Safety Guideline and Warranty Manual

Replacement
Passenger, van and 4x4 tyres

Contents

1 Kontrol Technology
2 Tyre Labelling
3 Tyre Guide
   Functions of Tyres
   Sidewall Information
   Radial Tyre Construction
4 Care Guide
   Tyre Pressure
   Maintenance
   Rotation
   Replacement
   Storage
   Repair
5 Safety and Driving Tips
   Eco-Driving
   Wet Driving
   Winter Driving
6 Competition Tyres
7 Runflat Tyres (HRS)
8 Limited Warranty
9 Hankook Europe Network
1. Kontrol Technology

To achieve the highest level of satisfaction in performance, riding comfort, safety and eco-friendly driving, our goal is to continually advance our technological capabilities to produce tyres that perform optimally under all conditions.

**Kontrol Technology**

The philosophy most fundamental to Hankook Tyre is Kontrol Technology. This is applied across the entire research and development process for all of Hankook Tyre's products.

The ‘K’ of Kontrol stands for ‘Kinetic’ or, in other words, ‘Movement’. Kontrol is based on the concept of being able to fully command the interaction between the car, the driver and the road.

All Hankook Tyre products are based on the concept of Kontrol Technology and this aims to provide consumers with the joy of driving.

2. Tyre Labelling

Hankook Tyre has established a tyre labelling system to provide valuable information to customers, including important data on performance, energy and eco-friendliness.

**What is the EU tyre labelling regulation?**

The tyre labelling regulation introduces:

- Fuel efficiency
- Wet grip
- External rolling noise of tyres

Its aim is:

- To improve safety
- To improve environmental and economic efficiency of road transport by promoting fuel efficient and safe tyres
- Lower noise levels

**When did these labelling rules apply?**

- Rules applied from 1st November, 2012.

**Tyres under the scope of the regulation:**

- Apply to passenger cars, light truck and heavy duty vehicle tyres.
- The categories that are excluded from the scope; retreaded tyres, professional off-road tyres, racing tyres, studded tyres (only with studs), temporary use spare tyres, tyres designed to be fitted on vehicles registered for the first time before 1st October 1990, tyres with a speed rating of less than 80 km/h and tyres with the nominal rim diameter of under 10 inches or over 25 inches.
2. Tyre Labelling

Who should provide this information?

Tyre suppliers (manufacturers or importers into the EU):
• For all tyres within the scope, the information must be available in technical promotional literature and on the manufacturer’s website.
• For passenger and light truck tyres, the suppliers have a choice of placing a sticker on the tyre tread or a label accompanying each delivery of tyres to the dealer and end user.

Tyre retailer:
• Must ensure tyres which are visible to consumers at the point of sale carry a sticker or have a label in their close proximity, which is shown to the end user before the sale.
• Must provide the information that is not visible to the end user, during the purchasing process when the tyres are offered for sale.
• Must give the information on or with the bill.

Car manufacturers:
• Must declare the wet grip, fuel efficiency class and external rolling noise value of each tyre type that is offered as an option, when different from those fitted normally on the basic vehicle.
• As soon as the customer is given a choice either in the size/type of tyres fitted on the basic rim or a choice of rim and tyre size, the labelling information must be provided before sale.
• There might be no obligation to provide information, only in those cases where there is a choice of rim with tyre types and sizes that are identical to those which are sold automatically with the new vehicle.

Actual fuel saving and road safety depend on the behaviour of drivers, and in particular the following:
• Eco-driving can reduce fuel consumption
•Tyre pressure should be regularly checked to optimise wet grip and fuel efficient performance
• Stopping distances should always be strictly respected.

Tyre labelling Information

Fuel efficiency - rolling resistance (R.R)
Tyres account for 20% to 30% of the fuel consumption of vehicles. A reduction of the rolling resistance of tyres may therefore contribute significantly to the energy efficiency of road transport and thus to the reduction of emissions.

Wet grip - braking performance
Wet grip indicates the braking performance of tyres on wet road surfaces and is related to the safety performance of vehicles.

Noise level - exterior noise
The exterior noise levels are measured in decibels (dB) and indicated in three categories. The more black bars shown, the more road noise is created from the tyres.
The primary functions of a tyre are to support the weight of the vehicle and transmit traction and braking force to the road surface, absorb shocks and maintain the direction of travel.

**Main Tyre Functions**

- **Support vehicle load.**
- **Transmit traction and breaking forces to the road surface.**
- **Absorb road shocks.**
- **Change and maintain the direction of travel.**

To fulfill these four basic functions, tyres are made of resilient rubber and filled with compressed air. The inner liner in a tyre is used for the retention of air pressure, but it alone cannot support vehicle load, nor is it durable enough to withstand damage or shocks.

The carcass protects the inner liner when inflated with air pressure to assist in supporting the vehicle load. Tyre tread patterns are chosen according to car performance and stability needs.

A robust structure is necessary to ensure that the tyres main functions are met. With the exacting demands of high performance vehicles, a variety of tyres with more complex functions and performance have been developed to meet the highest standards in all aspects of safety, comfort and performance for the vehicle manufacturers and the consumers.
3. Tyre Guide

3.2 Sidewall Information

Load index
The load index shows in a codified form the maximum weight that can be supported by one tyre while driving. For example, if the load index is 97 it means that a tyre can support a maximum of 730kg.

<table>
<thead>
<tr>
<th>Load index</th>
<th>Max load per tyre (kg)</th>
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Speed symbol
This indicates the maximum speed at which the weight (with the exception of weight when speed is equal to or exceeds 210 km/h) designated by the manufacturing company can be supported by the tyre.

