

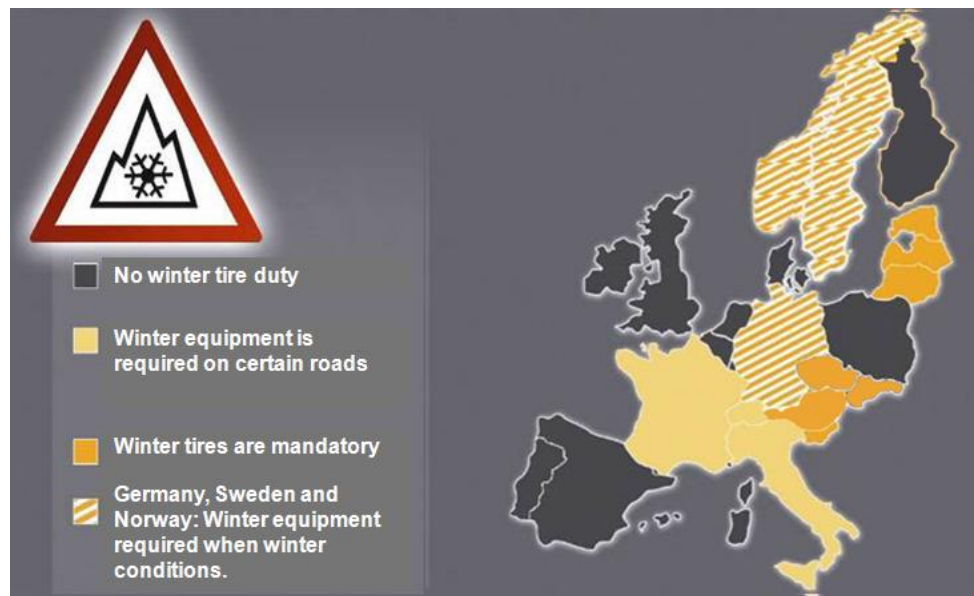
Suitability of Winter Tyres on Trucks and Coaches



1. Legal Situation

European markets have their own legislation regarding winter tyre fitments that are specific to the respective local country. Truck or coach operators who travel to Europe throughout the winter season therefore need to ensure that their tyres and vehicles comply with the respective local legislation. The driver(s) may suffer financial penalties and may even be prevented from entering or travelling through that country, if they don't adhere to the regulations.

The following quickly shows which European countries have winter tyre legislation:



The current laws for countries in snow covered areas of mainland Europe are as follows:

Austria

- a) Tyre regulations:
- Compulsory from 1 November to 15 April (for trucks/coaches) and from 1 November to 15 March for buses)

- Winter tyres (with M+S marking) are mandatory during the above timescale on at least one drive axle
 - Winter tyres are compulsory on roads signposted 'Winterausruistung erforderlich'
 - Minimum tread depth (for commercial vehicles over 3.5t) is 6mm for cross-ply tyres and 5mm for radial tyres
- b) Snow chain regulations:
- Snow chains should be fitted to at least two drive tyres
 - There are exceptions for buses. Use on roads covered with snow and ice
 - Snow chains are required on roads where signs say 'Schneeketten vorgeschrieben'
- c) General
- Studded tyres are not permitted for vehicles above 3.5t
 - Commercial vehicles over 3.5t must have the same type of tyre on each axle
 - Risk of a driving ban and heavy penalties if vehicle not compliant ie anything between 35€ up to 5,000€

Germany

- a) Tyre regulations:
- Vehicle must comply with weather conditions
 - Winter tyres (with M+S marking) are compulsory in winter conditions
 - Minimum tread depth for winter tyres is 4mm
- b) Snow chain regulations:
- Snow chains are required on snow-covered roads to meet with the relevant road signs
 - Chains should be fitted to drive axles
 - Studded tyres are prohibited
 - Please note: the route via Kleine deutsche Eck. Bad Reichenhall – Lofer and the neighbouring area are under customers surveillance
- c) General:
- There is a 20€ penalty if tyres don't comply with the weather conditions; and there is a 40€ penalty plus 1 point if a traffic obstruction is caused by inadequate tyre fitment

Italy

- a) Tyre regulations:
- In general, there are no winter tyre rules; any exceptions are indicated by road signs
 - M+S tyres are compulsory in the Aosta Valley from 15 October until 15 April
 - Minimum tread depth is 1.6mm but Continental recommends 4mm
- b) Snow chain regulations:
- Snow chains must be carried in the vehicle and used in accordance with relevant road signs
 - Studded tyres are permitted up to 3.5t vehicles from 15 November until 15 March

