.

Loads over 2.9 metres in width are classed as abnormal loads and the police must be notified two days before a journey commences.

Recommended maximum height



3.0m high or 1.7 times the wheel track (the horizontal distance between the centre lines of the tyre treads)

There is no legal requirement, but this is an accepted guideline.

If however the height does exceed 3.0m then a notice giving the height details must be displayed in the cab of the towing vehicle.

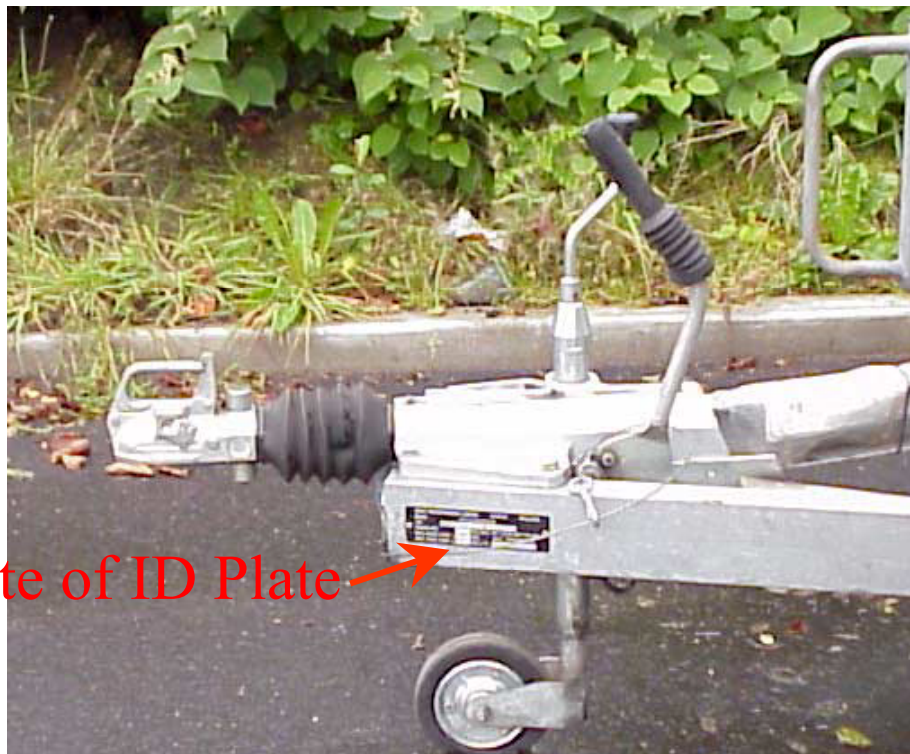
(Only buses are subject to a maximum height regulation (Regulation 9).)

Weights

Type 01: unbraked trailers - max. 750kg gross trailer weight or half the towing vehicle's kerb weight - whichever is less.

Type 02: trailers on overrun brakes - max. 3500kg gross trailer weight

Identification plates:



Site of ID Plate

1982 regulations demand that all trailers, including unbraked ones, must be clearly marked with their maximum gross weight in kg. This may be checked at any time by the police at a



weighbridge. Since 1st January 1997, all unbraked trailer plates must show the year of manufacture.

To comply with the D.o.T. Code of Practice for the recall of defective trailers less than 3500kg G.V.W. it is desirable that a trailer should carry a manufacturer's plate clearly showing:

- Manufacturers name and address chassis or serial number and model number
- Number of axles
- Maximum weight per axle maximum
- Nose weight of coupling
- Maximum gross weight (G.V.W.)
- Date of manufacture

Driving Licences:

Summary

You must hold a full driving licence to tow anything. Most drivers who passed their test before 1 January 1997 have licence categories allowing them to drive vehicle and trailer combinations weighing up to 8.25 tonnes.

With effect from 1 January 1997 the second EC Directive on Driving Licences (91/439/EEC) came into effect, affecting new drivers passing their test after that date and HGV drivers who obtained their licence after 31 December 1991.

The net result is that new drivers will only be allowed to drive and tow the following combinations: -

1. Vehicles up to 3.5 tonnes (category B) with a 750kg trailer (4.25 tonnes total MAM).
2. Category B vehicles with larger trailers i.e. > 750kg, provided that the combined MAM does not exceed 3.5 tonnes and the gross MAM of the trailer does not exceed the unladen weight of the towing vehicle. To be able to tow combinations outside this ruling requires the passing of an additional test.
3. New HGV drivers and those who have passed their HGV tests since 1 January 1992 will be restricted to towing trailers up to 750kg until they pass an additional test.