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Speed symbol

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<td>over 168</td>
</tr>
<tr>
<td>Y</td>
<td>300</td>
<td>186</td>
</tr>
<tr>
<td>(Y)</td>
<td>over 300</td>
<td>over 186</td>
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※ Note
Speeds in excess of 210 km/h (the maximum load per tyre), should not exceed the percentages of the load capacity quoted in the displayed chart. This can be dependent on the type of tyre and the speed capability of the vehicle.
3. Tyre Guide

3.2 Sidewall Information

DOT (Department of Transportation)

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<tr>
<td>H</td>
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</tr>
<tr>
<td>2614</td>
<td>Week and year of manufacture. (Eg. 26th week of 2014)</td>
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M+S

Tyres marked "M+S" have tread and material designed in a way that driving performance on mud and in snow are better than standard tyres.

November 2012 UNECE Regulation 117 states that snow tyres require a minimum level of performance threshold on snow (braking and traction.) If the tyre meets the criteria, it can be marked with the three peak mountain and snow flake symbol.

This indicates important information related to tyre use.

Serious injury may result from:

- Tyre failure due to under inflation/overloading.
- Failure to follow the vehicle manual or tyre data plate in the vehicle.
- Explosion of tyre/rim assembly due to improper mounting.
- Not mounting only on to an approved rim.
- Exceeding 40 psi (275 kPa) to seat the tyre beads.
- Only specially trained persons should mount tyres.

Tyres designed for loads and inflation pressure higher than standard tyres.

This new marking has the same meaning as reinforced.
3. Tyre Guide

3.3 Radial Tyre Construction

The components of the tyre tread, shoulder, sidewall, bead, carcass, belt and inner liner are structurally connected to complete the scientific formation of a tyre.

1. **Inner liner**
The inner liner substitutes the need for an inner tube, the tyre's interior has a built-in rubber layer with superior airtight qualities. The main function of the inner liner is to maintain the air inside the tyre.

2. **Bead** (the part that is in contact with rim)
The bead wraps around the end of the main body cord and anchors the tyre to the rim. In the case of a sudden reduction of air pressure while driving the tyre will not become unfastened from the rim.

3. **Carcass** (the framework of the tyre)
The carcass is the structure of the tyre, the most important part. It helps to absorb shocks, support the tyre's weight and protect the inner liner.

4. **Belt** (the layer in between the tread and carcass)
The belt is a strong reinforcement layer mainly consisting of steel or nylon materials, that is positioned to completely cover the whole circumference of the carcass structure between the tread and carcass. The belt's main functions are to protect the carcass and give reinforcement to the tread.

5. **Tread** (directly makes contact with the road surface)
The tread consists of a thick layer of rubber which comes into direct contact with the road surface. It is highly resistant to fracture and shock in order to protect the carcass and belt located in the tyre's interior.

6. **Shoulder** (the shoulder of the tyre)
Located between the tread and both of the sidewalls. The shoulder area has the thickest rubber layer, it is designed to disperse the heat that accumulates inside the tyre while driving.

7. **Sidewall** (the side/lateral part of the tyre)
Located between the tyre's shoulders and bead, the sidewall protects the carcass and assists in ride comfort. Moulded into the rubber sidewall is certain tyre information relevant to the tyre's size: load, speed rating, structure, pattern and brand name.
4. Care Guide

For your safety and protection against serious injury or death, the following safety precautions and maintenance instructions must be observed at all times.

**Important safety check list**

- Check tyre air pressure monthly.
- Inspect tyre(s) for uneven tread wear, cracks, bulges or any sign of foreign material or trauma.
- Remember to check your tyre load carrying capacity and speed ratings.
- Check the lifespan of your tyre. Tyres must be replaced when the tread is worn down to 1.6mm.
- Never overload your vehicle, check tyre load carrying capacity against the vehicle manual or data plate for the maximum recommended load and tyre pressures.

**Avoid damage**

Inspect your tyres frequently for uneven wear, scrapes, bulges, separations, cuts, snags and any other damage from road hazards. Damage from impact can occur to the inner part of your tyre without being visible to the outside. If you are in any doubt whether your tyre has been damaged, it must be removed from the wheel and inspected for damage by a qualified person. Uneven wear can lead to internal damage or separation.

**Tyre load**

The load carrying capacity of the replacement tyre should always be equal to or exceed the load carrying capacity of the original equipment tyre. Tyres that are loaded in excess of the allowable maximum can build up heat which can cause sudden air loss.

**Speed**

When replacing tyres, consult the vehicle manual for correct size and speed rating. The speed rating of the replacement tyres must be equal to or greater than the speed rating of the tyre fitted as original equipment, to maintain the performance capability of the vehicle. Speed ratings do not imply that the vehicle can be safely driven at the maximum speeds for which the tyre is rated. Serious injury or death may result if you drive your vehicle in an unsafe or unlawful manner. Hankook’s speed symbol designations are verified and comply with regulatory indoor testing in accordance with ECE-R30, 54* test.

**Never purchase a tyre which has no qualified mark or a used tyre with an unknown origin**

There is potential risk concerning the purchase of used or non-qualified tyres, especially those of an uncertain or unknown history. Used tyres may have been exposed to improper service, maintenance or storage conditions and may have damage that could eventually lead to tyre disablement. If you are within the EU, do not buy tyres which do not have an “E-Mark” ** on the tyre sidewall. The tyres which have no “E-mark” are not permitted to be used in the EU by law.

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* ECE : Economic council for Europe
* Regulation 30, 54 : Procedure load/speed performance tyre test
** Each EU member state has its own E-Mark Certificate:
4. Care Guide
4.1 Tyre Pressure

The tyre inflation pressure is directly related to safety. Therefore tyre pressure must be checked monthly and proper maintenance can prolong the lifespan of the tyres.