- c) General:
 - Headlights are compulsory in daylight

France

- a) Tyre regulations:
 - In general, there are no winter tyre rules; any exceptions are indicated by road signs
- b) Snow chain regulations:
 - Snow chains must be carried in the vehicle and used in accordance with relevant road signs
 - Studded tyres are permitted up to 3.5t vehicles from the beginning of November up until the end of March if a sign is fitted on the vehicle
- c) General:
 - The minimum tread depth is 1mm but Continental recommends 4mm

Switzerland

- a) Tyre regulations:
 - In general, there are no winter tyre rules; however, there are liability issues if you run the vehicle on 'summer tyres'
- b) Snow chain regulations:
 - Snow chains are required on roads where signs say 'Chaines à neige obligatoires'
 - Studded tyres are not permitted on most motorways in Switzerland
 - When studded tyres are used, the speed limits of 80 or 50 km/h apply
- c) General:
 - The minimum tread depth is 1mm but Continental recommends 4mm

Norway

- a) Tyre regulations:
 - Tyres/wheels have to offer sufficient grip between 1 November and the first Monday after Easter (Southern Norway) and then between 1 October and 1 May (Northern Norway)
- b) Snow chain regulations:
 - In non-wintery conditions you are required to carry snow chains on board (7 for 5 axles)
 - In wintry conditions you are required to carry snow chains on board for all axle positions except for when the total vehicle has been equipped with M+S tyres (which have been designed for winter applications)
 - Studded tyres are permitted from 1 November until the first Sunday after Easter (and in Nordland, Troms and Finnmark from 15 October until 1 April)
- c) General:
 - The minimum tread depth for 'summer tyres' is 3mm

Finland

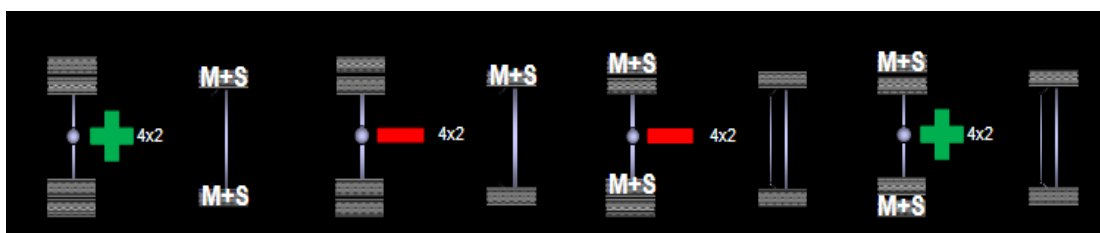
- a) Tyre regulations:
 - Winter tyres are not compulsory for commercial vehicles over 3.5t
- b) Snow chain regulations:
 - Snow chains must be carried in the vehicle, but are only allowed to be used when snow and ice are present on roads
 - Studded tyres are permitted from 1 November until the first Monday after Easter if fitted on all wheels
- c) General:
 - The minimum tread depth for vehicles over 3.5t is 1.6mm but Continental recommends 4mm

Sweden

- a) Tyre regulations:
 - Laws covering the use of winter tyres on commercial vehicles have been tightened, whereby Swedish and foreign vehicles must comply with the winter tyre laws when entering and leaving Sweden
 - Winter tyres are not compulsory, but the transport authority has now set a minimum tread depth of 5mm for vehicles weighing over 3,500 kgs. The regulation is valid from 1 December to 31 March and for trucks, coaches and buses, but not trailers
- b) Snow chains:
 - Snow chains are recommended
- c) General:
 - Local authorities will now forbid vehicles, with spiked tyres, from driving on certain roads and/or sections of roads
 - The number of spikes permitted on tyres has also been limited. The new regulation states that no more than 50 spikes may be fitted per metre of tyre rolling circumference. So for example, for a 385/65R22.5 tyre that has a rolling circumference of (+/- 2%) 3,250mm, the tyre will have a maximum of 162 spikes.
 - In addition, the period during which 'tyres with spikes' can be used, has been reduced by 2 weeks and are now strictly forbidden between 16 April and 30 September every year.