Detail of the Regulation

The Motor Vehicles (Driving Licences) (Amendment) Regulations 1990 SI 1990 No 842 classifies vehicles according to either:

- "Maximum authorised mass" (permitted maximum weight). Vehicles over 3,500kg MAM are classified as LARGE GOODS VEHICLES (LGV's)

- Number of seats. Vehicles having more than 8 seats (not including the drivers) are classified as PASSENGER CARRYING VEHICLES (PCV's)

Requires ADDITIONAL qualifications for people to drive LGV's and PCV's

Vehicle categories

The main non-LGV (unified) licence categories are:

Category A: Motor cycles (with or without a sidecar), including tricycles and mopeds

Category B: Motor vehicles with:

- A maximum authorised mass (MAM) not over 3,500kg
- A maximum of 8 seats (not including the driver's seat)

Trailers being towed by vehicles in this category must either

- Be not more than 750kg MAM – making a maximum authorised Train Weight of 4,250kg
- Have a MAM which does not:
 - exceed the unladen weight of the towing vehicle
 - Have a train weight exceeding 3,500kg

Drivers of vehicles in this category wishing to tow trailers which do not comply with either of the above conditions must have a B + E entitlement.

Category D

Passenger-carrying vehicle having more than 8 seats (in addition to the driver's seat), including such a vehicle towing a trailer not exceeding 750 kg mam.

Category D1

Sub-category of category D being a passenger carrying vehicle having more than 8 but not more than 16 seats, in addition to the driver's seat, including such a vehicle towing a trailer not exceeding 750 kg mam.

Category D + E

Combination of a passenger carrying vehicle and trailer where the passenger vehicle is in category D but the combination does not fall within that category. (Other categories covered – B + E.)

Category D1 + E



Sub-category of category D + E comprising any combination of motor vehicle and trailer where:

- (a) the motor vehicle is in sub-category D1
 - (b) the trailer exceeds 750 kg mam but not the *unladen* weight of the towing vehicle
 - (c) the combination does not exceed 12 tonnes mam, and
 - (d) the trailer does not carry passengers.
- (Other categories covered – B + E.)

The above categories are limited to driving vehicles not used for “hire or reward”.

Voluntary Drivers

Drivers holding only category B entitlement may drive vehicles in sub-category D1 (passenger vehicles with between 9 and 16 seats) provided they have held their licence for an aggregate period of at least **two years**, they are aged **21** or over, and receive **no payment or consideration for their services** apart from out of pocket expenses.

The vehicle may be driven on behalf of a non-commercial body, for social purposes but **not for hire or reward**. The vehicle must not exceed 3.5 tonnes mam, or 4.25 tonnes mam where specialised equipment for disabled passengers is installed. **A trailer may not be towed.**

Holders of category B entitlement gained before 1st January 1997 must, upon reaching the age of 70, comply with the medical standards required for category D1 vehicles if they wish to continue to drive these vehicles. This will also apply to category C1 vehicles. Similar requirements apply to holders of short term licences.

Land Rover Station Wagons

These vehicles if fitted with 9 or 11 passenger seats, in addition to the driver’s seat fall legally into category D1 and, therefore, all the restrictions to age, time licence is held and trailer towing apply. **Young people and holders of category B licences since 1-1-1997 can easily fall foul of the law.**

The main categories of LGV licences

Category C1: Rigid goods vehicles over 3,500kg but NOT over 7,500kg. Vehicles drawing trailers not over 750kg maximum authorised mass are included in this category

Category C1 + E: Combinations of vehicles in Category C1 plus trailers over 750kg maximum authorised mass, but with an overall maximum authorised mass (gross train weight) not over 12,000kg

Category C: Rigid goods vehicles over 3,500kg maximum authorised mass (MAM – this expression has the same meaning as permitted maximum weight –PMW). Entitlement holders may also draw trailers not over 750kg MAM.



Category C + E: Articulated vehicles and drawbar combinations whose semi-trailers and trailers have a MAM greater than those stipulated in Category C

NB: The 'E' relates to trailers and semi-trailers over 750kg maximum authorised mass.