The importance of tyre pressure

Tyre pressure plays an important role in the service life and safety performance of your tyres. Follow the vehicle manual for the recommended air pressure applicable to your vehicle.

Optimum air pressure should be maintained to ensure safety, driving performance, tyre life and fuel efficiency.

Incorrect tyre pressure reduces the tyre's performance to grip the road properly and can cause excessive or uneven tread wear. Incorrect tyre pressure may also compromise the stability and handling of the vehicle with dangerous consequences.

Tyre air pressure should be checked at least monthly, as tyres may naturally lose air over time.

To get an accurate reading, you should measure tyre pressure when the tyres are cold or the car has been stationary for more than 3 hours.

Tyres have been known to lose up to one pound per square inch (psi) every month. Therefore, it is important to check all tyres, even the spare, at least once a month or before a long trip.

Recommended Interval

Using a tyre pressure gauge, tyre pressure should be inspected monthly. Vehicles fitted with a Tyre Pressure Monitoring System should not substitute this for manually checking the tyre pressure.

Tyre inflation pressure

Correct inflation pressure
- Ensures good grip levels, best traction and braking performances.
- Tyre life is extended through even wear.

Over inflation
- The tyre is more likely to be damaged from road hazards.
- Speeds up tyre wear, particularly to the tread centre.

Under inflation
- Excessive heat leads to separation or cord failure.
- Easier for tyre beads to separate from wheel.
- Susceptible to standing wave deformation.
- Speeds up wear, particularly to the tyre shoulders.
- Increasing rolling resistance and lower fuel economy.
4. Care Guide
4.1 Tyre Pressure

Checking for optimum tyre pressure

The optimum air pressure for your tyre can be found on the inner side of the car door, inside the fuel cap or in the vehicle manual (the location of the sticker can vary according to country/vehicle manufacturer).

Air pressures marked on the tyre's sidewall represents maximum air pressure and should not be used, as a basis for the vehicle's tyre pressure requirements.

How to check tyre pressure

1) Purchase a certified air pressure gauge or take your vehicle to a nearby service centre (or fuel station) for a check up.
2) Tyres must be checked in a “cold” state (at least three hours after driving).
3) Insert the gauge onto the valve.
4) Compare the measured air pressure level with the level listed against the vehicle manual or data plate.
   - If the measured figure is higher, release air until the correct vehicle tyre pressures are reached.
   - If the measured figure is lower, insert more air until the correct vehicle tyre pressures are reached.

※Never bleed off or reduce air pressure when the tyres are hot from driving.

Tyre wear directly affects the driver’s safety and the performance of the vehicle. It is essential for the driver to be well informed on how to check for tyre wear on a regular basis.

Importance of checking for tyre wear

You can prevent danger of unexpected accidents by checking for tyre wear on a regular basis.

Recommended interval between check ups

Hankook Tyre recommends that you check for tyre wear and the tyre(s) condition at least once each month and before the commencement of any long distance travel.

Checking tyre life

Tyres have six built-in tread wear indicators (T.W.I) that warn you when it is time to replace your tyres. These indicators are raised ribs set at 1.6 mm height and spaced intermittently in the base of the tread grooves. When they appear even with the remainder of the tread, it is time to replace your tyres immediately. We strongly recommend that drivers change their tyres before they reach the minimum legal tread depth limit, because worn tyres increase the risk of aquaplaning and reduce the braking performance particularly in wet road conditions.
Safety tread depth of snow tyres

Although the safe tread depth of snow tyres is the same as other tyres at 1.6 mm, a separate platform marking (▲, △) shows that when the tread has decreased to that level the tyre loses its performance as a snow tyre and becomes the same as an ordinary tyre. (Flat groove = ½ of total tread depth).

Periodic rotation prevents uneven wear, prolonging the life of your tyres. Learn about the importance of tyre rotation and how to rotate them.

The importance of tyre rotation

Even wear on all tyres eliminates the need for rotation. For safe driving and saving money please refer to the rotation method below.

Benefits of tyre rotation

- Prevents irregular wear and extends tyre life.
- Easier detection of irregular wear due to misalignment.
- Enables easy repair of flat tyres.

When to rotate your tyres

In general it is best to rotate tyres every six months or between 5,000 - 10,000kms (3,000 - 6,000 miles). This advice may also be included within the vehicle manual. Each tyre is removed from your vehicle and repositioned to a different position to ensure that all tyres wear evenly and last longer.

<table>
<thead>
<tr>
<th>Non-directional patterns, same tyre sizes on axles</th>
<th>Directional patterns, same tyre sizes on axles</th>
<th>Non-directional patterns, different tyre size on axles</th>
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<tbody>
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<tr>
<td><img src="image1.png" alt="Diagram of rotation" /></td>
<td><img src="image2.png" alt="Diagram of rotation" /></td>
<td><img src="image3.png" alt="Diagram of rotation" /></td>
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</table>

Tread wear indicator (▲)
- 1.6 mm
- Minimum tread depth indicator

Platform mark (▲, △)
- ½ of total tread depth
- Snow performance indicator
4. Care Guide
4.4 Replacement

The importance of tyre replacement is essential information that every driver must know. Replace tyres at an appropriate time to ensure a safe and comfortable ride.

The importance of tyre replacement
Timely tyre replacement is critical for driver safety and the influences on vehicle handling and performance.

Tyre service life recommendation
It is difficult to predict to an accurate degree the service life of a tyre which is strongly influenced on how the tyre has been stored, the service it has been subjected to and how it has been maintained.