Belgium

- a) Tyre regulations:
 - Winter tyres are not compulsory. However, if winter tyres are fitted, then symmetry is compulsory ie



- b) Snow chain regulations:
 - Snow chains are only allowed when roads are covered with snow and ice
- c) General:
 - Studded tyres are allowed for vehicles up to 3.5t from 1 November to 31 March, with a speed limit of 60 or 90 km/h

Spain / Portugal / Denmark / United Kingdom / Ireland / The Netherlands

- a) Tyre regulations:
 - There are no winter tyre regulations
- b) Snow chain regulations:
 - There is no general rule on snow chains

Details for of legislation in Bosnia, Poland, Estonia, Bulgaria, Croatia, Czech Republic, Latvia, Lichtenstein, Lithuania, Luxembourg, Macedonia, Slovenia, Slovakia, and Serbia is available on request.

What does this mean?

Truck or coach operators who are therefore planning to travel to snow covered areas of Europe during the winter season need to ensure that their tyres and vehicles comply with the respective local legislation. If not the driver may suffer financial penalties and may even be prevented from entering or travelling through that country.

Austria has the strictest legislation, so although the laws differ from country to country operators can rest assured in the knowledge that if they meet the requirements in Austria they will be covered for most other countries of mainland Europe.

2. Continental's Recommendations

In light of the increased legislation Continental recommends that commercial vehicle operators prepare well in advance for the winter season by ensuring that their vehicles are equipped with the correct tyres before leaving British and Irish shores. Recommendations depend on the operation.

Truck Operators



Continental recommends that:

- ▶ In winter all truck tyres should have a minimum remaining tread depth of at least 4mm
- ▶ This applies to all axle positions on a tractor unit

In typical winter conditions winter tyres can provide up to 20% more traction compared to standard tyres. And thanks to optimised loading, the traction of vehicles can be improved significantly.

So if travelling under the following severe road and weather conditions trucks should be fitted with specially developed winter tyres:

- ▶ Extreme winter conditions in hilly regions of middle Europe that are snow covered and have uncleared roads
- ▶ On roads covered with significant amounts of ice or snow
- ▶ On winding and sloping roads that are cold and wet.

To ensure maximum safety and vehicle performance winter tyres should be fitted in order of priority on trucks as follows:

1. To the drive axle
2. To the steer axle
3. To the remaining axles such as lift or trailer axles.

Continental has just introduced a brand new range of winter tyres, covering all axle positions, and clearly defines its tyres by marking the sidewalls with a snowflake symbol and the word Winter.

Continental can also now offer a dedicated coach tyre, the HSW Coach, which is suitable for use all year round.

Continental's tyres can be used with snow chains. However, the operator needs to ensure that the correct size of chains is used, the chains are fitted correctly (in accordance with the manufacturer's fitting instructions) and that the chains are used in the correct conditions (ie snow).

Use of snow chains in the wrong conditions may damage both the tyre and/or the road surface.

Importance of Load Distribution on Trucks under Winter Conditions

- ▶ When driving on ice or snow the position of the centre of gravity of a partly loaded truck significantly influences the safety and driving characteristics of the vehicle, as does the type of tyres fitted
- ▶ The load arrangement determines the amount of drive power required
- ▶ Arranging the load above the drive axle increases weight on this axle, which results in better traction and improved braking
- ▶ If the load is over the trailer axle there is an increased drag effect and less traction through the drive axle

- ▶ The drive axle must therefore be loaded with the maximum weight in snow and ice
- ▶ Test show that when the drive axle is fully loaded the drive power required is four times greater than if the load is placed over the trailer axles
- ▶ Optimum load distribution will therefore significantly improve traction performance on snow and ice-covered roads.

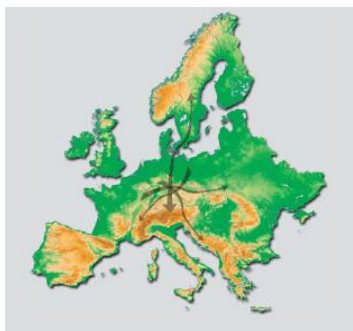


The Practicalities for Truck Operators

The impact of load distribution and drive axle tyre fitments means it is important to set a route plan before crossing the borders of countries with extreme winter conditions. The higher the terrain, the lower the average annual temperature is likely to be.

It is therefore likely there will be a high chance of snowfall in the Alps and hilly regions of Europe during winter months.

The nature of the roads (rising or falling) and the size of the roads (motorways, dual carriageways, single track etc) should also be taken into consideration when planning the journey. In addition, it is also advisable to consider carrying snow chains or shovels for emergency situations.