These categories are for drivers who previously held old style ("ordinary") licences (in either Group A or Group B) issued before 1 June 1990 allowing them to retain their previous entitlement under the old style ordinary licences.

Drivers in these two categories are also permitted to drive PCV's provided they do not:

- Carry more than 8 passengers
- Use the vehicle for 'hire and reward' work
-

Qualifying requirements

To qualify for an LGV licence (of either category) a person must be:

- In possession of either:
 - A full 'ordinary' driving licence
 - A category B licence
- At least 21 years of age, except drivers:
 - Of medium-sized goods vehicles, i.e. Over 3,500kg but not over 7,500kg maximum authorised mass. For these the minimum age is 18
- A fit and proper person. Although LGV licences are issued by the Secretary of State for Transport, the Traffic Commissioners (Licensing Authorities) in the nine traffic areas are empowered to determine whether an applicant's conduct/convictions justify the granting or refusal of a licence. Similarly, an existing licence holder can be disqualified as the result of a traffic commissioner's recommendation.
- Physically fit. A medical certificate (dtp 20003) is required:
 - Before the first licence (provisional or full) is issued
 - With each renewal after the age of 45
 - When required by the Secretary of State for Transport

Although the medical examination is concerned with every aspect of the applicant's physical fitness, some conditions normally preclude the granting of an LGV entitlement, e.g.

Epilepsy – since the age of five. However, a person who has been subject to epileptic attacks may apply for a licence provided:

- (a) No attacks have taken place in the 10 years prior to the date from which the licence is to run
- (b) No treatment for epilepsy has been received during this period
- (c) A DVLA nominated consultant has investigated the applicant's medical history and, as a result, is satisfied that there is no likelihood of further attacks.



14. Glossary of terms used in this booklet

Unladen Weight (UW):	The weight of the trailer (or towing vehicle) less removable optional equipment and load
Gross Weight:	The total weight of the trailer (or towing vehicle) and load
Gross Vehicle Weight (GVW) or Gross Weight Mass (GWM)	The total weight of the towing vehicle and its load
Maximum Gross Weight (MGW):	The maximum figure set by the manufacturer for the gross weight. This will normally be the technically permissible maximum based on the carrying capacity of the tyres, axles, coupling, suspension and chassis but may have been adjusted downwards for commercial reasons
Technically Permissible Maximum Weight:	The technically permissible maximum based on the capacity of the tyres, axles, coupling, suspension and chassis
Maximum Authorised Mass (MAM)	As maximum gross weight above. The latest EC term as used in the Driver Licensing Regulations
Gross Train Weight/ GTW:	The maximum allowable combined weight (combined MAM) of the towing vehicle and trailer as set by the towing vehicle manufacturer
Payload:	The difference between the gross weight of the trailer and its unladen weight, i.e. The load carrying capacity
Kerb Weight/ Kerbside Weight	The weight of the towing vehicle (without payload), including all fluids required for operation (95/48/EEC: Vehicle, 90% full tank, 68kg driver and 7kg luggage.)
Vertical Static Load/ Nose Load	The weight imposed on the towball or eye by the trailer coupling
Over-run Braking System:	A trailer braking system operated by the action of the trailer bearing on the towing vehicle under deceleration
Power Operated Braking System:	A trailer braking system which is operated directly by the Action of the foot brake on the towing vehicle
Wheel Track:	Horizontal distance between the centre lines of the wheels across the width of the vehicle or trailer
Wheel Base:	Horizontal distance between the centre lines of the wheels of multi-axle vehicles or trailers along the length of the vehicle or trailer



Acknowledgements

Thanks are due to all those who contributed and proof-read:

- Brian Bate
- Jim Bedford
- Philip Holman
- John Jacobs
- Tony Jones
- Nigel Lea
- Chris Lloyd
- Tony Maris
- Pam Pellymounter
- Peter Turner
- Phillip Miles

Editor: David Ryder

Disclaimer

The information in this booklet is intended as a guide. It is as accurate at the time of publication as the editor is able to make it. Neither the Editor nor the NTTA nor any other person or company associated with the production of this booklet accepts any responsibility for any inaccuracies which may be in the text.

It is the responsibility of any person wishing to depend on the facts contained in this booklet to check for themselves with original documentation or any updating regulations, instruments or changes in the law.

Published by Education and Training Solutions Ltd., M25 0EF England. January 2000