Hankook recommend: (including spare tyres)
• Any tyres in service for more than 10 years from the date of manufacture are to be replaced with new tyres, even if the tyres general appearance is usable and the tread depth has not reached the legal minimum wear limit depth of 1.6 mm.
• In case of new tyres, any tyres more than 6 years old from the date of manufacture should be replaced with new tyres. (Some vehicle manufacturers may specify this time limit within the vehicle’s manual)

Tips for tyre replacement
• It is best practice to replace tyres in sets of two.
• If a tyre on only one side is replaced, this may lead to a vehicle handling issue, some SUV/4x4 vehicles may require tyres to be replaced in sets of four to avoid damage to the vehicles transmission/drive system.
• It is recommended that tyres are to be of the same size, type, speed rating and manufacturer when fitted on the same axle. Never mix different size tyres on the same axle, except in the case of temporary use of a spare tyre.

How to replace a tyre
In the case of a damaged tyre and wheel, professional consultation is recommended. Tyre replacement should be done by a trained and highly experienced technician.

1. Detach the tyre and wheel from the vehicle.
2. After separating the tyre and wheel, replace with a new tyre.
3. Check tyre balance.
4. Attach the newly attached tyre and wheel to the vehicle.

Tyre mounting
Tyre mounting and inflation can be dangerous and should only be done by specially trained persons using proper tools and procedures. Serious physical injury or death may result from explosion of tyre/rim assembly due to improper mounting. A tyre bead diameter must always match the diameter of the rim on which it is being mounted. Never stand, lean or reach over the assembly while inflating tyres.
4. Care Guide

4.4 Replacement

Tyre mounting precautions
1) Ensure the rim is clean and lubricate bead area.
2) Be sure beads are centred.
3) Do not stand over tyre while inflating.
4) After the beads have been seated adjust to recommended inflation.

Do not exceed air pressure of 40 psi when mounting tyre to rim.

When the air pressure is over 30 psi and both beads are still not attached to the rim: deflate tyre, lubricate bead area and then apply pressure again.

Special precautions for steel radial tyres
Moisture trapped inside tyres can cause damage.
1) Store tyres in a dry area.
2) Dry interior before mounting.
3) Inflate with cold dry air/nitrogen.

4.5 Storage

How a tyre is stored has a huge impact on its lifespan and performance. Learn about the importance of storing tyres and how to store tyres correctly.

Necessity of tyre storage
Improper storage methods can have a negative effect on the tyre's outer appearance and performance. It is imperative to learn and practice proper storage methods.

Tyre storage methods and points to consider:
• Before removing the tyre from the car, mark where the tyre was attached.
• Wash the wheel and tyre thoroughly with water.
• Once cleaning is finished, dry them off.
• Remove any stones or debris from the tyre's tread grooves and check for signs of abrasion or damage.
• Store tyres in a cool place that avoids direct sunlight. Do not store tyres in close proximity to any fuels, oils, grease or other chemical substances.

If storing with the wheel

Suspend

Stack

Do not store upright

If storing without the wheel

Store upright and turn every four weeks

Do not stack

Do not suspend
A complete inspection and repair of your tyre in accordance with Rubber Manufacturers Association (RMA) procedures should be conducted by qualified tyre service technician within the scope of the BSAU.

**Repair procedure**

- For minor damages, repairs are limited to only the tread area.
- Puncture injury cannot be greater than 6 mm (1/4 inch) in diameter.
- Repairs must be performed by removing the tyre from the rim/wheel assembly to perform a complete inspection to assess all damage that may be present.
- Repairs cannot overlap.
- A rubber stem or plug must be applied to fill the puncture injury and a patch must be applied to seal the inner liner.

A common repair unit is a one-piece unit with a stem and patch portion. A plug by itself is an unacceptable repair.

- Minor tyre repairs are to be carried out by specially trained persons in compliance to the repair standards applicable within the EU member state where the minor repair is done.

**Additional Information**

- Tyres that carry the sidewall marking Seal Guard or Sound Absorber can be repaired as that of a standard tyre for minor repairs, but limited to a maximum diameter of 5mm. Tyres are also subject to limitations of minor repair to the standards applicable within the EU Member states or United Kingdom standard BSAU 159g and only undertaken by trained persons in tyre repair.
- Not all tyres can be repaired:
  - NEVER repair tyres with a tread puncture larger than 6 mm (1/4 inch)
  - NEVER repair tyres worn to the tread wear indicators or to 1.6 mm (2/32 inch) remaining tread depth in any area of the tread
  - NEVER repair a tyre that has an existing improper repair
  - the tyre must be scrapped.
  - Using only a plug (stem) or using only a patch to repair a puncture is not a safe or proper repair.
  - Patch the inside of the tyre and plug the hole.
  - NEVER substitute an inner tube for a proper repair or to remedy an improper repair.

**SAFETY WARNING**

- Improperly repaired tyres can fail while in service, due to tread belt separation and/or components, which may result in serious personal injury or death.
- Tyre changing can be dangerous and should be done by trained personnel using proper tools and procedures.

**SAFETY WARNING**

Permanent tyre damage due to under inflation and/or overloading cannot always be detected. Any tyre known to, or suspected to have been run at a reduced air pressure than that specified on the vehicle plate or manual, is recommended to be the correct tyre(s) operating inflation pressure and could possibly have permanent structural damage. This may result in components/materials detaching, unexpected air pressure loss and deflation of the tyre. This can result in serious injury or death.
5. Safety and Driving Tips

5.1 Eco-Driving

Using Hankook Tyre’s eco-driving methods your trip will be more efficient from start to finish.

Check the label grade

Hankook Tire uses a tyre labelling system to provide useful information for consumers who buy new tyres. See the tyre labelling information in this manual.