Mountainous regions highlighted in brown

Coach Operators



Continental recommends that due to the increased safety requirements on coaches travelling to the Alps, or to Scandinavian and Baltic regions all axles should be equipped with specially developed winter tyres such as its HSW Scandinavia / HSW Coach or HDW Scandinavia tyres.

This is particularly important on coaches because coach operators often fit steer tyres to all axles so either a specialist winter steer tyre such as the HSW Scandinavia tyre or the brand new dedicated coach tyre HSW Coach should be fitted all round or preferably the HSW Scandinavia / HSW Coach should be fitted on the steer axle and a specialist winter drive tyre such as the HDW Scandinavia tyre on the drive axle.

In addition Continental recommends using snow chains on at least one drive axle.

Importance of Winter Tyres and Axle position on Coaches

An independent test carried out by a leading coach manufacturer highlighted the importance of the right winter tyre fitment on a coach.

In the test 2 identical coaches were equipped with the following Continental tyres:

Coach 1

Steer Axle HSR regional tyre
Drive Axle HDW winter tyre

Coach 2

Steer Axle HSW winter tyre
Drive Axle HDW winter tyre

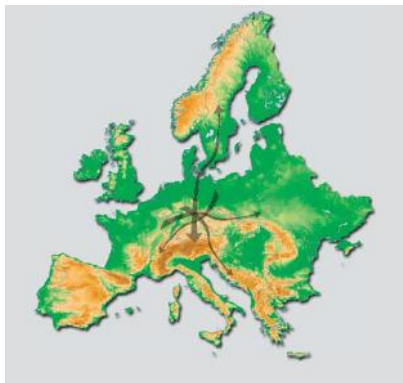
During the course of the test the two coaches followed each other over the same stretch of road that was covered with simulated snow with the result that coach 1 with mixed tyres was only able to reach a speed of 20km / h while coach 2 which was completely equipped with winter tyres covered the same stretch of road at almost double the speed and control due to the extra grip and performance of the specialist winter tyres.

The Practicalities for Coach Operators

It is important for coaches on winter ski or school trips for example to set a route plan before crossing borders of countries with extreme winter conditions. The higher the terrain the lower the average annual temperature is likely to be.

There is therefore likely to be a high chance of snowfall in the Alps and hilly regions of Europe during the winter months.

The nature of the roads (rising or falling) and the size of roads (motorways, dual carriageways, single track etc) should also be taken into consideration when planning the journey.



Mountainous regions highlighted in brown

3. Technology behind Winter Tyres

The best winter tyres should provide control in snow, ice and on cold wet roads. Operators expect good grip, precise steering response and reliable acceleration and braking. They also want low noise and reduced tread wear on roads free of ice and snow.

Continental's winter tyres have a special tread pattern and compound for maximum grip and safety on winter roads. The HSW Scandinavia and HSW Coach steer tyres provide good grip and braking capabilities owing to a special compound and tread pattern.

The HDW Scandinavia drive tyres have been specially developed to ensure optimum performance in all winter conditions.

HSW Scandinavia

- ▶ Designed for excellent grip and mileage
- ▶ A finely-tuned rib profile with a high density of lateral grooves and sipes
- ▶ A specially-designed tread compound for optimal grip
- ▶ A two-phase tread design, which means that after the winter tread has started worn down operators still have a steer tyre suitable for non-winter conditions that still delivers good mileage and fuel efficiency

HSW Coach

- ▶ Designed for safety and comfort in wintry conditions
- ▶ High number of grooves and sipes mean excellent grip on all axles
- ▶ Excellent grip due to optimised tread compound
- ▶ High comfort due to circumferential rib design
- ▶ High mileage thanks to innovative tread pattern (high tread volume / narrow grooves / wide shoulder ribs for even wear)

HDW Scandinavia

- ▶ For best traction and a long life
- ▶ Large number of grip edge through serrated sipes
- ▶ Use of 3-D technology for block support and protection from braking and acceleration forces
- ▶ Compound for optimal traction
- ▶ Directional drive pattern to withstand strong retarder forces

HTW Scandinavia

- ▶ For excellent grip and mileage
- ▶ Wide and open shoulder ribs for optimal directional stability
- ▶ Rib pattern with high number of lateral grooves and sipes
- ▶ Compound for optimal grip
- ▶ A two-phase tread design, which means that after the winter tread has started worn down operators still have a trailer tyre suitable for non-winter conditions that still delivers good mileage and fuel efficiency

Note:

- ▶ All Continental Truck and Coach tyres have basic winter properties
- ▶ All Continental Drive Tyres have M&S marking
- ▶ All Continental Winter tyres meet the most extreme winter conditions

4. The Right Tyre for the Right Winter Application

To help commercial vehicle operators determine which tyres should be fitted for their application Continental recommends using the following snow symbol measurement as a guide.