Keep your car as light as possible

For every 100 kg of weight in your trunk, fuel efficiency decreases up to 6% on a mid-size car. Fuel efficiency is also very sensitive to air friction. When you install a roof rack fuel may decrease by up to 20%.

Maintain recommended air pressure

If you are driving with tyres that are less than the recommended air pressure, fuel may decrease by up to 6% in the city and 4% on the highway.

Avoid abrupt acceleration/quick starts

Gradual acceleration enhances fuel efficiency. Accelerating about 20km/h through five seconds enhances fuel efficiency to approximately 11%.

Use engine brakes

Taking your feet off the acceleration to slow down will enhance your fuel efficiency by 2%.

Safety precautions

- Tyres subject to low tread depths are at a disadvantage for wet driving so be sure to check the tyre tread depth before travelling.
- Reduce driving speed to match road conditions, avoid harsh acceleration, braking and fast tight cornering.
- Keep a safe distance from the vehicle in front of you, taking into account increased braking distances to stop.

If you lose control of your vehicle while driving in wet conditions, do not suddenly press down on the brake or accelerator. Drive with both hands firmly on the steering wheel.

5.2 Wet Driving

Your tyre’s handling performance, braking power and drainage becomes more critical in the rain. Learn about the dangers of driving on wet surfaces and some of the precautions you can take to enhance safety.

Check the label grade

Hankook Tyre uses a tyre labelling system to provide useful information for consumers who buy new tyres. See the tyre labelling information in this manual.

Challenges of driving on wet surfaces

The accident rate for wet driving conditions is just as high as for driving in snow conditions, drivers must be aware of the risks posed when driving in wet or damp conditions. A variety of abnormal conditions can occur when driving on wet roads.

For example, the tyre can aquaplane on the water’s surface, causing a momentary loss of direction. Also, grip is reduced when driving on wet or damp roads so braking distances should be lengthened.

When at a stand still for longer periods of time, turn off the engine or put the gear in neutral position.
Use air conditioning sparingly.
Keep the windows closed when the car is moving.
Drive under low RPM’s (revolutions per minute).
5. Safety and Driving Tips

5.3 Winter Driving

Winter tyres are designed to exhibit excellent braking power and handling on snow or ice covered roads. Learning to use the right type of tyres and to drive properly would ensure a safer driving experience in the winter.

**Importance of winter tyres**

Winter tyres are made with a different rubber compound that has better grip in cold weather and an optimised tread width. This difference provides extra grip, preventing the car from slipping on snowy or icy roads. Even cars equipped with four-wheel drive need winter tyres. For increased safety change to winter tyres for all round fitment.

**Summer tyre**
- Ventus S1 evo³

**Winter tyre**
- Winter i*cept evo²

**Winter for a tyre**

Temperatures **below 7 Celsius**, the rubber in some summer tyres can harden and be less flexible (lose their effectiveness) which affects braking and handling performance.

**Braking distance in winter conditions**

- Up to 3x longer stopping distance

**Considering factors before driving on winter roads**

- Always drive with two hands on the steering wheel.
- Before turning a corner, make sure to slow down.
- Do not accelerate whilst turning a corner.
- In the case where you accelerate or brake abruptly you may lose control of your vehicle.
- Use the brakes carefully to prevent loss of control on straight roads.
- Driving downhill, use a lower gear and let the engine act as a brake.
- Avoid switching lanes on roads with lots of snow.
- On icy roads you need at least eight times the braking distance compared to a dry road, keep your distance from the vehicle in front of you.

**3D sipes**
- High block hardness.
- Prevention of unusual abrasion at block edge.
- Impressive sipe edge effect on the snowy road.

**Special compound**
- Optimised silica compound.
- Improving wet, snow and ice performance.
5. Safety and Driving Tips

5.3 Winter Driving

Winter regulations in Europe

- **Sweden**
  - Period: 01/12~31/03
  - Min. RSD 3.0mm

- **Slovakia**
  - Period: 15/11~15/03
  - Min. RSD 3.0mm

- **Czech**
  - Period: 01/11~31/03
  - Min. RSD 3.0mm

- **Austria**
  - Period: 01/11~30/04
  - Min. RSD 4.0mm

- **Italy (partly)**
  - Period: 15/11~15/04
  - Min. RSD 1.6mm

- **Macedonia**
  - Period: 15/11~15/03
  - Min. RSD 4.0mm

- **Serbia**
  - Period: 01/11~01/04
  - Min. RSD 4.0mm

- **Latvia**
  - Period: 01/12~01/03
  - Min. RSD 4.0mm

- **Lithuania**
  - Period: 01/11~01/04
  - Min. RSD 3.0mm

- **Slovenia**
  - Period: 15/11~15/03
  - Min. RSD 3.0mm

- **Moldavia, Montenegro**
  - Period: 15/11~15/04
  - Min. RSD 4.0mm

- **Bosnia & Herz.**
  - Period: 15/11~15/04
  - Min. RSD 4.0mm

- **Slovenia**
  - Period: 15/11~15/04
  - Min. RSD 4.0mm

- **Romania**
  - Period: 01/11~31/03
  - Min. RSD 1.6mm

- **Finland**
  - Period: 01/12~28/02
  - Min. RSD 3.0mm

- **Russia**
  - Period: 01/12~28/02
  - Min. RSD 4.0mm

- **Turkey**
  - Period: 01/12~01/04
  - Min. RSD 3.0mm

*Status October 2019*

- **Obligation in winter condition**
- **Obligation on specific traffic signs**
- **At least drive axle**

*We do not accept any liability for correctness of the given information.*

*The use of studded tyres are not permitted within the UK.*

It is recommended to check with an appropriate motoring organisation prior to travel for winter tyre regulations of the particular country you are driving in and countries you are transiting through.
6. Competition Tyres

Hankook Tyre have been using motorsport events as a meaningful opportunity to assess tyre performance, this has been an essential component for obtaining better results in motorsport races.

Safety warning

Tyre use
Hankook racing tyres are specially designed and compounded solely for the purpose of motorsport competition. The use of Hankook racing tyres on public roadways, which is expressly prohibited, may result in loss of traction, unexpected loss of vehicle control or sudden loss of tyre pressure. This may result in serious injury or death. No warranty is given on Hankook racing tyres due to the limited conditions under which they operate and Hankook shall not be liable for damage arising from their use.

Tyre care
The tyre should be stored in a controlled environment, at a cool temperature and within darkness. High temperature, direct sunlight, proximity to high voltage electric motors or welders should be avoided. The use of chemical treatments such as tyre “soaking” or tread “softener” to alter the tyre carcass or tread compound of any Hankook racing tyre, could result in premature or catastrophic tyre failure, serious injury or death.

Tyre fitting
The fitting of Hankook racing tyres should always be carried out with special care and procedures adopted to avoid damage to the bead area, which is of critical importance in tubeless tyres. The use of correctly specified and maintained fitting machines are only to be used for this purpose, to prevent damage to the tyres and wheels. Tyres should not be inflated over 40psi/2.7bar.

Hankook strongly recommends that competition tyres are only to be mounted by suitably trained persons or a certified competition tyre dealer. The use of Hankook racing tyres on wheels that do not meet industry standards can cause the tyre and the wheel assembly to fail and explode, with a force sufficient to cause serious injury or death.

Tyre pressure
The correct pressure varies according to driver, car and circuit conditions and is often a matter of personal preference. Sufficient pressure must always be used to avoid structural damage to the tyre.

**Competition tyre size marking**

<table>
<thead>
<tr>
<th>Design tread arc width B (mm)</th>
<th>300</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design overall diameter A (mm)</td>
<td>680</td>
</tr>
<tr>
<td>Radial</td>
<td>R</td>
</tr>
<tr>
<td>Rim diameter (inch)</td>
<td>18</td>
</tr>
</tbody>
</table>

| Section width C (mm) | 265 |
| Aspect ratio         | 35  |
| Radial and speed grade ≥ 240km | ZR |
| Rim diameter (inch)  | 18  |
6. Competition Tyres

**Compound information**

**Compound marking**

<table>
<thead>
<tr>
<th>Compound type</th>
<th>Version</th>
<th>Tyre category</th>
</tr>
</thead>
<tbody>
<tr>
<td>C30</td>
<td></td>
<td>C Circuit / G Gravel rally / T Tarmac rally / W Wet (or intermediate)</td>
</tr>
</tbody>
</table>

**Proper compound selection**

If the values measured are out of the indicated limits, it may be necessary to change the tyre size or compound type. For detailed information please contact Hankook Tyre’s authorised competition tyre dealer.

**Pressure**

Moisture inside of a tyre can cause excessive pressure build up and handling problems. After purchasing a new set of mounted tyres, the valve cores should be removed to purge out any moisture, and the tyre should be inflated with dry air or nitrogen. When switching from another brand of tyres to Hankook tyres, it isn’t necessary to change cold or hot inflation pressures. Start with the same settings, and then make adjustments to achieve the desired handling characteristics that the driver prefers.

An approximate hot pressure target for DOT approved R-compound road racing tyres is 40 psi. It could be a few pounds less for lighter cars, and a few pounds more for heavier cars.

FWD cars may require higher inflation pressure in the front tyres. 13” slicks for formula cars and sports racers should initially aim for 22 psi hot. Changing hot inflation pressures to alter the handling characteristics of the car is a fine tuning adjustment. Improving the overall grip level should be done by tuning spring rates, dampers, antiroll bars, ride heights and alignment settings, etc.

**Temperature**

The temperature should be within a range of 70 to 105 Celsius when measured in the pit lane. Optimum grip level is at 80 to 95 Celsius.

A probe type pyrometer is recommended for temperature measurements, and a consistent technique must be used.

Check the tyres in the same location (inside, middle, outside) and in the same order (LF, RF, RR, LR) each time the car comes to the pit lane. Depending on the width of the tyre, the inside tread temperature should be 10 to 20 Celsius hotter than the outside.

- If the inside is too hot, camber may need to be reduced.
- If the outside is too hot, camber will need to be increased, or inflation pressure will need to be increased to prevent the tyre from rolling over on the outside shoulder.

Front tyres are hotter than the rear tyres, it may show an under steer condition.

Rear tyres are hotter than the front tyres, it may show an over steer condition.

This is not the case for all types of vehicles. The front tyres on FWD cars are usually always hotter, and the rear tyres on high horsepower RWD cars may be hotter due to wheel spin. The tyres should be relatively new when using tread temperature data to interpret car set up issues.

Tyres with a worn shoulder may give a misleading temperature spread across the tyre because the thin area doesn’t hold as much heat as thicker areas.

**Tyre care information**

**Mounting**

Hankook tyres should be mounted and installed on the car according to the directional arrows on the sidewall. After one or two heat cycles, the tyres can be rotated on the car. Worn tyres can be dismounted and flipped on the wheel to extend tread life.

**Scuffing**

The longevity and consistency of the grip level can be increased by properly scuffing a new set of race tyres. It’s very important not to run hard for an entire session on new tyres. Think of it like breaking in a new engine, or bedding in new brakes. To scuff a set of tyres, start by taking one or two moderately paced laps to gradually bring the tyres up to operating temperature, and then run one hard lap followed by a cool down lap.