1 Snow Symbol – Average Winter Conditions

HSR, HDR, HTR

- ▶ limited snow or ice on roads
- ▶ mainly flat roads
- ▶ road likely to de-ice or snow to melt

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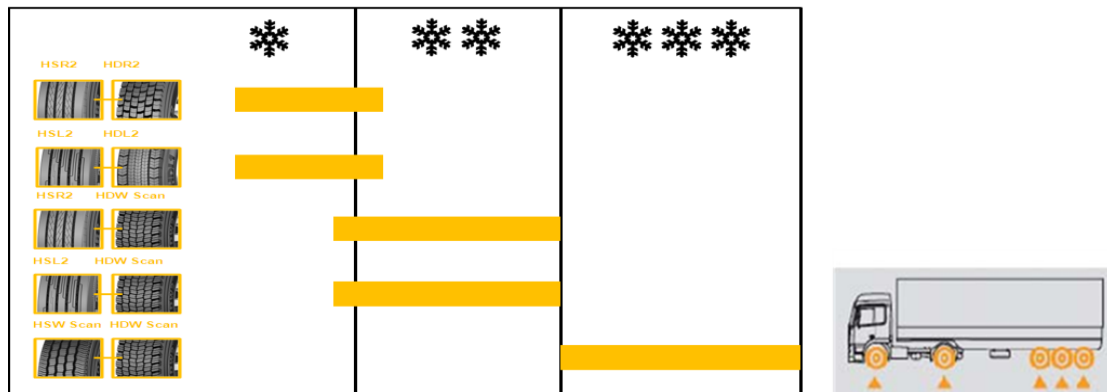
3 Snow Symbols – Harsh Winter Conditions

HSW, HDW, HTW

- ▶ plenty of snow or ice on roads
- ▶ winding and sloping roads
- ▶ ice and snow likely to remain on road

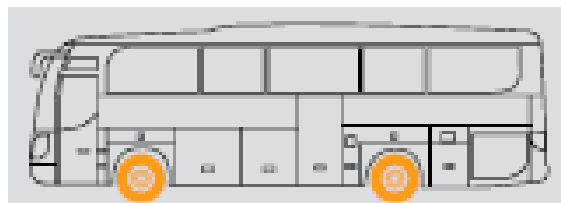
Continental Tyres for Trucks

Using the snow symbol guide Continental will select the right tyre for the application. Continental offers a range of premium truck tyre for all winter applications as follows:



Continental Tyres for Coaches

Using the snow symbol guide Continental will select the right tyre for the application. Continental offers a range of premium coach tyres for all winter applications as follows:



	HSR, HSL	HSW Coach / HSW Scandinavia
	HSW Coach / HSW Scandinavia	HSW Coach / HSW Scandinavia
	HSW Coach / HSW Scandinavia	HDW Scandinavia

5. Continental’s Regional, Long Distance and Winter Tyre Range

Continental’s range of premium regional, long distance winter tyres are proven to deliver excellent traction and performance in wintry conditions and are available in the sizes shown on the table overleaf.

Size	HSR1	HSR2	HDR	HDR2	HSL2	HDL2	HSW / HSW2 2 Scan	HSW2 Coach	HDW / HDW2 Scan	HTW / HTW2 Scan
245/70R19.5	●		●				●			
265/70R19.5	●		●				●			●
285/70R19.5	●		●				●			
305/70R19.5	●		●							
11R22.5	●		●						●	
12R22.5	●		●						●	
13R22.5	●								●	
385/55R22.5		●			●		●			●
295/60R22.5					●	●			●	
305/60R22.5					●		●			
315/60R22.5					●	●			●	
385/65R22.5		●					●			
275/70R22.5	●		●						●	
305/70R22.5	●		●							
315/70R22.5		●		●	●	●	●		●	
295/80R22.5		●		●	●	● (HDL1)	●	●	●	
315/80R22.5		●		●	●	●	●		●	

6. Overview of Tyre Patterns



HSR1



HSR2



HDR



HDR2



HSL2



HDL2



HSW



HSW2 Scan



HSW2 Coach



HDW



HDW2 Scan



HTW



HTW2 Scan