The ideal situation would be to stop and remove the tyres from the car, and allow them to cool down to ambient temperature before running them again. When running an entire session on a new set of tyres without stopping, one should still follow the scuffing procedure at the beginning of the session before turning laps at a fast pace. It’s also very important to run a slower lap at some point in the middle of the session to allow the tyres to cool off before running hard laps again.
6. Competition Tyres

Wear
In addition to utilising tread temperature data to evaluate how the car and tyres are performing; the inside and outside tread wear indicator pins should be measured with a depth gauge to determine if camber or pressure changes need to be made.
- If the inside of the tyre is worn more, camber may need to be reduced.
- If the outside is worn more, camber will need to be increased or inflation pressure will need to be increased to prevent the tyre from rolling over on the outside shoulder.

Storage
All Hankook's racing tyres should not be stored or operated below freezing temperatures, otherwise they will lose rubber compound flexibility and may experience cracking. These tyres should be stored and operated between 0°C and 32°C.

To minimise the chances of this happening, users are advised to follow these instructions during sub-freezing conditions:

1) Do not operate the car with these tyres, as the tyres may suddenly fail.
2) Do not throw these tyres on the ground when you move them at below 0°C (32°F).
3) Always store these tyres indoors at temperatures above 0°C (32°F).
4) Before mounting or dismounting, store these tyres for at least 24 hours in a temperature-controlled environment of 20 °C (68 °F) or warmer.
5) Remove these tyres from the vehicle and deflate to half the normal air pressure during prolonged periods of non-use or storage.
6) Do not move a car that is in storage with these tyres, as the tyres may crack.
7) If storing outdoors, please avoid direct sunlight.

SAFETY WARNING
Hankook Tyre makes no expressed or implied warranty as to the fitness or merchantability of Hankook racing tyres due to the varied and severe conditions under which they operate, and shall not be liable for any damages arising out of their use.

It is illegal and dangerous to sell and/or use race tyres on public streets that have not passed FMVSS109 or ECE36 safety standards.

Hankook DOT-approved race tyres meets the Department of Transportation performance requirements, but are not intended for highway use. DOT-labelled Hankook racing tyres are designed for racing use only.

The prohibited use of Hankook racing tyres on public roadways may result in loss of traction, unexpected loss of vehicle control, or sudden loss of tyre pressure, potentially resulting in serious injury or death.

The use of chemical treatments such as tyre “soaking” or tread “softener” to alter the tyre carcass or tread compound of any Hankook racing tyre, could result in premature or catastrophic tyre failure, serious injury or death.

The use of Hankook racing tyres on wheels that do not meet ETRTO (European Tyre & Rim Technical Organisation) standards can cause the tyre and wheel assembly to fail and explode with force sufficient to cause serious injury or death.
7. Runflat Tyres (HRS)

HRS is the acronym for Hankook Tyre Runflat System.

What are runflat tyres?
Runflat tyres are specially designed to temporarily support your vehicle in slow or sudden inflation pressure loss. You can drive limited distances (driven up to 80 km at 80 km/h) with a flat tyre.

Hankook Tyre’s superior runflat system, HRS employs SMH technology with three partitioned rubber layers that provides an extra level of safety with each layer carrying out three distinctive functions of shock absorption. The layers allow the tyre to give a degree of comfort without supportive air pressure.

When driving at zero psi, your vehicle must be equipped with Tyre Pressure Monitoring System (TPMS).

Why choose runflat tyres?

Safety
Allows drivers to maintain control of a vehicle in the event of rapid tyre air loss. Ensures vehicle mobility allowing drivers to easily maneuver out of dangerous driving situations. No need to jack-up vehicles to replace tyres in hazardous places or in bad weather situations.

Convenience
Allows continued driving to reach a place of safety for a repair or replacement facility without the need of changing punctured tyres.

Better fuel economy
Eliminates the need for a spare wheel, reducing vehicle weight. Saves fuel by 1-3% annually.
7. Runflat Tyres (HRS)

How to identify Hankook runflat tyres
Hankook runflat tyres are marked with the HRS logo on the sidewall.

Air pressure of runflat tyres
Like other tyres, Runflat tyres also should be maintained with optimum air pressure to ensure safety, driving performance, tyre life and fuel efficiency.
See the information about tyre pressure in this manual.

Rotation
Follow the vehicle manufacturer’s recommendations, rotate tyres every six months or 10,000 km. Consult with the vehicle manual, TPMS devices require resetting the tyre position to ensure the transmitter sensor can indicate the right position of your tyres on the display unit.

Replacement
Never mix runflat tyres with general tyres, except only in an emergency situation on a limited, temporary basis. The general tyre should then be replaced with a runflat tyre as soon as possible. It is not recommended to mix different runflat products.

Repair
An improper repair is unsafe and will void the limited warranty. Runflat tyres are not repairable in the following situations;
- If the tyre was operated with inflation pressure less than 15 psi (100 kPa).
- Abrasion or other damage is present on the exterior tread, sidewall or bead areas.
- Abrasion, wrinkling or separation is present on the tyre interior.
- Any condition or damage is present that disqualifies the repair of a conventional tyre.

Please see the Repair section in this manual for further information.
Hankook recommends that only persons trained in minor tyre repairs to the applicable EU standard or United Kingdom standard BSAU 159g should carry out repairs.

Tyre Pressure Monitoring System (TPMS)
Refer to your vehicle owner’s manual for more information about this system.

When TPMS alter or a warning is received
This indicates that the air pressure has dropped to a selected minimum value or lost air pressure.

Hankook recommends:
1) Reduce your speed and do not exceed 80 km/h.
2) Avoid severe handling and braking manoeuvres.
3) Avoid road hazards.
4) Minimise your traveled distance and proceed to a safe location to stop where the tyres can be checked and/or serviced.

※Runflat tyres can be driven up to 80 km at 80 km/h at low or zero air pressure condition.

Additional Information
Some vehicle manufacturers do not recommend using repaired tyres. Such recommendations apply to runflat tyres. Use of runflat tyres deemed non-reparable may result in damage to vehicle, injury or death. Consult your vehicle owner’s manual or contact the vehicle manufacturer before placing a repaired tyre on your vehicle.
8. Limited Warranty

Eligibility
This warranty standard only applies to the original purchaser of any new tyre manufactured by Hankook Tire Co Ltd. Eligible tyres shall be used on the vehicle on which they were installed according to the vehicle manufacturer’s or Hankook’s recommendation.

1 Warranty validity
This warranty is valid for any new Hankook passenger tyre and light truck tyre removed from service due to a covered warranty condition until the minimum tread depth index TWI* is reached or service period assigned by each country completed, whichever comes first.

2 Condition of claim inspection
To make a claim against a defective/unsatisfactory tyre: this is carried out in observance of the protocols of UK consumer law, following the guidelines of the UK tyre industry practices.

Warranty/complaint against the product should be made through the tyre retailer, where the tyre was originally purchased from. In the case where the tyre was of original equipment fitment to a vehicle, this must be handled by the supplying vehicle dealer.

Warranty/complaint is initiated by the completion of the official UK Tyre Industry form- Application Form For Tyre Examination. This is to be completed by both the tyre retailer and the owner/user of the tyre subject to warranty/complaint and is to be fully completed, signed, dated and submitted by the tyre retailer in conjunction with the tyre for examination purposes.

The manufacturer has the right to decline the warranty/complaint, if the tyres are not compliant to documentation completion.

Compensation follows the chain of supply/return of the product, with final settlement completed between the retailer/vehicle dealer and the consumer, this is in accordance to UK consumer law protocols. Compensation made is on the understanding it is as an offer of goodwill and does not act as an admission of liability or product fault.

- Remaining value based on original tread depth.

Remaining groove depth - TWI
Original groove depth - TWI

Hankook will give compensation on the following conditions:
- The amount of credit will be determined by multiplying the actual dealer selling price for the tyre (excluding taxes) by the percentage of original tread depth remaining on the tyre.
- Applicable taxes on the tyre and cost of mounting, balancing and any other charges in connection with the replacement of the tyre are required to be paid by the owner.
- Compensation values are based on Hankook product prices and not against other tyre brand manufacturer’s replacement prices.
- The product, of which the claim was accepted and/or claim settlement was made by the granting of an allowance for compensation, means the tyre becomes the property of Hankook. This is also stated in the Application Form For Tyre Examination, the documentation that is submitted in conjunction with the tyre.

What does the warranty not cover?
The warranty does not cover compensation for:
- Time delays, temporary vehicle stoppage, discomfort or inconvenience related to claim submission, calling technical service, extra travel time, loss of earnings, vehicle downloading, hiring a substitute vehicle or vehicle reloading.
8. Limited Warranty

• Any financial losses: profit, income, expected savings, company value losses etc.

• Any other damages, losses and injuries caused directly or indirectly by product fault, assembly, mistakes, carelessness or any mistake in providing tyre services.

The warranty does not cover the following:
• Any products that were repaired regardless of method, scope of repair and person who made a repair.

Irregular wear or tyre damage due to:
Road hazards such as punctures, cuts, snags, scuffs, bulges, carcass, bruising or impact breaks.
Fire, wreckage, collision, contamination by chemicals, water or material trapped inside the tyre during mounting or inflation.
Improper inflation, overloading, misuse, high speed spinning, improper mounting or demounting, running flat, off-road use, racing, tyre chain damage, vandalism, accident, willful damage or abuse.
Misalignment, wheel imbalance, failure to rotate tyres as recommended in this manual or use of defective brakes, suspension components or other mechanical irregularities.
Tyre failure as a result of adding material.
(e.g. tyre fillers, sealant, or balancing substances)
Continued use while flat or service in under inflation, over inflation or over load.
Runflat tyres only:
Improper run flat or low pressure operation without limitation.
(e.g. exceeding speed, distance or other operation limitations)

• Ozone or weather cracks on tyres over four years from the date of manufacture and stock which is not stored in a correct manner.

• Tyres with less than the minimum tread wear of 1.6 mm.

• Ride disturbance or vibration:
Due to damaged wheels or after the first 0.8 mm of tread wear.

• Any tyre that has been intentionally altered to change its appearance.
(e.g. white inlay on a black tyre, regrooved or retreaded, cosmetic dressings).

• Tyres purchased as used or part worn.

• Tyres without serial or DOT numbers that have been removed or buffed off.

• Tyres inflated with anything besides air or nitrogen.

• Tyres without E markings on the sidewall which is an obligatory requirement for the UK and EU countries.

• Failure to follow any of the safety and care recommendations or warnings contained in this manual.

Owner’s general obligation
• To return product under warranty/complaint back to Hankook via the retailer who originally supplied the product or the vehicle dealer in case of original equipment fitment.

• No claim will be considered unless it is submitted on a recognised UK Tyre Industry Form (BTMA 05/08) Application Form For Tyre Examination which has been fully completed and signed by the tyre retailer/vehicle dealer/owner/user of the product.

SAFETY WARNING
All tyres must be routinely inspected for damage or abnormality and removed from service or repaired as needed. All inflation pressures must be checked with a gauge and maintained at recommended levels.
Failure to do the aforementioned or to abuse or otherwise improperly maintain tyres may result in premature deterioration, tyre failure, accident and injury or death.
9. Hankook Europe Network